MATH

35 cumulative units in concepts and skills

Math

English

Vocabulary

Reading
Acknowledgments

Without the frank comments of my students in the Martin Luther King School in Boston, this book would not be what it is today. They gave me new insights every day, and they deserve much credit for the sequence, organization, content, and breakdown of the units in the book.

Rudd Crawford, a fellow teacher of math, is responsible for the idea of the cumulative review process, which he developed in a somewhat different form in his classroom in Brookline, Massachusetts. He is also responsible for Unit 9 on Adding and Subtracting Decimals. I am grateful to him, Mary Scott, and Ransom Lynch for their ideas, encouragement, and criticism over the years.

Jeff Rubin, an editor from Educators Publishing Service, played a major role in resequencing the units, eliminating unnecessary sections, revising the review pages, and expanding and rewriting the measurement units. His ideas have greatly improved the book.

I am grateful to these and other people for their substantive contributions, and to my wife, Rhoda Schneider, for her invaluable support over the last ten years.
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To the Student

Math is divided into Part A and Part B and includes a total of thirty-five units. This book is Part B and should be introduced after Part A. However, if you already know the material in Review Test 18 in Part A, then you can begin with this book. The two books cover basic skills, Roman numerals, measurement, graphing, fractions, and basic geometry. If you work carefully through each unit, you should become a better math student and should be more confident in your ability to use math outside of school.

Each unit introduces one new skill. The sequence within each unit progresses as follows:
- Page one and page two teach the new material.
- Page three is a review with short practice questions on all the skills learned in previous units, so you won’t forget them.
- Page four and page five provide more practice on new material.
- Page six is a test on the material learned in that unit.
- Page seven is a Review Test which has one exercise that covers each skill introduced up to that point in the book.

By the end of the book, you should know the material so well that you will be successful on the final test, and that will mean you are a better math student than most people you know.

The two-part box at the top of each page is your grade. The number already filled in is the number of questions on that page; the empty part of the box is for you or your teacher to write in the number you got right. At the back of the book is a progress chart where you can keep track of your grades on Unit Tests and on Review Tests. There is also a special bar graph on which to record your grades on these Review Tests. The top line of the bar graph indicates the level of one hundred percent correct on these Review Tests. The lower line represents an eighty percent level of achievement. You should try to keep your bar graph above the lower eighty percent line.

Good luck with these books. I hope you find them interesting and helpful.

Kim Marshall
Exponents are a short way of multiplying numbers by themselves. The little number written above the big one tells you how many times to write the big number and how many times to multiply it by itself. The little number is called the exponent.

Example:

$3^2$ means that you should write the 3 two times and multiply: $3 \times 3 = 9$.

$5^3$ means that you should write the 5 three times and multiply: $5 \times 5 \times 5 = 125$.

Different exponents are read in different ways. Examples of how to read and do exponents are given in the chart below.

Study the examples and then fill in the rest of the chart.

<table>
<thead>
<tr>
<th>Exponent</th>
<th>How you read it</th>
<th>How many times you multiply</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3^2$</td>
<td>three squared</td>
<td>$3 \times 3$</td>
<td>9</td>
</tr>
<tr>
<td>$3^3$</td>
<td>three cubed</td>
<td>$3 \times 3 \times 3$</td>
<td>27</td>
</tr>
<tr>
<td>1. $3^4$</td>
<td>three to the fourth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. $3^5$</td>
<td>three to the fifth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. $3^6$</td>
<td>three to the sixth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. $4^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. $5^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. $9^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. $10^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. $5^4$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. $8^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. $11^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. $2^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. $2^5$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. $9^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. $6^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. $2^7$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. $8^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. $2^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exponents 2

Remember:
- With a little $2$ you say *squared*.
- With a little $3$ you say *cubed*.
- With a little $4$ you say to the *fourth*.
- With a little $5$ you say to the *fifth*.

Fill in all of the chart below.

<table>
<thead>
<tr>
<th>Exponent</th>
<th>How you read it</th>
<th>How many times you multiply</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $4^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. $3^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. $2^4$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. $5^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. $6^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. $9^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. $4^5$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. $2^7$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>seven squared</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>two cubed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>three to the sixth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>twelve squared</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td>$8 \times 8$</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td></td>
<td>$9 \times 9 \times 9$</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td></td>
<td>$4 \times 4 \times 4 \times 4$</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td></td>
<td>$7 \times 7 \times 7$</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td></td>
<td>$2 \times 2 \times 2 \times 2 \times 2 \times 2$</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td>$8 \times 8 \times 8$</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td></td>
<td>$3 \times 3 \times 3 \times 3$</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td></td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>21.</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>22.</td>
<td></td>
<td></td>
<td>36</td>
</tr>
</tbody>
</table>
In each unit there will be a Review mixed in with the regular work pages. These Reviews are cumulative, so that they will give you the chance to practice what you learned in Math — Part A and all the things you learn in Part B. This way you won’t forget the material.

Put the decimal in the right place in the answer to each problem below.

1. \[ \frac{641}{93.1} \rightarrow 596.77 \]
2. \[ \frac{754}{619} \rightarrow 466.72 \]
3. \[ \frac{706}{.203} \rightarrow 3.43318 \]
4. \[ \frac{2050}{.143} \rightarrow 293.15 \]

Find the interval, and then figure out what A is on the following number lines.

5. \[ \underline{18} \quad A \quad \underline{54} \]
6. \[ \underline{21} \quad A \quad \underline{30} \]

A = _____

7. Factor 24 three ways. 

8. Write 911,000,000,000,000 in words.

9. \[ 32297 \div 8 = \] 

10. \[ 4559.5 \div 5 = \] 

11. Find the average of 12, 21, and 15.

12. \[ 23.7 - 14.631 = \] 

13. \[ 91.905 + 74.3 = \] 

14. \[ 21.7 \times .45 = \] 

15. Write four and eleven thousandths in numbers.

16. Write 18.03 in words.

17. Round off 47.83151 to the nearest one.

18. \[ 177.52 + 2.8 = \] 

19. Write MMCDXXXIV in Arabic numbers.

20. A group of 5 friends went to the movies and spent $6.25 to get in. How much did each ticket cost?

21. A toll collector at the end of the Pennsylvania Turnpike collects $1.35 from each car. How much will he get from 96 cars?

22. Circle the best metric measure for measuring the weight of a horse.

   milligram
   gram
   kilogram

23. What is the best metric measure for measuring the weight of a grain of sugar?

24. Circle the best metric measure for measuring the width of a postage stamp.

   millimeter
   centimeter
   meter
   kilometer

25. What is the best metric measure for measuring the length of a house?
26. Circle the best metric measure for measuring the liquid in a Coke can.
   milliliter
   liter

27. What is the best metric measure for measuring the water in a bathtub?

28. How many days are in May? _____

29. How many days are in April? _____

30. How many quarts are in a gallon? _____

31. How many days are in a leap year? _____

32. How many quarters are in a dollar? _____
## Exponents 3

Fill in all of the chart below.

<table>
<thead>
<tr>
<th>Exponent</th>
<th>How you read it</th>
<th>How many times you multiply</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (9^3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. (4^4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. (10^2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>three to the fifth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>two to the eighth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>six cubed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td>(2 \times 2 \times 2 \times 2)</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td>(8 \times 8 \times 8)</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td>(9 \times 9 \times 9)</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>twelve squared</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td></td>
<td>64</td>
</tr>
</tbody>
</table>

Now work out the following problems. First work out each exponent; then add or subtract.

14. \(2^2 + 4^2 = \) 

15. \(9^2 + 2^3 = \) 

16. \(5^3 + 6^2 = \) 

17. \(4^3 + 8^2 = \) 

18. \(2^4 - 3^2 = \)
## Exponents 4

Fill in all of the chart below.

<table>
<thead>
<tr>
<th>Exponent</th>
<th>How you read it</th>
<th>How many times you multiply</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $4^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>five squared</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. $2^8$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>$3 \times 3 \times 3 \times 3$</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>nine cubed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. $6^2$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td>$5 \times 5 \times 5$</td>
<td></td>
</tr>
<tr>
<td>9. $10^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>two to the fourth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Now work out the following problems. First work out each exponent; then add or subtract.

11. $3^3 + 4^2 =$

12. $12^2 - 2^3 =$

13. $6^2 + 2^2 + 3^2 =$

14. $2^5 - 1^9 =$

15. $8^3 + 9^2 =$
Test 19 — Exponents

Use words to write each of the following numbers and exponents.
1. $4^3$
2. $8^2$
3. $5^4$
4. $6^7$

Write the following words as numbers with exponents. You don’t have to work out the answers.
5. four squared =
6. nine cubed =
7. two to the fifth =

Work out the following problems.
8. $4^2 =$
9. $6^3 =$
10. $7^2 =$
11. $4^4 =$
12. $9^2 =$
13. $2^6 =$
14. $8^3 =$
15. nine squared + five cubed =
16. six cubed + four squared =
17. $8^2 + 7^2 =$
18. $3^4 + 2^3 =$
19. $10^2 + 12^2 =$
20. $2^6 + 10^3 =$
Since this is *Math — Part B*, this Review Test is the sixteenth out of thirty-two tests which appear at the end of each unit. The tests go over the skills you have learned in previous weeks. The idea is to test you on new skills as you learn them and also to give you practice on the old ones. This way, by the end of the year, you should be good at all the skills you’ve learned and practiced in *Part A* and *Part B*.

Each skill will always be the same question number; for instance, question two will always be on writing numbers as words. As the tests get longer during the year, you will find the questions at the beginning easier and easier because you will have had so much practice on them. If you do get a question wrong, be sure to check it over and understand your mistake. That way you will get it right on the next test you take.

1. Find the interval, and then figure out what \( A \) is on the following number line.

\[
\begin{array}{c}
19 \quad A \quad 23 \\
\end{array}
\]

\( A = \) _____

2. Write 305,000 in words.

_____________________________

Write twenty-seven billion in numbers.

_____________________________

3. Factor 24 three ways.

_____________________________

_____________________________

_____________________________

4. \( 24778 \div 8 = \) ______________________

5. Find the average of 17, 23, 46, and 30.

_____________________________

6. Write 7.017 in words.

_____________________________

Write two and seven hundredths in decimals.

_____________________________

7. \( 35 + 8.91 + 7.397 = \) ________________

8. \( 125.4 - 67.157 = \) ________________


_____________________________

10. Round off .4287459 to the nearest tenth.

_____________________________

11. \( 6.49 \times 5.7 = \) ________________

12. Write MMCDLXXIV as an Arabic number.

_____________________________

Write 3,721 in Roman numerals.

_____________________________

13. \( 224.70 \div 3.5 = \) ________________
A *fraction* is part of a whole thing, like \( \frac{1}{2} \) a pie or \( \frac{3}{4} \) of a dollar. The top number (the *numerator*) tells how many pieces you have. The bottom number (the *denominator*) tells how many pieces there are in one whole thing if it is divided into parts.

Put fractions next to each circle or square below. Make your fraction show the number of shaded parts over the total number of parts in each circle or square.

**Example:**

1. \( \quad \) = 12.
2. \( \quad \) = 14.
3. \( \quad \) = 11.
4. \( \quad \) = 8.
5. \( \quad \) = 9.
6. \( \quad \) = 10.
7. \( \quad \) = 7.
8. \( \quad \) = ___
9. \( \quad \) = ___
10. \( \quad \) = ___
11. \( \quad \) = ___
12. \( \quad \) = ___
13. \( \quad \) = ___
14. \( \quad \) = ___
15. \( \quad \) = ___

16. Which of the above fractions is equal to one whole? ___________

17. Circle the following fractions which are equal to one whole.

\[
\frac{5}{6} \quad \frac{7}{7} \quad \frac{8}{11} \quad \frac{2}{3} \quad \frac{6}{6} \quad \frac{9}{9} \quad \frac{5}{7}
\]

If the denominators (bottoms) are the same, adding and subtracting fractions is easy. Just leave the denominator the same and add or subtract the numerators (tops).

**Try the following problems.**

**Example:**

18. \( \frac{9}{10} - \frac{5}{10} = \frac{10}{10} \)
19. \( \frac{6}{11} + \frac{4}{11} = \) 20. \( \frac{2}{3} - \frac{1}{3} = \)
21. \( \frac{3}{9} + \frac{4}{9} = \)
22. \( \frac{5}{6} - \frac{4}{6} = \)
23. \( \frac{4}{8} + \frac{3}{8} = \)
24. \( \frac{2}{7} + \frac{5}{7} = \)
25. \( \frac{9}{14} + \frac{4}{14} = \)
26. \( \frac{2}{13} - \frac{1}{13} = \)
27. \( \frac{7}{8} - \frac{5}{8} = \)
28. \( \frac{6}{19} + \frac{4}{19} = \)

29. Which of the answers above is equal to one whole? ___________
Next to each circle, write the fraction which shows the number of shaded parts and the total number of parts in that circle.

Example:

1. __________ 3. __________ 5. __________ 7. __________
2. __________ 4. __________ 6. __________ 8. __________

10. Which three of the fractions above are equal to one whole? __________ __________ __________

Now shade in the following circles. Look at the fractions to decide how many parts to shade in.

11. __________ 15. __________ 19. __________ 23. __________ 27. __________
13. __________ 17. __________ 21. __________ 25. __________ 29. __________
14. __________ 18. __________ 22. __________ 26. __________ 30. __________

31. Which of the fractions above are equal to one whole? __________ __________ __________

Now work out the following problems. Remember to leave the denominators the same.

32. \( \frac{3}{4} - \frac{2}{4} = \) __________
33. \( \frac{4}{8} - \frac{3}{8} = \) __________
34. \( \frac{2}{11} + \frac{5}{11} = \) __________
35. \( \frac{6}{7} - \frac{4}{7} = \) __________
36. \( \frac{6}{8} + \frac{1}{8} = \) __________
37. \( \frac{9}{10} - \frac{5}{10} = \) __________
38. \( \frac{2}{3} + \frac{1}{3} = \) __________
39. \( \frac{2}{13} + \frac{7}{13} = \) __________
Write the following words as numbers with exponents.

1. two squared ____________________
2. three squared ____________________
3. four cubed ____________________
4. five to the fourth ____________________
5. ten squared ____________________
6. nine to the sixteenth ____________________

Work out the following problems.

7. $3^2 =$ ____________________
8. $4^2 =$ ____________________
9. $9^2 =$ ____________________
10. $10^3 =$ ____________________
11. $2^6 =$ ____________________

Write the following numbers with exponents as words.

12. $5^3$ ____________________
13. $6^8$ ____________________
14. $7^2$ ____________________

15. Figure out what $A$ is on the following number line.

```
20   A   40
```

$A =$ ____________________

16. Write $914,000,000,000$ in words. ____________________

17. Factors of $36 =$ ____________________

18. $63238 ÷ 7 =$ ____________________

19. Find the average of $118, 320, 214,$ and $400$. ____________________

20. Write two and seven tenths in decimals. ____________________

21. Write $7.013$ in words. ____________________

22. $9 + 1.8 + 37.931 =$ ____________________

23. $6.3 - 1.471 =$ ____________________

24. Round off $65,521,318$ to the nearest million. ____________________

25. Round off $69.73148$ to the nearest one. ____________________

26. $149 × .49 =$ ____________________

27. Write MMCDXXII in Arabic numbers. ____________________

28. Write $1,693$ in Roman numerals. ____________________

29. $41.663 ÷ .61 =$ ____________________

30. A car weighs $1.9$ tons. How many pounds is that? ____________________

31. Mungo Hulk weighs $845$ pounds. He wants to lose $3$ pounds every day of the month of March, and he plans to do it by starving himself and sweating in a Turkish bath. How much will he weigh at the end of March if he sticks to his plan? ____________________
32. Circle the metric measure you would use to measure the length of a baseball bat.
   millimeter
centimeter
meter
kilometer

33. Which metric measure would you use to measure the width of this book?

34. How many seconds are in a minute? ___
35. How many days are in a year? ___
36. How many ounces are in a pound? ___
37. How many years are in a century? ___
38. How many years are in a decade? ___
Shade in the following circles. Look at the fractions to decide how many parts to shade in.

1. $\frac{1}{2}$
2. $\frac{1}{6}$
3. $\frac{1}{4}$
4. $\frac{5}{6}$
5. $\frac{3}{4}$
6. $\frac{1}{8}$
7. $\frac{1}{3}$
8. $\frac{4}{8}$
9. $\frac{2}{3}$
10. $\frac{7}{8}$

Now work out the following problems.

11. $\frac{5}{6} - \frac{4}{6} = \underline{\hspace{2cm}}$
12. $\frac{2}{3} + \frac{1}{3} = \underline{\hspace{2cm}}$
13. $\frac{6}{11} + \frac{4}{11} = \underline{\hspace{2cm}}$
14. $\frac{2}{5} + \frac{2}{5} = \underline{\hspace{2cm}}$
15. $\frac{6}{9} - \frac{5}{9} = \underline{\hspace{2cm}}$
16. $\frac{3}{8} + \frac{4}{8} = \underline{\hspace{2cm}}$
17. $\frac{2}{7} + \frac{5}{7} = \underline{\hspace{2cm}}$
18. $\frac{9}{10} - \frac{1}{10} = \underline{\hspace{2cm}}$
19. $\frac{6}{9} - \frac{4}{9} = \underline{\hspace{2cm}}$
20. $\frac{7}{8} + \frac{1}{8} = \underline{\hspace{2cm}}$
21. $\frac{2}{13} + \frac{9}{13} = \underline{\hspace{2cm}}$
22. $\frac{6}{7} - \frac{5}{7} = \underline{\hspace{2cm}}$
23. $\frac{4}{5} - \frac{3}{5} = \underline{\hspace{2cm}}$
24. $\frac{2}{9} + \frac{7}{9} = \underline{\hspace{2cm}}$
25. $\frac{6}{10} + \frac{3}{10} = \underline{\hspace{2cm}}$
26. $\frac{4}{17} + \frac{8}{17} = \underline{\hspace{2cm}}$

27. Which of the answers above are equal to one whole? \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}}

The following fractions are equal to one whole: $\frac{2}{2}$, $\frac{3}{3}$, $\frac{4}{4}$, $\frac{5}{5}$, $\frac{6}{6}$, and so on. You will need to use fractions which equal one whole in the problems below.

Remember: The denominator (bottom) of each fraction tells how many pieces there are in one whole thing if it is divided into parts.

Work out the following problems.

28. A boy eats $\frac{1}{3}$ of a pie. What fraction is left? \underline{\hspace{2cm}}
29. The boy eats $\frac{1}{4}$ of the pie. What fraction is left? \underline{\hspace{2cm}}
30. The boy eats $\frac{5}{8}$ of the pie. What fraction is left? \underline{\hspace{2cm}}
31. A girl got $\frac{9}{10}$ right on a test. What fraction did she get wrong? \underline{\hspace{2cm}}
32. If she got $\frac{7}{10}$ right, what fraction did she get wrong? \underline{\hspace{2cm}}
Introduction to Fractions 4

Shade in the following circles. Look at the fractions to decide how many parts to shade in.

1. \( \frac{1}{4} \) 2. \( \frac{3}{4} \) 3. \( \frac{5}{8} \) 4. \( \frac{1}{3} \) 5. \( \frac{7}{8} \) 6. \( \frac{5}{6} \) 7. \( \frac{1}{6} \) 8. \( \frac{4}{4} \)

Now work out the following problems.

11. \( \frac{7}{9} - \frac{4}{9} = \) 12. \( \frac{4}{5} - \frac{3}{5} = \) 13. \( \frac{5}{8} + \frac{3}{8} = \) 14. \( \frac{6}{12} + \frac{5}{12} = \) 15. \( \frac{2}{11} + \frac{9}{11} = \)

17. \( \frac{2}{8} + \frac{5}{8} = \) 18. \( \frac{2}{3} + \frac{1}{3} = \) 19. \( \frac{4}{13} + \frac{9}{13} = \) 20. \( \frac{2}{17} - \frac{1}{17} = \) 21. \( \frac{4}{9} + \frac{3}{9} = \)

22. \( \frac{2}{7} + \frac{5}{7} = \) 23. \( \frac{5}{10} + \frac{4}{10} = \) 24. \( \frac{6}{7} - \frac{4}{7} = \) 25. \( \frac{8}{9} - \frac{6}{9} = \) 26. \( \frac{2}{21} + \frac{9}{21} = \)

27. Which of the answers above are equal to one whole?

Now work out the following problems.

28. A hotel has \( \frac{14}{20} \) of its rooms filled. What fraction of the hotel is not filled? ______

29. A boy gets \( \frac{11}{25} \) right on a test. What fraction is wrong? ______

30. A girl eats \( \frac{7}{8} \) of a pie. What fraction is left? ______

31. A used car salesman sells \( \frac{24}{27} \) of his cars. What fraction is left? ______

32. \( \frac{19}{24} \) of the students in a class are present. What fraction of the class is not present? ______

33. \( \frac{14}{21} \) of the students in a class are girls. What fraction of the class is boys? ______

34. \( \frac{6}{26} \) of the alphabet is vowels. What fraction is consonants? ______
Test 20 – Introduction to Fractions

Shade in the correct number of parts in each circle below.

1. $\frac{1}{2}$
2. $\frac{5}{6}$
3. $\frac{3}{4}$
4. $\frac{1}{8}$
5. $\frac{1}{4}$
6. $\frac{3}{8}$
7. $\frac{1}{3}$
8. $\frac{7}{8}$
9. $\frac{2}{3}$
10. $\frac{1}{6}$

Now work out the following problems.

11. $\frac{4}{5} - \frac{3}{5} = \underline{\hspace{2cm}}$
12. $\frac{4}{19} + \frac{8}{19} = \underline{\hspace{2cm}}$
13. $\frac{9}{17} + \frac{7}{17} = \underline{\hspace{2cm}}$
14. $\frac{3}{9} - \frac{2}{9} = \underline{\hspace{2cm}}$
15. $\frac{5}{8} - \frac{4}{8} = \underline{\hspace{2cm}}$
16. $\frac{6}{11} + \frac{5}{11} = \underline{\hspace{2cm}}$
17. $\frac{6}{7} + \frac{1}{7} = \underline{\hspace{2cm}}$
18. $\frac{5}{10} + \frac{4}{10} = \underline{\hspace{2cm}}$

19. Which of the above answers are equal to one whole? \underline{\hspace{2cm}} \underline{\hspace{2cm}}

Now work out the following problems.

20. A boy eats $\frac{3}{5}$ of a pie. What fraction of the pie is left? \underline{\hspace{2cm}}

21. A girl gets $\frac{2}{25}$ of a test wrong. What fraction is right? \underline{\hspace{2cm}}

22. A boy spends $\frac{51}{100}$ of a dollar on candy. What fraction of the dollar is left? \underline{\hspace{2cm}}

23. A car travels $\frac{13}{30}$ of a trip. What fraction of the trip is left to go? \underline{\hspace{2cm}}

24. A school is $\frac{97}{200}$ boys. What fraction of the school is girls? \underline{\hspace{2cm}}
1. Figure out what $A$ is on the following number line.

\[
\begin{array}{ccc}
16 & A & 48 \\
\end{array}
\]

$A = \blank$

2. Write 309,000,000,000 in words.

Write four hundred ninety-seven million in numbers.

3. Factor 18 in two ways.

4. $45523 \div 7 = \blank$

5. Find the average of 18, 36, and 24.

6. Write 2.07 in words.

Write eight and eleven thousandths in decimals.

7. $3.5 + 21 + 2.479 = \blank$

8. $93.4 - 56.218 = \blank$

9. Round off 57,245 to the nearest thousand.

10. Round off 73.7489213 to the nearest one.

11. $2.07 \times .93 = \blank$

12. Write CMLXXXVI as an Arabic number.

Write 2,742 in Roman numerals.

13. $352.83 + 5.7 = \blank$

14. Three squared + two cubed = \blank

$5^4 = \blank$
Draw a line between each pair of fractions that is the same. Looking at the shaded parts will help you.

1. \(\frac{1}{2}\)
2. \(\frac{3}{4}\)
3. \(\frac{2}{2}\)
4. \(\frac{1}{6}\)
5. \(\frac{1}{3}\)
6. \(\frac{2}{3}\)

7. \(\frac{1}{2}\) is the same as \(\frac{2}{4}\) is equivalent to \(\frac{4}{4}\), so \(\frac{1}{2} = \frac{2}{4}\)
8. \(\frac{1}{2}\) is the same as \(\frac{2}{8}\), so \(\frac{1}{2} = \frac{2}{8}\)
9. \(\frac{1}{2}\) is the same as \(\frac{3}{6}\), so \(\frac{1}{2} = \frac{3}{6}\)
10. \(\frac{2}{3}\) is the same as \(\frac{4}{6}\), so \(\frac{2}{3} = \frac{4}{6}\)
11. \(\frac{3}{4}\) is the same as \(\frac{6}{8}\), so \(\frac{3}{4} = \frac{6}{8}\)

You can't always use drawings to find equivalent fractions. There is a quicker and easier way. Find the number that is multiplied by the old denominator (bottom) to get the new denominator; then multiply the old numerator (top) by the same number.

Solve the problems below. You will be finding equivalent fractions. An example has been done for you. Study it before you do the problems.

Example:

\(\frac{2}{3} \times 2 = \frac{4}{6}\)

12. \(\frac{4}{5} = \frac{8}{10}\)
13. \(\frac{3}{5} = \frac{6}{15}\)
14. \(\frac{6}{7} = \frac{12}{21}\)
15. \(\frac{1}{3} = \frac{4}{12}\)
16. \(\frac{6}{7} = \frac{12}{14}\)
17. \(\frac{2}{3} = \frac{4}{9}\)
18. \(\frac{4}{5} = \frac{8}{20}\)
19. \(\frac{8}{9} = \frac{16}{27}\)
20. \(\frac{1}{2} = \frac{2}{12}\)
21. \(\frac{4}{7} = \frac{20}{35}\)
Equivalent Fractions 2

In each problem, shade in the circles so they are equal. Then fill in the numerator (top) of the fraction next to the second circle.

1. \( \frac{1}{2} \) is the same as (is equivalent to) \( \frac{2}{4} \)

2. \( \frac{1}{2} \) is the same as \( \frac{3}{6} \)

3. \( \frac{1}{2} \) is the same as \( \frac{4}{8} \)

4. \( \frac{1}{2} \) is the same as \( \frac{5}{10} \)

5. \( \frac{1}{4} \) is the same as \( \frac{2}{8} \)

6. \( \frac{3}{4} \) is the same as \( \frac{6}{8} \)

7. \( \frac{4}{4} \) is the same as \( \frac{8}{8} \)

8. \( \frac{1}{3} \) is the same as \( \frac{2}{6} \)

9. \( \frac{2}{3} \) is the same as \( \frac{2}{6} \)

Find equivalent fractions. Remember to multiply or divide the numerator and denominator by the same number. Before you try the following problems, study the two examples which have been done for you.

Examples:

10. \( \frac{4}{5} \times 3 = \frac{12}{15} \)

11. \( \frac{6}{7} \times 2 = \frac{12}{14} \)

12. \( \frac{1}{2} \times 2 = \frac{2}{4} \)

13. \( \frac{3}{7} \times 2 = \frac{6}{14} \)

14. \( \frac{4}{5} \times 3 = \frac{12}{15} \)

15. \( \frac{1}{9} \times 3 = \frac{3}{27} \)

16. \( \frac{3}{7} \times 2 = \frac{6}{14} \)

17. \( \frac{8}{14} \div 2 = \frac{4}{7} \)

18. \( \frac{12}{20} \div 2 = \frac{6}{10} \)

19. \( \frac{12}{27} \div 3 = \frac{4}{9} \)

20. \( \frac{12}{22} \div 2 = \frac{6}{11} \)

21. \( \frac{25}{45} \div 5 = \frac{5}{9} \)

22. \( \frac{20}{30} \div 2 = \frac{10}{15} \)

23. \( \frac{15}{50} \div 5 = \frac{3}{10} \)
In each drawing below, tell what fraction is shaded in.

1. [Diagram showing shaded section]

2. [Diagram showing shaded section]

3. [Diagram showing shaded section]

4. If \( \frac{9}{10} \) of a test is right, what fraction is wrong?

5. If \( \frac{7}{15} \) of a job is done, what fraction remains to be done?

6. If a tree is \( \frac{4}{5} \) dead, what fraction is alive?

7. \( \frac{4}{7} + \frac{2}{7} = \) 

8. \( \frac{1}{11} + \frac{4}{11} = \) 

9. \( \frac{9}{10} + \frac{1}{10} = \) 

10. Figure out what \( A \) is on the following number line.

   14  15  16  17  18  19  20  21  22  23  24  25  26  30  35  40  42

   A = 

11. Factors of 27 = 

12. Write four hundred seventeen billion in numbers. 

13. \( 7483 \div 6 = \) 

14. Find the average of 17 and 31. 

15. Write 10.03 in words.

16. \( 18.6 + 9.73 = \) 

17. \( 93.4 - 19.138 = \) 

18. Round off 16,793,211 to the nearest million.

19. Round off 7.43799 to the nearest tenth.

20. \( 14.9 \times 28 = \) 

21. Write MMCDLXXVI in Arabic numbers.

22. Write 3,624 in Roman numerals.

23. Circle the measures for volume.
   - kilometers
   - liters
   - feet
   - cups
   - gallons
   - miles
   - quarts
   - milliliters
   - meters

   \( 40.992 \div .61 = \) 

25. \( 9^3 = \) 

26. The fuel tank of Mr. Cante’s car holds 15.4 gallons. How far can he drive on a full tank if the car gets 19 miles to each gallon?
27. Jan broke open her piggy bank and found 15 quarters, 29 dimes, 37 nickels, and 215 pennies. How much is this in dollars and cents?

28. How many days are in June? 

29. How many days are in September? 

30. How many days are in July? 

31. How many days are in a leap year? 

32. How many pounds are in a ton?
Equivalent Fractions 3

Write the equivalent fractions in the problems below.

1. \( \frac{1}{2} = \frac{6}{6} \)
2. \( \frac{3}{4} = \frac{12}{12} \)
3. \( \frac{5}{6} = \frac{12}{12} \)
4. \( \frac{8}{11} = \frac{33}{33} \)
5. \( \frac{20}{25} = \frac{5}{5} \)
6. \( \frac{2}{9} = \frac{18}{18} \)
7. \( \frac{18}{21} = \frac{7}{7} \)
8. \( \frac{1}{10} = \frac{30}{30} \)
9. \( \frac{35}{49} = \frac{7}{7} \)
10. \( \frac{2}{3} = \frac{33}{33} \)
11. \( \frac{27}{30} = \frac{10}{10} \)
12. \( \frac{1}{8} = \frac{40}{40} \)

If you are asked to find the lowest common denominator, you must give the same denominator to all the fractions you are working with. To find the lowest common denominator, you find the smallest number into which all denominators can be divided evenly.

Example:
\[ \frac{2}{3} = \frac{12}{12} \]
3 and 4 (the denominators) can both be divided into 12, so 12 is a common denominator.
3 and 4 can also be divided into 24, but 24 is not the lowest common denominator.
\[ \frac{3}{4} = \frac{12}{12} \]
12 is the lowest common denominator for 3 and 4.

Now find the lowest common denominators for the problems below. Make sure you write the lowest common denominators every place where they should be.

13. \( \frac{5}{8} = \frac{6}{6} \) can both be divided into ______, so ______ is the common denominator.
   \[ \frac{1}{6} = \frac{6}{6} \] Is it the lowest? ______

14. \( \frac{1}{5} = \frac{5}{5} \) and 4 both go into ______, so ______ is the common denominator.
   \[ \frac{3}{4} = \frac{5}{5} \] Is it the lowest? ______

15. \( \frac{5}{6} = \frac{12}{12} \)

16. \( \frac{3}{10} = \frac{30}{30} \)
Equivalent Fractions 4

Find the equivalent fractions in the following problems.

1. \( \frac{2}{3} = \frac{9}{9} \)  
2. \( \frac{15}{18} = \frac{6}{6} \)  
3. \( \frac{4}{5} = \frac{20}{20} \)  
4. \( \frac{14}{16} = \frac{8}{8} \)  

5. \( \frac{8}{12} = \frac{3}{3} \)  
6. \( \frac{18}{33} = \frac{11}{11} \)  
7. \( \frac{4}{9} = \frac{27}{27} \)  
8. \( \frac{3}{5} = \frac{30}{30} \)  

9. \( \frac{5}{8} = \frac{24}{24} \)  
10. \( \frac{2}{3} = \frac{21}{21} \)  
11. \( \frac{20}{35} = \frac{7}{7} \)  
12. \( \frac{8}{9} = \frac{81}{81} \)  

13. \( \frac{1}{12} = \frac{36}{36} \)  
14. \( \frac{2}{9} = \frac{45}{45} \)  
15. \( \frac{6}{7} = \frac{49}{49} \)  
16. \( \frac{40}{64} = \frac{8}{8} \)  

Find the lowest common denominator for each group of fractions below. Make sure you write the lowest common denominator every place where it should be.

17. \( \frac{1}{3} = \frac{\_}{\_} \)  
19. \( \frac{3}{8} = \frac{\_}{\_} \)  
21. \( \frac{3}{7} = \frac{\_}{\_} \)  

18. Is it 10, 30, 36, or 60?  

20. \( \frac{4}{9} = \frac{\_}{\_} \)  
22. \( \frac{1}{2} = \frac{\_}{\_} \)  
24. \( \frac{1}{3} = \frac{\_}{\_} \)  

23. Is it 12, 16, 24, or 48?

\( \frac{3}{4} = \frac{\_}{\_} \)  
\( \frac{1}{4} = \frac{\_}{\_} \)  
\( \frac{1}{2} = \frac{\_}{\_} \)  
\( \frac{3}{8} = \frac{\_}{\_} \)  
\( \frac{2}{3} = \frac{\_}{\_} \)  
\( \frac{5}{6} = \frac{\_}{\_} \)  

\( \frac{2}{3} = \frac{\_}{\_} \)  
\( \frac{1}{6} = \frac{\_}{\_} \)  
\( \frac{3}{10} = \frac{\_}{\_} \)  
\( \frac{3}{4} = \frac{\_}{\_} \)  
\( \frac{5}{6} = \frac{\_}{\_} \)  
\( \frac{2}{3} = \frac{\_}{\_} \)  
\( \frac{4}{5} = \frac{\_}{\_} \)  
\( \frac{5}{8} = \frac{\_}{\_} \)
Test 21 — Equivalent Fractions

Find the equivalent fractions in the problems below.

1. \( \frac{2}{3} = \frac{6}{9} \)  
2. \( \frac{1}{2} = \frac{24}{48} \)  
3. \( \frac{4}{5} = \frac{20}{25} \)  
4. \( \frac{5}{8} = \frac{24}{38} \)  
5. \( \frac{3}{11} = \frac{22}{77} \)  
6. \( \frac{5}{5} = \frac{20}{20} \)  
7. \( \frac{5}{6} = \frac{42}{42} \)  
8. \( \frac{3}{7} = \frac{28}{35} \)  
9. \( \frac{4}{9} = \frac{45}{45} \)  
10. \( \frac{5}{6} = \frac{18}{18} \)  

Now find the lowest common denominator for each group of fractions below. Make sure you write the lowest common denominator every place where it should be.

11. Is it 20, 10, or 40?  12. Is it 14, 28, or 42?  13. \( \frac{5}{6} = \frac{\_\_\_\_}{\_\_\_\_} \)

\[ \frac{1}{5} = \frac{4}{20} = \frac{1}{3} = \frac{3}{4} = \frac{1}{2} = \]
Review Test 21

1. Find the interval, and figure out what \( A \) is on the following number line.

\[
\begin{array}{c|c|c}
25 & A & 45 \\
\end{array}
\]

\( A = \quad \)

2. Write 600,000 in words.

Write four hundred twenty-nine trillion in numbers.


4. \( 72575 \div 9 = \quad \)

5. Find the average of 16, 23, 19, 11, and 21.

6. Write 7.003 in words.

Write four and one tenth in decimals.

7. \( 291.5 + 7 + 8.471 = \quad \)

8. \( 91.5 - 26.258 = \quad \)

9. Round off 89,623,210 to the nearest million.

10. Round off .4735897 to the nearest hundredth.

11. \( 8.47 \times 26 = \quad \)

12. Write MDCCCLXIX as an Arabic number.

Write 3,334 in Roman numerals.

13. \( 12.816 \div .48 = \quad \)

14. Seven squared = \( 9^2 = \quad \)

15. What fraction of the circle is shaded in?

16. If \( \frac{11}{21} \) of a class is boys, what fraction is girls?
Unit 22 — Ratios 1

To find ratios divide the first number into the second number and multiply the answer by the third number.

Example:

\[
\begin{align*}
4 \text{ is to } 12 \text{ as } 5 \text{ is to } 15 \text{ or } \frac{4}{12} &= \frac{5}{15} \leftarrow \text{This line means "is to."} \\
\frac{3}{4} \text{ of } 12 \quad 3 \times 5 &= 15
\end{align*}
\]

Do the following ratio problems.

1. 9 is to 18 as 3 is to _____ or \( \frac{9}{18} = \frac{3}{6} \)

2. 2 is to 8 as 3 is to _____ or \( \frac{2}{8} = \frac{3}{12} \)

3. 5 is to 15 as 6 is to _____ or \( \frac{5}{15} = \frac{6}{18} \)

4. 10 is to 20 as 11 is to _____ or \( \frac{10}{20} = \frac{11}{22} \)

5. 7 is to 14 as 8 is to _____ or \( \frac{7}{14} = \frac{8}{16} \)

6. 8 is to 24 as 6 is to _____ or \( \frac{8}{24} = \frac{6}{18} \)

7. 3 is to 15 as 4 is to _____ or \( \frac{3}{15} = \frac{4}{20} \)

8. 7 is to 21 as 10 is to _____ or \( \frac{7}{21} = \frac{10}{30} \)

9. 2 is to 6 as 4 is to _____ or \( \frac{2}{6} = \frac{4}{12} \)

10. 10 is to 50 as 6 is to _____ or \( \frac{10}{50} = \frac{6}{30} \)

11. 8 is to 56 as 9 is to _____ or \( \frac{8}{56} = \frac{9}{63} \)

12. 2 is to 10 as 4 is to _____ or \( \frac{2}{10} = \frac{4}{20} \)

13. 7 is to 56 as 8 is to _____ or \( \frac{7}{56} = \frac{8}{64} \)

14. 6 is to 24 as 7 is to _____ or \( \frac{6}{24} = \frac{7}{28} \)

Use the same method as you used above to work out the next three problems.

15. 2 bars of candy cost 12 cents, so 5 bars of candy would cost _____ cents.

16. 3 cans of tonic cost 15 cents, so 4 cans would cost _____ cents.

17. 5 cans of soup cost 40 cents, so 3 cans would cost _____ cents.
Work out the following ratio problems.
Remember: Divide the first number into the second, and then multiply the answer by the third number.

1. 7 is to 35 as 8 is to _____ or \( \frac{7}{35} = \frac{8}{\text{_____}} \)

2. 6 is to 54 as 7 is to _____ or \( \frac{6}{54} = \frac{\text{_____}}{\text{_____}} \)

3. 5 is to 25 as 4 is to _____ or \( \frac{5}{\text{_____}} = \frac{\text{_____}}{\text{_____}} \)

4. 12 is to 36 as 5 is to _____ or \( \frac{12}{36} = \frac{\text{_____}}{\text{_____}} \)

5. 6 is to 30 as 7 is to _____ or \( \frac{6}{30} = \frac{\text{_____}}{\text{_____}} \)

6. 2 is to 12 as 3 is to _____ or \( \frac{2}{12} = \frac{\text{_____}}{\text{_____}} \)

7. 8 is to 24 as 9 is to _____ or \( \frac{8}{24} = \frac{\text{_____}}{\text{_____}} \)

8. 4 is to 36 as 6 is to _____ or \( \frac{4}{36} = \frac{\text{_____}}{\text{_____}} \)

9. 6 is to 18 as 9 is to _____ or \( \frac{6}{18} = \frac{\text{_____}}{\text{_____}} \)

10. 7 is to 28 as 8 is to _____ or \( \frac{7}{28} = \frac{\text{_____}}{\text{_____}} \)

11. 12 is to 24 as 11 is to _____ or \( \frac{12}{24} = \frac{\text{_____}}{\text{_____}} \)

Note that the colon (:) is short for “is to.”

12. \( 6 : 36 = \frac{7}{\text{_____}} \)

13. \( 9 : 63 = \frac{10}{\text{_____}} \)

14. \( 3 : 30 = \frac{5}{\text{_____}} \)

15. \( 8 : 32 = \frac{9}{\text{_____}} \)

16. \( 4 : 16 = \frac{6}{\text{_____}} \)

17. \( 9 : 18 = \frac{8}{\text{_____}} \)

Use the same method as you used above to work out the next two problems.

18. 2 tires cost $50, so 5 tires would cost ________.

19. 6 cans of beer cost $1.20, so 7 cans would cost ________.
Find equivalent fractions by putting the correct numerator over each denominator.

1. \( \frac{4}{5} = \frac{12}{15} \)  
2. \( \frac{1}{8} = \frac{1}{16} \)  
3. \( \frac{5}{7} = \frac{35}{44} \)  
4. \( \frac{9}{10} = \frac{30}{30} \)

5. \( \frac{12}{24} = \frac{48}{48} \)  
6. \( \frac{1}{2} = \frac{100}{100} \)  
7. \( \frac{9}{11} = \frac{44}{44} \)

Do the following problems.

8. \( \frac{9}{13} - \frac{3}{13} = \)  
9. \( \frac{4}{7} + \frac{2}{7} = \)

10. \( \frac{3}{19} + \frac{14}{19} = \)

11. If \( \frac{8}{11} \) of a pie is eaten, how much is left?

12. If \( \frac{57}{100} \) of the rooms in a hotel are taken, what fraction of the rooms are empty?

13. Write fourteen million in numbers.

14. Factors of 80 =

15. \( 25264 \div 9 = \)

16. \( 8^2 = \)

17. Find the average of 99, 13, and 53.

18. Write MMCMLXIV in Arabic numbers.

19. Write 14.01 in words.

20. Write two and eighteen thousandths in decimals.

21. \( 2.89 + 40 + 1.3 = \)

22. \( 45 - 2.371 = \)

23. Round off \( .77731 \) to the nearest hundredth.

24. Round off 88.5931 to the nearest one.

25. \( 78.4 \times .52 = \)

26. \( 4555.2 \div 73 = \)

27. Five squared + nine squared + three cubed =

28. How many days are in February in a non-leap year?

29. Circle the measures of distance.
   - kilograms
   - inches
   - pounds
   - liters
   - centimeters
   - kilometers
   - millimeters
   - miles
   - meters
   - ounces

30. A cross-country runner ran 24.3 miles in 2.7 hours. How fast was he running in miles per hour?
31. Beverly weighs 119 pounds on Earth, but she would weigh .38 of that on Mars. What would she weigh on Mars?

32. How many pounds are in a ton?

33. How many ounces are in a pound?

34. How many cups are in a pint?

35. How many quarts are in a gallon?

36. How many cents are in a half dollar?

37. How many hours are in a day?
Ratios 3

Work out the following ratio problems.

1. $6 : 12 = 7 : ___$
2. $4 : 28 = 8 : ___$
3. $2 : 20 = 9 : ___$
4. $2 : 14 = 3 : ___$
5. $5 : 60 = 6 : ___$
6. $4 : 16 = 7 : ___$
7. $7 : 14 = 9 : ___$
8. $5 : 55 = 6 : ___$
9. $12 : 60 = 11 : ___$
10. $6 : 42 = 9 : ___$
11. $4 : 36 = 8 : ___$
12. $9 : 90 = 5 : ___$
13. $6 : 36 = 5 : ___$
14. $3 : 21 = 12 : ___$
15. $9 : 36 = 4 : ___$
16. $5 : 25 = 7 : ___$
17. $7 : 56 = 9 : ___$
18. $2 : 22 = 5 : ___$
19. $10 : 100 = 9 : ___$
20. $4 : 48 = 6 : ___$
21. $3 : 60 = 5 : ___$
22. $11 : 22 = 12 : ___$
23. $9 : 81 = 7 : ___$
24. $5 : 20 = 6 : ___$
25. $3 : 30 = 5 : ___$
26. $2 : 18 = 8 : ___$
27. $3 : 33 = 4 : ___$
28. $5 : 35 = 4 : ___$
29. $6 : 42 = 2 : ___$
30. $7 : 28 = 8 : ___$

Now use the same method as you used above to work out the following word problems.

31. 3 bags of potato chips cost 15 cents, so 4 bags will cost ________.
32. 6 candy bars cost 66 cents, so 8 candy bars will cost ________.
33. 2 slices of pizza cost 60 cents, so 4 slices will cost ________.
34. 3 hamburgers cost 90 cents, so 2 will cost ________.
Ratios 4

Carefully work out the following ratio problems.

1. $6 : 24 = 7 : \underline{}$
2. $3 : 36 = 8 : \underline{}$
3. $5 : 40 = 9 : \underline{}$
4. $2 : 12 = 4 : \underline{}$
5. $4 : 28 = 9 : \underline{}$
6. $3 : 33 = 7 : \underline{}$
7. $12 : 48 = 5 : \underline{}$
8. $9 : 27 = 4 : \underline{}$
9. $6 : 54 = 5 : \underline{}$
10. $2 : 22 = 7 : \underline{}$
11. $4 : 48 = 5 : \underline{}$
12. $6 : 60 = 4 : \underline{}$
13. $13 : 26 = 3 : \underline{}$
14. $7 : 49 = 5 : \underline{}$

Here are some more ratio problems. These are a little tricky, so be careful.

15. $5 : 25 = \underline{} : 30$
16. $4 : 12 = \underline{} : 9$
17. $3 : 30 = \underline{} : 50$
18. $6 : 36 = \underline{} : 48$
19. $4 : 16 = \underline{} : 20$
20. $7 : 21 = \underline{} : 27$
21. $3 : 21 = \underline{} : 49$
22. $4 : 44 = \underline{} : 55$
23. $6 : 12 = \underline{} : 24$
24. $9 : 36 = \underline{} : 44$
25. $6 : 24 = \underline{} : 20$
26. $4 : 28 = \underline{} : 35$

Now work out the following word problems.

27. 2 games cost 6 dollars; how much would 3 games cost? \underline{}.
28. 3 ice-cream cones cost 75 cents, so 5 would cost \underline{}.
29. 4 bags of marbles cost 52 cents, so 2 bags would cost \underline{}.
30. 5 toy cars cost 45 cents, so 10 would cost \underline{}.
Work out the following ratio problems.

1. 2 is to 14 as 3 is to ____

2. 6 is to 12 as 8 is to ____

3. 5 : 25 = 7 : ____

4. 9 : 27 = 7 : ____

5. 10 : 30 = 3 : ____

6. 4 : 16 = 5 : ____

7. 12 : 36 = 2 : ____

8. 7 : 63 = 5 : ____

9. 4 : 48 = 5 : ____

10. 4 : 40 = 2 : ____

11. 5 : 55 = 2 : ____

12. 7 : 49 = 6 : ____

13. 9 : 90 = 3 : ____

14. 5 : 45 = 7 : ____

15. 8 : 32 = 5 : ____

16. 9 : 45 = 6 : ____

17. 6 : 18 = ____ : 21

18. 5 : 35 = ____ : 63

19. If 3 candy bars cost 24 cents, 5 candy bars will cost ____.

20. If 5 cans of tonic cost $1.00, 3 cans will cost ____.
Review Test 22

1. Find the interval, and figure out what A is on the following number line.

\[ \begin{array}{c|c|c}
23 & A & 27 \\
\end{array} \]

A = ______

2. Write 702,000,000,000,000 in words.

Write ninety-seven billion in numbers.

3. Factor 27.

4. \(63727 + 7 = \)

5. Find the average of 628 and 500.


Write two and one hundredths in decimals.

7. \(69 + 4.2 + 115.37 = \)

8. \(26.4 - 18.268 = \)

9. Round off 268,721 to the nearest thousand.

10. Round off .3547219 to the nearest hundredth.

11. \(2.47 \times .37 = \)

12. Write MMMXIII as an Arabic number.

Write 2,747 in Roman numerals.

13. \(684.32 \div 9.1 = \)

14. Two cubed = 
\(3^5 = \)

15. What fraction of the circle is shaded in?

16. If \(\frac{2}{19}\) of a test is wrong, what fraction is right?
Unit 23 — Fractions with Unlike Denominators 1

To add or subtract fractions, the denominators must be the same. If they are not the same to start with, you have to change them to the lowest common denominator.

Lowest common denominators have been found for the following groups of fractions. First, find new numerators to put over the lowest common denominators. (Notice that you are finding equivalent fractions.) Then, add or subtract the numerators (tops).

Example:

\[
\begin{align*}
\frac{2}{3} &= \frac{8}{12} \\
+ \frac{1}{4} &= \frac{3}{12} \\
\hline
\text{Answer} &= \frac{11}{12}
\end{align*}
\]

\[
\begin{align*}
1. \quad \frac{5}{9} &= \frac{9}{9} \\
+ \frac{1}{3} &= \frac{9}{9} \\
\hline
2. \quad \frac{2}{9} &= \frac{36}{36} \\
+ \frac{3}{4} &= \frac{36}{36}
\end{align*}
\]

\[
\begin{align*}
3. \quad \frac{2}{5} &= \frac{15}{15} \\
+ \frac{1}{3} &= \frac{15}{15} \\
\hline
5. \quad \frac{8}{9} &= \frac{18}{18} \\
- \frac{5}{6} &= \frac{18}{18}
\end{align*}
\]

\[
\begin{align*}
6. \quad \frac{7}{8} &= \frac{24}{24} \\
- \frac{2}{3} &= \frac{24}{24} \\
\hline
7. \quad \frac{4}{9} &= \frac{18}{18} \\
+ \frac{1}{2} &= \frac{18}{18}
\end{align*}
\]

\[
\begin{align*}
8. \quad \frac{1}{11} &= \frac{22}{22} \\
+ \frac{1}{2} &= \frac{22}{22}
\end{align*}
\]
Fractions with Unlike Denominators 2

Find new numerators to put over the lowest common denominators. Then add or subtract the numerators.

1. \( \frac{4}{5} = \frac{30}{30} \quad 3. \quad \frac{3}{4} = \frac{12}{12} \quad 5. \quad \frac{5}{9} = \frac{9}{9} \quad 7. \quad \frac{2}{3} = \frac{24}{24} \)
   
   \( + \frac{1}{6} = \frac{30}{30} \quad - \frac{2}{3} = \frac{12}{12} \quad + \frac{1}{3} = \frac{9}{9} \quad - \frac{1}{8} = \frac{24}{24} \)
   
   \( \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \)

2. \( \frac{6}{7} = \frac{14}{14} \quad 4. \quad \frac{7}{8} = \frac{40}{40} \quad 6. \quad \frac{2}{7} = \frac{21}{21} \quad 8. \quad \frac{5}{8} = \frac{8}{8} \)

   \( - \frac{1}{2} = \frac{14}{14} \quad - \frac{3}{5} = \frac{40}{40} \quad + \frac{2}{3} = \frac{21}{21} \quad - \frac{1}{4} = \frac{8}{8} \)

   \( \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \)

In the following problems, find the lowest common denominator. (Look for the smallest number that both the denominators will divide into evenly.) Then work out the problems by following the same steps as you used for the problems above.

9. Is the common denominator 4, 6, or 8?
   \( \frac{1}{3} = \frac{3}{3} \quad + \frac{1}{2} = \frac{6}{6} \)

10. Is the common denominator 8, 10, or 12?
    \( \frac{2}{3} = \frac{16}{16} \quad + \frac{1}{4} = \frac{4}{4} \)

11. \( \frac{3}{8} = \frac{3}{3} \quad - \frac{1}{3} = \frac{3}{3} \)

12. \( \frac{6}{7} = \frac{6}{6} \quad - \frac{2}{3} = \frac{2}{2} \quad - \frac{1}{3} = \frac{1}{1} \)

13. \( \frac{2}{5} = \frac{2}{2} \quad - \frac{1}{4} = \frac{1}{1} \quad - \frac{1}{4} = \frac{1}{1} \)

14. \( \frac{1}{9} = \frac{1}{1} \quad + \frac{2}{3} = \frac{2}{2} \)

15. \( \frac{5}{6} = \frac{5}{5} \quad - \frac{1}{3} = \frac{1}{1} \)

16. \( \frac{2}{7} = \frac{2}{2} \quad + \frac{1}{4} = \frac{1}{1} \)

34
1. Figure out what \( A \) is on the following number line.

\[
\begin{array}{c|c|c}
23 & A & 28 \\
\end{array}
\]

\( A = \) 

2. Write 19,000,000,000,000 in words. 

3. Factors of 56 = 

4. \( 42238 \div 7 = \) 

5. \( 4 : 44 = \) : 66 

6. \( 9 : 45 = 4 : \) 

7. \( 10 : 20 = 100 : \) 

8. \( 12 : 36 = \) : 9 

9. Find the average of 713 and 515. 

10. Write ten and seventeen thousandths in decimals. 

11. \( 74 - 21.428 = \) 

12. \( 2.4 + 35 + .17 = \) 

13. Round off .44568 to the nearest thousandth. 

14. Round off 78.472 to the nearest one. 

15. \( 8.21 \times 3.7 = \) 

16. \( 6.822 \div 1.8 = \) 

17. Circle the measures of weight.
- miles
- kilograms
- pounds
- centimeters
- inches
- ounces
- kilometers
- tons
- grams

18. How many days are in July? 

19. How many days are in September? 

20. \( 7^2 + 5^3 = \) 

21. Three to the sixth = 

22. How far along the inch is \( A \)? Use a fraction to answer.

\[
\begin{array}{c|c}
\text{A} & A = \end{array}
\]

23. Write MMCLXVIII as an Arabic number. 

24. Write 3,234 in Roman numerals. 

25. Howard and Bo did \( \frac{3}{4} \) of a job. How much remained to be done? 

26. Gladys read 28 pages an hour as she made her way through a detective novel. It took her exactly 6.5 hours to read the book. How many pages did the book have? 

27. How many cents are in a quarter? 

28. How many cents are in five nickels? 

29. How many cents are in nine dimes?
30. How many days are in seventeen weeks?
   ____
31. How many ounces are in a pound? ____
32. How many pounds are in a ton? ____
33. How many cups are in a pint? ____
34. How many pints are in a quart? ____
35. How many quarts are in a gallon? ____
36. How many inches are in a foot? ____
37. How many feet are in a mile? ____
38. How many seconds are in a minute? ____
Fractions with Unlike Denominators 3

To solve the problems below, use the following steps:
1) Find the lowest common denominator.
2) Find the numerators (tops) to put over the lowest common denominators.
3) Add or subtract the numerators.

1. \( \frac{3}{5} = \) ____________
   \( \text{+} \) \( \frac{1}{4} = \) ____________

5. \( \frac{8}{9} = \) ____________
   \( \text{+} \) \( \frac{5}{6} = \) ____________

9. \( \frac{6}{7} = \) ____________
   \( \text{-} \) \( \frac{1}{2} = \) ____________

2. \( \frac{3}{8} = \) ____________
   \( \text{+} \) \( \frac{1}{6} = \) ____________

6. \( \frac{5}{6} = \) ____________
   \( \text{+} \) \( \frac{1}{4} = \) ____________

10. \( \frac{3}{8} = \) ____________

3. \( \frac{4}{9} = \) ____________
   \( \text{+} \) \( \frac{1}{3} = \) ____________

7. \( \frac{4}{5} = \) ____________
   \( \text{-} \) \( \frac{2}{3} = \) ____________

11. \( \frac{4}{9} = \) ____________

4. \( \frac{2}{3} = \) ____________
   \( \text{+} \) \( \frac{1}{7} = \) ____________

8. \( \frac{1}{3} = \) ____________
   \( \text{+} \) \( \frac{3}{10} = \) ____________

12. \( \frac{5}{8} = \) ____________

Each of the following problems contains three fractions. To solve these problems, use the same steps as you used for the problems above.

13. \( \frac{1}{3} = \) ____________

14. \( \frac{1}{2} = \) ____________

15. \( \frac{1}{10} = \) ____________

\( \frac{1}{4} = \) ____________

\( \frac{1}{6} = \) ____________

\( \frac{1}{3} = \) ____________

\( \text{+} \) \( \frac{1}{2} = \) ____________

\( \text{+} \) \( \frac{1}{4} = \) ____________

\( \text{+} \) \( \frac{1}{5} = \) ____________
Fractions with Unlike Denominators 4

To solve the problems below, use the following steps:
1) Find the lowest common denominator.
2) Find the numerators (tops) to put over the lowest common denominators.
3) Add or subtract the numerators.

1. \( \frac{1}{6} + \frac{3}{5} = \) 
5. \( \frac{3}{4} - \frac{1}{3} = \)
9. \( \frac{8}{9} - \frac{1}{2} = \)
13. \( \frac{4}{5} + \frac{1}{7} = \)

2. \( \frac{7}{8} - \frac{1}{3} = \) 
6. \( \frac{4}{11} + \frac{1}{2} = \) 
10. \( \frac{2}{5} + \frac{1}{4} = \) 
14. \( \frac{1}{2} + \frac{3}{8} = \)

3. \( \frac{5}{6} - \frac{3}{8} = \) 
7. \( \frac{2}{7} + \frac{1}{4} = \) 
11. \( \frac{9}{10} - \frac{2}{3} = \) 
15. \( \frac{5}{6} - \frac{4}{9} = \)

4. \( \frac{1}{2} + \frac{1}{3} + \frac{1}{8} = \)
8. \( \frac{1}{5} + \frac{1}{6} + \frac{1}{10} = \)
12. \( \frac{1}{5} + \frac{1}{6} + \frac{1}{9} = \)
16. \( \frac{1}{3} + \frac{1}{9} = \)

Arrange the fractions in the following problems one above the other. Then work out each problem and put the answers on this page.

17. \( \frac{1}{7} + \frac{2}{3} = \)
18. \( \frac{4}{5} - \frac{3}{7} = \)
19. \( \frac{1}{10} + \frac{1}{2} = \)
Solve the following problems.

1. \( \frac{3}{8} + \frac{1}{3} \)
2. \( \frac{1}{4} + \frac{1}{6} \)
3. \( \frac{3}{4} - \frac{1}{5} \)
4. \( \frac{7}{8} - \frac{5}{6} \)
5. \( \frac{5}{9} + \frac{1}{3} \)

Now do the following problems. Remember to arrange the fractions one above the other before you work each one out.

6. \( \frac{6}{7} - \frac{2}{3} = \) 
7. \( \frac{4}{7} + \frac{1}{5} = \)
8. \( \frac{1}{6} + \frac{2}{9} = \)
9. \( \frac{2}{3} - \frac{3}{10} = \)
10. \( \frac{1}{5} + \frac{1}{6} + \frac{1}{3} = \)
1. Figure out what A is on the following number line.

18  A  42

A = ______

2. Write 230,000,000 in words.

Write fourteen billion in numbers.

3. Factor 36 four ways. ______  ______

4. 51225 ÷ 8 = ______

5. Find the average of 17, 23, and 32.

6. Write 7.18 in words.

Write two and one thousandth in decimals.

7. 98 + 3.69 + 2.735 = ______

8. 16.8 − 4.231 = ______

9. Round off 69,575,214 to the nearest million.

10. Round off .443798 to the nearest tenth.

11. 685 × 3.7 = ______

12. Write MCDLXXXVIII as an Arabic number.

Write 2,845 in Roman numerals.

13. 468.72 ÷ 6.2 = ______

14. Five cubed = ______

15. What fraction of the circle is shaded in?

16. If \( \frac{3}{7} \) of a job is finished, how much still has to be done?

17. Complete the ratio.

\( 6 : 18 = 8 : \) ______
Unit 24 — Reducing Fractions 1

Reducing fractions to their lowest terms is a way of making them easier to understand. To reduce a fraction, find the largest number that will divide evenly into the top and bottom. This number is called the highest common factor. Divide it into the top and bottom, and then write the answers as the reduced fraction.

Example:
\[
\begin{align*}
\frac{6}{12} &= \quad \text{The highest common factor} \\
\quad &= \quad \text{of 6 and 12 is 6.} \\
\frac{6}{12} &= \quad \text{Dividing by 6} \\
\frac{1}{2} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

Reduce the following fractions to their lowest terms. Before you begin each problem, write the highest common factor in the circle.

1. \(\boxed{2}\) is the highest common factor.
\[
\begin{align*}
\frac{2}{4} &= \quad \text{Dividing by 2} \\
\frac{1}{2} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

2. \(\boxed{5}\) is the highest common factor.
\[
\begin{align*}
\frac{10}{15} &= \quad \text{Dividing by 5} \\
\frac{2}{3} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

3. \(\boxed{2}\)
\[
\begin{align*}
\frac{6}{8} &= \quad \text{Dividing by 2} \\
\frac{3}{4} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

4. \(\boxed{5}\)
\[
\begin{align*}
\frac{5}{15} &= \quad \text{Dividing by 5} \\
\frac{1}{3} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

5. \(\boxed{2}\)
\[
\begin{align*}
\frac{8}{8} &= \quad \text{Dividing by 8} \\
\frac{1}{1} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

6. \(\boxed{2}\)
\[
\begin{align*}
\frac{12}{14} &= \quad \text{Dividing by 2} \\
\frac{6}{7} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

7. \(\boxed{2}\)
\[
\begin{align*}
\frac{6}{12} &= \quad \text{Dividing by 6} \\
\frac{1}{2} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

8. \(\boxed{4}\)
\[
\begin{align*}
\frac{4}{12} &= \quad \text{Dividing by 4} \\
\frac{1}{3} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

9. \(\boxed{2}\)
\[
\begin{align*}
\frac{2}{16} &= \quad \text{Dividing by 2} \\
\frac{1}{8} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

10. \(\boxed{8}\)
\[
\begin{align*}
\frac{8}{12} &= \quad \text{Dividing by 4} \\
\frac{2}{3} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

11. \(\boxed{4}\)
\[
\begin{align*}
\frac{6}{6} &= \quad \text{Dividing by 6} \\
\frac{1}{1} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

12. \(\boxed{2}\)
\[
\begin{align*}
\frac{2}{20} &= \quad \text{Dividing by 2} \\
\frac{1}{10} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

13. \(\boxed{6}\)
\[
\begin{align*}
\frac{6}{8} &= \quad \text{Dividing by 2} \\
\frac{3}{4} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

14. \(\boxed{18}\)
\[
\begin{align*}
\frac{18}{24} &= \quad \text{Dividing by 6} \\
\frac{3}{4} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

15. \(\boxed{3}\)
\[
\begin{align*}
\frac{3}{15} &= \quad \text{Dividing by 3} \\
\frac{1}{5} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

16. \(\boxed{6}\)
\[
\begin{align*}
\frac{6}{15} &= \quad \text{Dividing by 3} \\
\frac{2}{5} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

17. \(\boxed{6}\)
\[
\begin{align*}
\frac{6}{18} &= \quad \text{Dividing by 6} \\
\frac{1}{3} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

18. \(\boxed{4}\)
\[
\begin{align*}
\frac{4}{24} &= \quad \text{Dividing by 4} \\
\frac{1}{6} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

19. \(\boxed{16}\)
\[
\begin{align*}
\frac{16}{20} &= \quad \text{Dividing by 4} \\
\frac{4}{5} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

20. \(\boxed{9}\)
\[
\begin{align*}
\frac{9}{18} &= \quad \text{Dividing by 9} \\
\frac{1}{2} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]

21. \(\boxed{20}\)
\[
\begin{align*}
\frac{20}{30} &= \quad \text{Dividing by 10} \\
\frac{2}{3} &= \quad \text{gives the reduced fraction.}
\end{align*}
\]
## Reducing Fractions 2

Reduce each fraction below to its lowest terms. To do this, write the highest common factor in the circle; then divide the highest common factor into the top and bottom of the fraction.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $\frac{6}{8}$</td>
<td>10. $\frac{5}{30}$</td>
<td>19. $\frac{8}{20}$</td>
</tr>
<tr>
<td>2. $\frac{4}{8}$</td>
<td>11. $\frac{6}{24}$</td>
<td>20. $\frac{2}{12}$</td>
</tr>
<tr>
<td>3. $\frac{7}{14}$</td>
<td>12. $\frac{6}{9}$</td>
<td>21. $\frac{10}{30}$</td>
</tr>
<tr>
<td>4. $\frac{3}{9}$</td>
<td>13. $\frac{10}{15}$</td>
<td>22. $\frac{9}{15}$</td>
</tr>
<tr>
<td>5. $\frac{5}{20}$</td>
<td>14. $\frac{8}{16}$</td>
<td>23. $\frac{6}{36}$</td>
</tr>
<tr>
<td>6. $\frac{12}{16}$</td>
<td>15. $\frac{4}{28}$</td>
<td>24. $\frac{4}{14}$</td>
</tr>
<tr>
<td>7. $\frac{7}{21}$</td>
<td>16. $\frac{7}{35}$</td>
<td>25. $\frac{2}{30}$</td>
</tr>
<tr>
<td>8. $\frac{14}{21}$</td>
<td>17. $\frac{6}{30}$</td>
<td>26. $\frac{5}{40}$</td>
</tr>
<tr>
<td>9. $\frac{4}{12}$</td>
<td>18. $\frac{12}{30}$</td>
<td>27. $\frac{9}{21}$</td>
</tr>
</tbody>
</table>
1. $\frac{1}{3} + \frac{3}{8} = $ 
2. $\frac{9}{10} - \frac{1}{3} = $ 
3. $\frac{4}{5} - \frac{3}{4} = $ 
4. $\frac{3}{7} + \frac{1}{3} = $ 
5. $\frac{4}{5} - \frac{2}{3} = $ 
6. $\frac{4}{7} + \frac{1}{4} = $ 

7. Figure out what $A$ is on the following number line.

```
35  A  63
```

$A = $ 

8. Write 44,000,000,000 in words.

9. Factors of 55 = 

10. $7 : 49 = 9 : $ 
11. $5 : 25 = $ : 35 
12. $210.945 + .35 = $ 
13. $79.1 \times .68 = $ 

14. Find the average of 371 and 203. 

15. Write six and one tenth in decimals. 


17. $79 + 1.9 + 3.77 = $ 
18. $22 - 1.73 = $ 

Round off the following to the nearest ten.

19. $77 $ 
20. $91 $ 

21. Round off .834793 to the nearest hundredth.

22. Write MMCCXLVII as an Arabic number.

23. $5^2 + 7^3 = $ 

24. Two to the seventh = 

25. Mr. Spock’s Cadillac went 286 miles on a full tank of 22 gallons of gas. How many miles is this gas-guzzler getting to the gallon?

26. A theater charged $3.25 per ticket, and only 93 people came to see the movie. How much did the theater make for that showing?

27. How many nickels are in a dollar? 

28. How many dimes are in a dollar? 

29. How many quarters are in a dollar? 

30. How many half-dollars are in a dollar? 

31. How many days are in February in a leap year? 

32. How many days are in March? 

33. How many days are in November? 

34. How many quarts are in 4 gallons? 

35. How many ounces are in 6 pounds? 

36. How many days are in 6 weeks?
37. Circle the metric measure you would use to measure the water in a pot.
   - millimeter
   - liter

38. Circle which metric measure you would use to measure the thickness of your fingernail.
   - millimeter
   - centimeter
   - meter
   - kilometer

39. Which metric measure would you use to measure the distance between your eyes?
Reducing Fractions 3

Reduce the following fractions to their lowest terms. Be careful; some of them don’t need to be reduced.

1. \( \frac{4}{8} = \) ______
2. \( \frac{6}{12} = \) ______
3. \( \frac{2}{3} = \) ______
4. \( \frac{7}{14} = \) ______
5. \( \frac{2}{12} = \) ______
6. \( \frac{4}{16} = \) ______
7. \( \frac{8}{9} = \) ______
8. \( \frac{11}{22} = \) ______
9. \( \frac{9}{27} = \) ______
10. \( \frac{14}{21} = \) ______
11. \( \frac{6}{18} = \) ______
12. \( \frac{3}{24} = \) ______
13. \( \frac{8}{16} = \) ______
14. \( \frac{4}{30} = \) ______
15. \( \frac{9}{21} = \) ______
16. \( \frac{7}{42} = \) ______
17. \( \frac{2}{21} = \) ______
18. \( \frac{8}{80} = \) ______
19. \( \frac{16}{24} = \) ______
20. \( \frac{18}{27} = \) ______

In the following problems, add or subtract, and then reduce the answer to the lowest terms if necessary.

21. \( \frac{7}{8} - \frac{3}{8} = \) ______
22. \( \frac{4}{15} + \frac{4}{15} = \) ______
23. \( \frac{3}{10} + \frac{3}{10} = \) ______
24. \( \frac{9}{14} - \frac{5}{14} = \) ______
25. \( \frac{5}{9} - \frac{2}{9} = \) ______
26. \( 1 \frac{1}{6} + 1 \frac{1}{6} = \) ______

27. A woman jogged \( \frac{5}{8} \) of a mile one day

and \( \frac{1}{6} \) of a mile the next. How far did she go in all?

\( \)
Reducing Fractions 4

Reduce the following fractions to their lowest terms. If a fraction can’t be reduced, just copy it the way it is—it’s already in its lowest terms.

1. \( \frac{4}{12} = \)  
6. \( \frac{15}{20} = \)  
11. \( \frac{6}{36} = \)  
16. \( \frac{4}{48} = \)

2. \( \frac{7}{21} = \)  
7. \( \frac{6}{18} = \)  
12. \( \frac{14}{28} = \)  
17. \( \frac{2}{5} = \)

3. \( \frac{6}{9} = \)  
8. \( \frac{4}{5} = \)  
13. \( \frac{16}{17} = \)  
18. \( \frac{15}{30} = \)

4. \( \frac{8}{12} = \)  
9. \( \frac{8}{10} = \)  
14. \( \frac{2}{32} = \)  
19. \( \frac{8}{48} = \)

5. \( \frac{11}{12} = \)  
10. \( \frac{10}{40} = \)  
15. \( \frac{9}{36} = \)  
20. \( \frac{2}{100} = \)

Now work out the following problems. If the answer needs to be reduced to its lowest terms, do so. If not, just leave it as it is.

21. \( \frac{3}{10} + \frac{2}{10} = \)  
23. \( \frac{6}{10} + \frac{3}{10} = \)

22. \( \frac{8}{15} + \frac{2}{15} = \)  
24. \( \frac{13}{20} - \frac{3}{20} = \)

Solve the following word problem.

25. A man painted \( \frac{4}{15} \) of his house one day and \( \frac{8}{15} \) the next. What fraction of the house was painted?

____________________________________

What fraction did he still have to do?

____________________________________
Reduce the following fractions to their lowest terms. If some of them can’t be reduced, just copy them as they are.

1. \( \frac{5}{10} = \)  
5. \( \frac{10}{40} = \)  
9. \( \frac{6}{36} = \)  
13. \( \frac{16}{32} = \)  

2. \( \frac{6}{8} = \)  
6. \( \frac{3}{18} = \)  
10. \( \frac{8}{40} = \)  
14. \( \frac{40}{50} = \)  

3. \( \frac{4}{5} = \)  
7. \( \frac{5}{35} = \)  
11. \( \frac{9}{17} = \)  
15. \( \frac{2}{28} = \)  

4. \( \frac{8}{16} = \)  
8. \( \frac{10}{12} = \)  
12. \( \frac{2}{22} = \)  
16. \( \frac{25}{100} = \)  

Now work out the following problems. Make sure you give the answers in their lowest terms.

17. \( \frac{4}{9} + \frac{2}{9} = \)  

18. \( \frac{6}{14} + \frac{1}{14} = \)  

19. \( \frac{4}{25} + \frac{9}{25} = \)  

20. \( \frac{19}{20} - \frac{4}{20} = \)  

1. Figure out what $A$ is on the following number line.

\[ \begin{array}{ccc}
20 & A & 100 \\
\end{array} \]

$A = \underline{___}$

2. Write 601,000 in words.

Write five hundred billion in numbers.

3. Factor 22.

4. $31555 \div 9 = \underline{___}$

5. Find the average of 123, 318, and 213.

6. Write 12,012 in words.

Write four and two hundredths in decimals.

7. $9.6 + 17 + 293.42 = \underline{___}$

8. $63.4 - 29.147 = \underline{___}$

9. Round off 62,741 to the nearest thousand.

10. Round off .6375926 to the nearest thousandth.

11. $7.21 \times .47 = \underline{___}$

12. Write MMMDCLXXI as an Arabic number.

Write 2,924 in Roman numerals.

13. $44.296 \div .56 = \underline{___}$

14. Three squared $= \underline{___}$

$5^3 = \underline{___}$

15. What fraction of the circle is shaded in?

16. If $\frac{17}{29}$ of a hotel is filled, what fraction is empty?

17. Complete the ratio.

$5 : 55 = \underline{___} : 77$

18. $\frac{2}{3} + \frac{1}{4} = \underline{___}$
An improper fraction is one like $\frac{8}{3}$ in which the top is bigger than the bottom. If you get an improper fraction in the answer to a problem, you must change it to a mixed number for it to be correct.

Example:

\[
\text{Improper fraction} \quad \rightarrow \quad \text{Mixed number}
\]

\[
\frac{8}{3} \quad = \quad 2 \frac{2}{3}
\]

Shade in the circles below. Look at the improper fractions to see how many parts to shade in. Write a whole number to show how many whole circles are filled in, and write a fraction to show what is left over.

Example:

\[
\begin{align*}
\text{1.}\quad & \frac{7}{3} \quad = \quad \underline{2} \underline{1} \underline{2} \\
\text{2.}\quad & \frac{9}{4} \quad = \quad \underline{2} \underline{1} \underline{0} \underline{1} \\
\text{3.}\quad & \frac{15}{8} \quad = \quad \underline{1} \underline{8} \underline{5} \underline{8}
\end{align*}
\]

There is an easier way to change improper fractions to mixed numbers. Follow these steps:

1) Divide the bottom of the fraction into the top.
2) Write the answer as a whole number.
3) Write the remainder (if there is one) as a numerator over the same denominator you started with.

Example:

\[
\frac{7}{5} = \quad 1 \frac{2}{5} \quad \text{Answer}
\]

Change the following improper fractions to mixed numbers.

\[
\begin{align*}
\text{8.} \quad & \frac{8}{2} \quad = \quad \underline{4} \\
\text{9.} \quad & \frac{3}{2} \quad = \quad \underline{1} \underline{5} \\
\text{10.} \quad & \frac{10}{3} \quad = \quad \underline{3} \underline{1} \\
\text{11.} \quad & \frac{7}{2} \quad = \quad \underline{3} \underline{5} \\
\text{12.} \quad & \frac{14}{5} \quad = \quad \underline{2} \underline{4} \\
\text{13.} \quad & \frac{14}{3} \quad = \quad \underline{4} \underline{5} \\
\text{14.} \quad & \frac{13}{2} \quad = \quad \underline{6} \underline{5} \\
\text{15.} \quad & \frac{13}{10} \quad = \quad \underline{1} \underline{3} \\
\text{16.} \quad & \frac{5}{3} \quad = \quad \underline{1} \underline{6}
\end{align*}
\]
Improper Fractions and Mixed Numbers 2

Change the following improper fractions to mixed numbers.

Remember the three steps to follow:
1) Divide the bottom of the fraction into the top.
2) Write the answer as a whole number.
3) Write the remainder (if any) as a numerator over the same denominator you started with.

Example:
\[
\frac{7}{3} = 2 \frac{1}{3}
\]

1. \(\frac{5}{4} = \) 
   4. \(\frac{10}{3} = \) 
   7. \(\frac{3}{3} = \) 
   10. \(\frac{9}{5} = \) 
   13. \(\frac{9}{9} = \) 

2. \(\frac{9}{2} = \) 
   5. \(\frac{12}{5} = \) 
   8. \(\frac{15}{7} = \) 
   11. \(\frac{17}{8} = \) 
   14. \(\frac{21}{10} = \) 

3. \(\frac{4}{2} = \) 
   6. \(\frac{8}{7} = \) 
   9. \(\frac{5}{4} = \) 
   12. \(\frac{14}{7} = \) 
   15. \(\frac{17}{2} = \) 

To change mixed numbers back into improper fractions, use the following steps:
1) Multiply the bottom of the fraction by the whole number.
2) Add the top of the fraction to the answer.
3) Write that answer as the top of a fraction with the same denominator that you started with on the bottom.

Example:
\[
2 \frac{3}{4} \rightarrow \frac{11}{4} \quad (4 \times 2 = 8 + 3 = 11)
\]

Change the following mixed numbers to improper fractions.

16. \(2 \frac{2}{3} = \) 
   19. \(1 \frac{1}{4} = \) 
   22. \(6 \frac{1}{8} = \) 
   25. \(10 \frac{1}{3} = \) 

17. \(4 \frac{1}{3} = \) 
   20. \(2 \frac{5}{9} = \) 
   23. \(1 \frac{9}{10} = \) 
   26. \(4 \frac{6}{7} = \) 

18. \(5 \frac{2}{3} = \) 
   21. \(4 \frac{3}{8} = \) 
   24. \(5 \frac{7}{8} = \) 
   27. \(7 \frac{1}{2} = \)
### Review 25

Reduce the following fractions to lowest terms.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \frac{4}{6} )</td>
<td>_____</td>
</tr>
<tr>
<td>2. ( \frac{9}{21} )</td>
<td>_____</td>
</tr>
<tr>
<td>3. ( \frac{4}{6} )</td>
<td>_____</td>
</tr>
<tr>
<td>4. ( \frac{6}{9} )</td>
<td>_____</td>
</tr>
<tr>
<td>5. ( \frac{7}{49} )</td>
<td>_____</td>
</tr>
<tr>
<td>6. ( \frac{4}{20} )</td>
<td>_____</td>
</tr>
<tr>
<td>7. ( \frac{5}{25} )</td>
<td>_____</td>
</tr>
<tr>
<td>8. ( \frac{21}{24} )</td>
<td>_____</td>
</tr>
<tr>
<td>9. ( \frac{30}{33} )</td>
<td>_____</td>
</tr>
<tr>
<td>10. ( \frac{3}{15} )</td>
<td>_____</td>
</tr>
<tr>
<td>11. ( \frac{9}{15} )</td>
<td>_____</td>
</tr>
</tbody>
</table>

23. \( \frac{3}{4} - \frac{1}{8} = \) _____
24. \( \frac{2}{5} + \frac{1}{3} = \) _____

25. Find the average of 636, 213, and 420. _____

26. \( 7^3 = \) _____
27. Five to the fourth = _____
28. Factors of 81 = _____

29. Write 6.05 in words. _____

30. Write nine hundred thirty-eight billion in numbers. _____

31. \( 4.78 + 9.731 = \) _____

32. \( 30 - 2.18 = \) _____

33. Circle the best metric measure to use to measure a basketball court.
   - millimeters
   - centimeters
   - meters
   - kilometers

34. Which metric measure would be best to measure this piece of paper?

35. Circle the best metric measure to use to measure the weight of a dog.
   - milligrams
   - grams
   - kilograms

36. How many seconds are in a minute? _____

37. How many minutes are in an hour? _____

38. How many hours are in a day? _____

---

12. Figure out what A is on the following number line.

```
12 | | | A | | | 40
```

A = _____

13. \( 7 : 14 = 8 : \) _____
14. \( 3 : 12 = \) _____ : 20

15. \( 5581 \times .23 = \) _____
16. \( 460.734 \div .51 = \) _____

17. Round off 29512 to the nearest thousand. _____

18. Round off 6.9343789 to the nearest thousandth. _____

19. Write MMCCCLXXXII in Arabic numbers. _____

20. Write 3,428 in Roman numerals. _____

21. \( \frac{9}{10} + \frac{1}{3} = \) _____
22. \( \frac{6}{7} - \frac{1}{3} = \) _____
39. How many days are in a week? 

40. How many days are in a year? 

41. How many days are in a leap year? 

42. How many inches are in a foot? 

43. How many inches are in a yard? 

44. How many feet are in a mile? 

45. How many cups are in a pint? 

46. A bicycle racer covered 595 miles going 35 miles an hour. How long did this take? 

47. A woman decided that she liked dimes. She went to the bank and asked for $189.90 worth of dimes. How many dimes did she get? 

Do you think they'd give that many dimes to her? Why?
Improper Fractions and Mixed Numbers 3

Change the following improper fractions to mixed numbers.

Example:
\(\frac{5}{3} = 1 \frac{2}{3}\)

1. \(\frac{8}{2} = \_\_\_\_\_
2. \(\frac{10}{7} = \_\_\_\_
3. \(\frac{7}{6} = \_\_\_\_
4. \(\frac{12}{3} = \_\_\_\_
5. \(\frac{15}{7} = \_\_\_\_
6. \(\frac{9}{2} = \_\_\_\_
7. \(\frac{23}{7} = \_\_\_\_
8. \(\frac{14}{3} = \_\_\_\_

Change the following mixed numbers to improper fractions.

9. \(2 \frac{1}{3} = \frac{7}{3}\)
10. \(4 \frac{3}{4} = \_\_\_\_
11. \(6 \frac{1}{2} = \_\_\_\_
12. \(9 \frac{2}{5} = \_\_\_\_
13. \(5 \frac{1}{2} = \_\_\_\_
14. \(7 \frac{4}{7} = \_\_\_\_
15. \(12 \frac{1}{2} = \_\_\_\_
16. \(6 \frac{2}{9} = \_\_\_\_
17. \(11 \frac{3}{5} = \_\_\_\_

Now work out the answers to the following problems. If an answer is an improper fraction, change it to a mixed number.

18. \(\frac{5}{8} + \frac{7}{8} = \frac{12}{8} = \_\_\_\_\_
19. \(\frac{2}{3} + \frac{2}{3} = \_\_\_\_\_
20. \(\frac{4}{5} + \frac{3}{5} = \_\_\_\_\_
21. \(\frac{7}{9} + \frac{8}{9} + \frac{3}{9} = \frac{20}{9} = \_\_\_\_\_
22. \(\frac{4}{5} + \frac{3}{5} + \frac{4}{5} = \_\_\_\_\_
23. \(\frac{7}{8} + \frac{6}{8} + \frac{5}{8} = \frac{18}{8} = \_\_\_\_\_
24. \(\frac{3}{4} + \frac{4}{5} = \_\_\_\_\_\_

25. \(\frac{7}{8} = \_\_\_\_\_\_\_

25. \(\frac{4}{5} = \_\_\_\_\_\_

53
Improper Fractions and Mixed Numbers 4

Change the following improper fractions to mixed numbers.

1. \( \frac{7}{2} = \) __________
2. \( \frac{5}{3} = \) __________
3. \( \frac{10}{2} = \) __________
4. \( \frac{14}{3} = \) __________
5. \( \frac{24}{5} = \) __________
6. \( \frac{6}{5} = \) __________
7. \( \frac{18}{6} = \) __________
8. \( \frac{24}{7} = \) __________
9. \( \frac{19}{10} = \) __________

Change the following mixed numbers to improper fractions.

10. \( 6 \frac{1}{3} = \) __________
11. \( 4 \frac{2}{5} = \) __________
12. \( 9 \frac{1}{2} = \) __________
13. \( 10 \frac{3}{5} = \) __________
14. \( 1 \frac{1}{5} = \) __________
15. \( 5 \frac{2}{7} = \) __________
16. \( 2 \frac{8}{9} = \) __________
17. \( 7 \frac{1}{7} = \) __________
18. \( 11 \frac{1}{5} = \) __________

Work out the following problems. If an answer is an improper fraction, change it to a mixed number.

19. \( \frac{1}{3} + \frac{2}{3} + \frac{2}{3} = \) __________
20. \( \frac{3}{7} + \frac{4}{7} + \frac{6}{7} = \) __________
21. \( \frac{2}{9} + \frac{8}{9} + \frac{5}{9} = \) __________
22. \( \frac{4}{5} + \frac{4}{5} + \frac{4}{5} = \) __________
23. \( \frac{9}{10} + \frac{7}{10} + \frac{5}{10} = \) __________
24. \( \frac{14}{15} + \frac{13}{15} + \frac{8}{15} = \) __________
25. \( \frac{7}{8} = \) __________
\( \quad + \frac{4}{5} = \) __________
# Test 25 — Improper Fractions and Mixed Numbers

<table>
<thead>
<tr>
<th>Change the following improper fractions to mixed numbers.</th>
<th>Change the following mixed numbers to improper fractions.</th>
<th>Work out the following problems. Give the final answers as mixed numbers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \frac{5}{2} = ) _______</td>
<td>8. ( 4 \frac{2}{3} = ) _______</td>
<td>15. ( \frac{4}{7} + \frac{5}{7} + \frac{6}{7} = ) _______</td>
</tr>
<tr>
<td>2. ( \frac{17}{5} = ) _______</td>
<td>9. ( 8 \frac{1}{2} = ) _______</td>
<td>16. ( \frac{9}{10} + \frac{1}{10} + \frac{7}{10} = ) _______</td>
</tr>
<tr>
<td>3. ( \frac{4}{3} = ) _______</td>
<td>10. ( 3 \frac{5}{6} = ) _______</td>
<td>17. ( \frac{2}{3} + \frac{2}{3} + \frac{1}{3} = ) _______</td>
</tr>
<tr>
<td>4. ( \frac{25}{5} = ) _______</td>
<td>11. ( 9 \frac{2}{5} = ) _______</td>
<td>18. ( \frac{8}{9} + \frac{2}{9} + \frac{7}{9} = ) _______</td>
</tr>
<tr>
<td>5. ( \frac{7}{6} = ) _______</td>
<td>12. ( 16 \frac{1}{2} = ) _______</td>
<td>19. ( \frac{4}{7} = ) _______ + ( \frac{2}{3} = ) _______</td>
</tr>
<tr>
<td>6. ( \frac{10}{9} = ) _______</td>
<td>13. ( 10 \frac{5}{7} = ) _______</td>
<td></td>
</tr>
<tr>
<td>7. ( \frac{28}{5} = ) _______</td>
<td>14. ( 9 \frac{4}{5} = ) _______</td>
<td>20. ( \frac{5}{9} = ) _______ + ( \frac{4}{5} = ) _______</td>
</tr>
</tbody>
</table>

55
1. Figure out what A is on the following number line.

16  |  A  |  24

A =

2. Write 219,000,000,000 in words.

Write three hundred trillion in numbers.

3. Factor 28 two ways.

4. \(42379 \div 7\) =

5. Find the average of 18 and 26.

6. Write 3.005 in words.

Write thirteen and twelve hundredths in decimals.

7. \(69 + 3.47 + 1.891\) =

8. \(26.5 - 18.268\) =

9. Round off 485,621,313 to the nearest million.

10. Round off 29.37842 to the nearest one.

11. \(9.03 \times 48\) =

12. Write MMCDLXVI as an Arabic number.

Write 3,642 in Roman numerals.

13. \(416.02 \div 6.2\) =

14. Six squared =

\(2^6\) =

15. What fraction of the circle is shaded in?

16. If \(\frac{13}{20}\) of a test is right, what fraction is wrong?

17. Complete the ratio.

\(9 : 27 = 10 : \frac{?}{4}\)

18. \(\frac{6}{7} - \frac{1}{3}\) =

19. Reduce the following fractions to lowest terms.

\(\frac{8}{30} = \frac{\phantom{0}}{\phantom{0}}\)

\(\frac{5}{35} = \frac{\phantom{0}}{\phantom{0}}\)
Work out the following problems. First add or subtract the fractions of each mixed number, then add or subtract the whole numbers.

Example:

1. \[ 9 \frac{4}{9} + 7 \frac{3}{9} = 16 \frac{7}{9} \]
2. \[ 6 \frac{1}{7} + 8 \frac{4}{7} = 15 \]
3. \[ 24 \frac{3}{4} - 5 \frac{2}{4} = 18 \frac{1}{4} \]
4. \[ 10 \frac{4}{11} - 2 \frac{3}{11} = 8 \frac{1}{11} \]
5. \[ 10 \frac{8}{9} - 5 \frac{7}{9} = 4 \frac{1}{9} \]
6. \[ 9 \frac{4}{5} - 4 \frac{1}{5} = 5 \frac{3}{5} \]

Work out the following problems. If the fraction in the answer is an improper fraction, change it to a mixed number. Then add the whole number in the mixed number to the whole number you already have.

Example:

7. \[ 5 \frac{2}{3} + 4 \frac{2}{3} = 9 \frac{4}{3} = 10 \frac{1}{3} \]
8. \[ 4 \frac{5}{8} + 7 \frac{3}{8} = 12 \frac{1}{4} \]
9. \[ 7 \frac{4}{5} + 8 \frac{3}{5} = 15 \frac{1}{10} \]
10. \[ 12 \frac{4}{11} + 10 \frac{2}{11} = 23 \frac{1}{11} \]
11. \[ 4 \frac{6}{7} + 8 \frac{3}{7} = 13 \frac{2}{7} \]
12. \[ 12 \frac{7}{9} + 5 \frac{8}{9} = 18 \frac{5}{9} \]

Extra skill: Get a ruler and measure these two lines. Reduce fractions of an inch. Put your answers on the lines below the problems.

13. \[
\text{__________________________}
= \text{__________________________}
\]
14. \[
\text{__________________________}
= \text{__________________________}
\]
Working with Mixed Numbers 2

Work out the following problems. The ones with an asterisk (*) are tricky—the fraction in the answer will be improper, so you will have to change it to a mixed number and then finish the problem.

1. \[4 \frac{7}{11} + 3 \frac{1}{11}\]
2. \[6 \frac{5}{9} + 2 \frac{2}{9}\]
3. \[9 \frac{1}{3} + 7 \frac{1}{3}\]
4. \[14 \frac{2}{3} - 3 \frac{1}{3}\]
5. \[13 \frac{7}{8} - 4 \frac{6}{8}\]
6. \[16 \frac{5}{8} + 3 \frac{2}{8}\]
7. \[8 \frac{4}{5} + 3 \frac{3}{5}\]
8. \[14 \frac{6}{7} + 5 \frac{3}{7}\]

Subtracting mixed numbers can also be tricky if the fraction on the top isn’t as big as the one on the bottom. Then you have to borrow from the whole number. Borrow one whole and turn it into a fraction.

Example:

\[
4 \frac{1}{3} - 1 \frac{2}{3} = 3 \frac{4}{3} - \frac{2}{3} = 2 \frac{2}{3}
\]

(Borrow \(\frac{3}{3}\) from the 4 and add it to \(\frac{1}{3}\).)

Practice turning one whole into fractions. Remember: to be one whole, the top and bottom of the fraction should be the same.

Example:

\[
1 = \frac{8}{8} \quad 9. \, 1 = \frac{5}{5} \quad 10. \, 1 = \frac{3}{3} \quad 11. \, 1 = \frac{2}{2} \quad 12. \, 1 = \frac{9}{9}
\]

Try the next two subtraction problems. You will have to borrow from a whole number in each problem.

13. \[5 \frac{3}{8} - 1 \frac{5}{8}\]
14. \[3 \frac{1}{9} - 1 \frac{5}{9}\]

Measure each of these lines with a ruler. Put your answer on the line to the right. Be sure to reduce fractions of an inch.

15. \[= \quad 16. \quad = \quad 17. \quad = \]
18. \[= \quad 19. \quad = \quad 20. \quad = \]
Change the following mixed numbers to improper fractions.

1. \( \frac{51}{8} = \) _____
2. \( \frac{41}{6} = \) _____
3. \( \frac{61}{9} = \) _____
4. \( \frac{34}{5} = \) _____
5. \( \frac{27}{7} = \) _____
6. \( \frac{12}{2} = \) _____

Change the following improper fractions to mixed numbers.

7. \( \frac{13}{2} = \) _____
8. \( \frac{24}{6} = \) _____
9. \( \frac{50}{9} = \) _____
10. \( \frac{41}{8} = \) _____
11. \( \frac{32}{5} = \) _____
12. \( \frac{18}{2} = \) _____

Reduce the following fractions to lowest terms.

13. \( \frac{6}{12} = \) _____
14. \( \frac{4}{16} = \) _____
15. \( \frac{18}{20} = \) _____
16. \( \frac{9}{12} = \) _____
17. \( \frac{7}{35} = \) _____
18. \( \frac{30}{32} = \) _____

Write point \( B \) as a mixed number; be sure to reduce the fraction.

19. \( \frac{2}{3} \)
   \( B = \) _____

20. \( \frac{4}{5} \)
   \( B = \) _____

21. Use a ruler to measure the line below.
   \[ \text{---} \]
   \( = \) _____

22. Factors of 35 =

23. Write 607,000,000,000 in words.

24. \( 4 : 24 = 7 : \) _____

25. \( 2 : 12 = \) _____ : 30

26. \( 1135.68 \div 2.8 = \) _____

27. Write MMDXI as an Arabic number.

28. Find the average of 28, 14, 35, and 23.

29. \( 6.04 \times 9.3 = \) _____

30. \( 6.4 + 83 + 1.063 = \) _____

31. \( 9.9 - 1.378 = \) _____

32. Round off 434 to the nearest hundred.

33. Round off \( .778931 \) to the nearest hundredth.

34. \( 4^3 = \) _____

35. Three to the fourth =

36. If \( \frac{4}{41} \) of a class is absent, what fraction is present?

37. \( \frac{6}{7} + \frac{4}{7} = \) _____

38. \( \frac{2}{3} - \frac{1}{4} = \) _____

39. \( \frac{1}{4} + \frac{2}{5} = \) _____
40. \(\frac{5}{6} - \frac{1}{3} = \)___

41. Mrs. Twinkle Toes runs 2.9 miles every day, rain or shine. How far would she run during the month of September? ___

42. Gus did \(\frac{1}{9}\) of a job, Hank did \(\frac{1}{5}\), and James did \(\frac{4}{15}\). How much did they do all together? ___

43. How much remained to be done? ___

44. How many feet are in a yard? ___
45. How many cups are in a pint? ___
46. How many quarts are in a gallon? ___
47. How many feet are in a mile? ___
48. How many days are in July? ___
49. How many days are in a leap year? ___
50. How many ounces are in a pound? ___
51. How many pounds are in a ton? ___
### Working with Mixed Numbers 3

Work out the following problems. One asterisk (*) means you will have an improper fraction in the answer. Two asterisks (**) mean you will have to borrow from a whole number before you subtract.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>3 (\frac{4}{9}) + 5 (\frac{2}{9})</td>
<td>5.</td>
<td>7 (\frac{1}{3}) + 8 (\frac{1}{3})</td>
<td>9.</td>
</tr>
<tr>
<td>2.</td>
<td>9 (\frac{2}{5}) + 8 (\frac{2}{5})</td>
<td>6.</td>
<td>16 (\frac{5}{13}) – 4 (\frac{4}{13})</td>
<td>10.</td>
</tr>
<tr>
<td>3.</td>
<td>8 (\frac{3}{5}) – 5 (\frac{1}{5})</td>
<td>7.</td>
<td>17 (\frac{3}{7}) + 6 (\frac{2}{7})</td>
<td>11.</td>
</tr>
<tr>
<td>4.</td>
<td>3 (\frac{4}{5}) * + 5 (\frac{2}{5})</td>
<td>8.</td>
<td>7 (\frac{1}{5}) ** – 4 (\frac{3}{5})</td>
<td>12.</td>
</tr>
</tbody>
</table>

Sometimes you must change a whole number to a mixed number before you can subtract.

Do the following subtraction problems.

Make sure the fractions have common denominators.

Example:

\[
\begin{align*}
8 & - 4 \frac{2}{3} = 7 \frac{3}{3} - 4 \frac{2}{3} \\
\frac{3}{1} & = \frac{1}{3}
\end{align*}
\]

\[
\begin{align*}
17. & \quad 6 - 2 \frac{1}{7} = 4 \frac{3}{4} - 1 \frac{3}{4} = 8 \frac{1}{2} - 8 \frac{1}{2} = 9
\end{align*}
\]

Measure these lines with a ruler and put your answers on the lines to the right. Reduce fractions of an inch.

20. \[\_\_\_\_] \[\_\_\_] = \[\_\_\_] 22. \[\_\_\_\_] \[\_\_\_] \[\_\_\_] \[\_\_\_] = \[\_\_\_\_\_] 21. \[\_\_\_\_] \[\_\_\_] = \[\_\_\_] 61
Work out the following problems. Watch out for improper fractions—don’t leave any in your answers. Also, watch for problems where you have to borrow from a whole number before you subtract.

1. \[ \frac{8}{5} + \frac{3}{5} = \frac{11}{5} \]
2. \[ \frac{14}{8} + \frac{4}{8} = \frac{18}{8} = \frac{9}{4} \]
3. \[ \frac{47}{9} - \frac{3}{9} = \frac{44}{9} \]
4. \[ 3 - \frac{4}{7} = \frac{17}{7} \]
5. \[ 18 \frac{4}{5} - \frac{1}{5} = 18 \frac{3}{5} \]
6. \[ 19 \frac{1}{3} + \frac{1}{3} = 20 \frac{2}{3} \]
7. \[ 10 \frac{1}{3} - \frac{2}{3} = 9 \frac{1}{3} \]
8. \[ 12 + \frac{3}{11} = 12 \frac{3}{11} \]
9. \[ 7 \frac{1}{8} - \frac{1}{8} = 7 \frac{0}{8} = 7 \]
10. \[ -1 \frac{4}{7} + 3 \frac{2}{3} = 1 \frac{2}{21} \]
11. \[ 12 \frac{2}{7} - \frac{1}{7} = 12 \frac{1}{7} \]
12. \[ 6 \frac{7}{8} - \frac{2}{8} = 6 \frac{5}{8} \]
13. \[ 14 \frac{3}{5} + 18 \frac{4}{5} = 33 \frac{7}{5} = 34 \frac{2}{5} \]
14. \[ 8 \frac{1}{3} + \frac{2}{3} = 9 \frac{1}{3} \]
15. \[ 41 \frac{1}{11} - 18 \frac{3}{11} = 22 \frac{8}{11} \]
16. \[ 13 \frac{4}{9} + \frac{7}{9} = 14 \frac{1}{9} \]
17. \[ 17 + \frac{3}{10} = 17 \frac{3}{10} \]
18. \[ 16 \frac{2}{3} - 7 \frac{1}{3} = 9 \frac{1}{3} \]
19. \[ 6 \]
20. \[ 59 \frac{2}{3} + 8 \frac{2}{3} = 68 \frac{4}{3} = 69 \frac{1}{3} \]

Measure each of these lines with a ruler. Put your answer on the line to the right. Reduce fractions of an inch.

21. \[ \underline{\text{Line 1}} = \underline{\text{Answer 1}} \]
22. \[ \underline{\text{Line 2}} = \underline{\text{Answer 2}} \]
Carefully work out the following problems.

1. \[ 4 \frac{1}{5} + 8 \frac{3}{5} \]

2. \[ 5 \frac{2}{5} + 9 \frac{4}{5} \]

3. \[ 9 \frac{1}{10} - 4 \frac{3}{10} \]

4. \[ 18 - 9 \frac{3}{4} \]

5. \[ 5 \frac{4}{9} - 3 \frac{3}{9} \]

6. \[ 4 \frac{5}{8} - 2 \frac{1}{3} \]

7. \[ 4 - 2 \frac{1}{2} \]

8. \[ 6 \frac{1}{3} - 3 \frac{2}{3} \]

9. \[ 2 \frac{3}{4} + 5 \frac{1}{4} \]

10. \[ 6 \frac{6}{7} + 9 \frac{4}{7} \]
1. Find the interval, and then figure out what $A$ is on the following number line.

$\begin{array}{ccc}
20 & & A & & 40
\end{array}$

$A = \underline{\hspace{2cm}}$

2. Write 290,000,000,000 in words.

$\underline{\hspace{8cm}}$

3. Factor 90 four ways.

$\underline{\hspace{5cm}}$

4. $48455 \div 8 = \underline{\hspace{2cm}}$

5. Find the average of 823 and 635.

$\underline{\hspace{2cm}}$

6. Write four and seventeen thousandths in decimals.

$\underline{\hspace{2cm}}$

7. $2.375 + 28 + 6.3 = \underline{\hspace{2cm}}$

8. $93.6 - 29.463 = \underline{\hspace{2cm}}$

9. Round off 354,265 to the nearest thousand.

$\underline{\hspace{2cm}}$

10. Round off .7764592 to the nearest hundredth.

$\underline{\hspace{2cm}}$

11. $629 \times 2.4 = \underline{\hspace{2cm}}$

12. Write MMDCXLVII in Arabic numbers.

$\underline{\hspace{7cm}}$

13. $20.976 \div .57 = \underline{\hspace{2cm}}$

14. $4^3 = \underline{\hspace{2cm}}$

15. What fraction of the circle is shaded in?

$\underline{\hspace{4cm}}$

16. If $\frac{9}{10}$ of a house is painted, how much remains to be done?

$\underline{\hspace{7cm}}$

17. Complete the ratio.

$\frac{6}{36} = \underline{\hspace{2cm}} : 42$

18. $\frac{3}{5} + \frac{1}{8} = \underline{\hspace{2cm}}$

19. Reduce the following fractions to lowest terms.

$\frac{6}{24} = \underline{\hspace{2cm}}$

$\frac{9}{12} = \underline{\hspace{2cm}}$

20. Change $4\frac{3}{5}$ to an improper fraction.

$\underline{\hspace{2cm}}$
To multiply fractions, first multiply the top by the top, then the bottom by the bottom. Check to make sure the answer is reduced to the lowest terms.

Work out the following problems.

Example:
\[
\frac{5}{6} \times \frac{3}{5} = \frac{15}{30} = \frac{1}{2}
\]

1. \(\frac{4}{5} \times \frac{1}{2} = \frac{4}{10} = \frac{1}{5}\)

2. \(\frac{3}{10} \times \frac{5}{6} = \frac{15}{60} = \frac{1}{4}\)

3. \(\frac{4}{9} \times \frac{6}{7} = \frac{24}{63} = \frac{8}{21}\)

4. \(\frac{7}{8} \times \frac{4}{11} = \frac{28}{88} = \frac{7}{22}\)

5. Of means “multiply”
\(\frac{8}{9} \times \frac{3}{4} = \frac{24}{36} = \frac{2}{3}\)

6. \(\frac{1}{4} \times \frac{8}{9} = \frac{8}{36} = \frac{2}{9}\)

7. \(\frac{7}{10} \times \frac{5}{14} = \frac{35}{140} = \frac{1}{4}\)

8. \(\frac{2}{3} \times \frac{6}{7} = \frac{12}{21} = \frac{4}{7}\)

9. \(\frac{5}{6} \times \frac{1}{15} = \frac{5}{90} = \frac{1}{18}\)

10. \(\frac{12}{13} \times \frac{1}{6} = \frac{12}{78} = \frac{2}{13}\)

11. \(\frac{8}{11} \times \frac{2}{3} = \frac{16}{33}\)

12. \(\frac{4}{5} \times \frac{15}{16} = \frac{60}{80} = \frac{3}{4}\)

13. \(\frac{2}{3} \times \frac{9}{10} = \frac{18}{30} = \frac{3}{5}\)

14. \(\frac{11}{12} \times \frac{6}{7} = \frac{66}{84} = \frac{11}{14}\)

15. \(\frac{1}{9} \times \frac{3}{4} = \frac{3}{36} = \frac{1}{12}\)

16. \(\frac{8}{15} \times \frac{3}{4} = \frac{24}{60} = \frac{1}{2}\)

17. \(\frac{3}{5} \times \frac{10}{11} = \frac{30}{55} = \frac{6}{11}\)
Multiplying Fractions and Mixed Numbers 2

Sometimes you can cancel before you multiply fractions. This makes the numbers smaller and easier to work with.

To cancel, look diagonally across a problem and see if you can reduce. Then multiply numerators by numerators and denominators by denominators.

Example: \( \frac{7}{9} \times \frac{3}{4} = \frac{7}{3} \times \frac{1}{4} = \frac{7}{12} \)

Study the next example and do the rest of the problems.

1. \( \frac{5}{6} \times \frac{1}{2} = \)  
2. \( \frac{4}{9} \times \frac{12}{13} = \)
3. \( \frac{2}{8} \) of \( \frac{4}{5} = \)
4. \( \frac{1}{2} \times \frac{4}{5} = \)
5. \( \frac{2}{3} \times \frac{9}{10} = \)
6. \( \frac{5}{7} \) of \( \frac{7}{10} = \)
7. \( \frac{12}{13} \times \frac{1}{6} = \)
8. \( \frac{2}{3} \times \frac{15}{16} = \)
9. \( \frac{9}{11} \) of \( \frac{2}{3} = \)
10. \( \frac{4}{5} \) of \( \frac{20}{21} = \)
11. \( \frac{3}{7} \times \frac{7}{24} = \)

Cancel if you can and then multiply. If you come across a whole number, make it into a fraction by putting it over 1.

Example:
\( \frac{13}{1} = \)

12. \( \frac{3}{4} \times \frac{12}{15} = \)
13. \( \frac{2}{3} \times \frac{3}{18} = \)
14. \( \frac{3}{8} \) of \( 16 = \)
15. \( \frac{1}{2} \times 12 = \)
16. \( \frac{4}{9} \) of \( \frac{7}{8} = \)
17. \( \frac{2}{3} \times \frac{5}{7} = \)
18. \( \frac{5}{6} \) of \( \frac{9}{10} = \)
19. \( \frac{4}{7} \times \frac{2}{5} = \)
20. \( \frac{4}{7} \) of \( 14 = \)
Change the following mixed numbers to improper fractions.

1. $2 \frac{1}{8} = \underline{\hspace{2cm}}$
2. $4 \frac{1}{5} = \underline{\hspace{2cm}}$
3. $1 \frac{1}{8} = \underline{\hspace{2cm}}$
4. $3 \frac{5}{6} = \underline{\hspace{2cm}}$
5. $5 \frac{1}{9} = \underline{\hspace{2cm}}$
6. $10 \frac{2}{3} = \underline{\hspace{2cm}}$

Change the following improper fractions to mixed numbers. Reduce your answers to lowest terms.

7. $\frac{13}{2} = \underline{\hspace{2cm}}$
8. $\frac{20}{3} = \underline{\hspace{2cm}}$
9. $\frac{45}{6} = \underline{\hspace{2cm}}$
10. $\frac{14}{7} = \underline{\hspace{2cm}}$
11. $\frac{14}{5} = \underline{\hspace{2cm}}$
12. $\frac{29}{8} = \underline{\hspace{2cm}}$

13. $4 \frac{4}{5} + 5 \frac{4}{5} = \underline{\hspace{2cm}}$
14. $6 \frac{1}{3} - 4 \frac{2}{3} = \underline{\hspace{2cm}}$

15. $5 \frac{1}{9} + 6 \frac{8}{9} = \underline{\hspace{2cm}}$
16. $6 \frac{1}{9} - 1 \frac{2}{9} = \underline{\hspace{2cm}}$

17. Write point $A$ as a mixed number. Reduce your answer to lowest terms.

$\begin{array}{cccccc}
\phantom{.} & \phantom{.} & \phantom{.} & \phantom{.} & \text{A} & \phantom{.} \\
\text{3} & \text{A} & \text{4} & \text{3} & \text{A} & \text{4}
\end{array}$

$A = \underline{\hspace{2cm}}$

18. Factors of 50 = \underline{\hspace{2cm}}\underline{\hspace{2cm}} \underline{\hspace{2cm}}

19. Write twenty-one billion in numbers.

$21,000,000,000$

20. $6 : 72 = 8$: \underline{\hspace{2cm}}

21. $164.84 \div 2.6 = \underline{\hspace{2cm}}$

22. Find the average of 99 and 103.

$\underline{\hspace{2cm}}$

23. $43.51 \times .73 = \underline{\hspace{2cm}}$

24. Write 21.016 in words.

$\underline{\hspace{2cm}}$

25. $8.3 + 21 + 36.94 = \underline{\hspace{2cm}}$

26. $18.9 - 9.314 = \underline{\hspace{2cm}}$

27. Circle the measures used for weight.
   - centimeters
   - inches
   - pounds
   - miles
   - ounces
   - grams
   - millimeters
   - kilograms
   - liters

28. Round off 561 to the nearest hundred.

$\underline{\hspace{2cm}}$

29. Round off .743294 to the nearest thousandth.

$\underline{\hspace{2cm}}$

30. Write 2,498 in Roman numerals.

$\underline{\hspace{2cm}}$

31. Four cubed + five squared = \underline{\hspace{2cm}}$

32. Figure out what $B$ is on the following number line.

$\begin{array}{cccccccc}
\phantom{.} & \phantom{.} & \phantom{.} & \phantom{.} & \phantom{.} & \phantom{.} & \phantom{.} & \phantom{.} & \text{B} \\
14 & \text{B} & \text{32} & \text{B} & \text{32}
\end{array}$

$B = \underline{\hspace{2cm}}$
Reduce to lowest terms.

33. \( \frac{9}{27} = \)  
34. \( \frac{18}{24} = \)

35. \( \frac{4}{7} + \frac{5}{7} = \)
36. \( \frac{6}{7} - \frac{2}{5} = \)
37. \( \frac{3}{4} + \frac{1}{5} = \)

38. Mrs. Emerson earns $11,220 a year. How much does she earn each month?

39. Cindy weighs 37 pounds. Her mother weighs four times that much. How much does her mother weigh?

40. Circle the metric measure you would use to weigh an elephant.
   - milligrams
   - grams
   - kilograms

41. Which metric measure would you use to weigh a pencil?
Multiplying Fractions and Mixed Numbers 3

Work out the following multiplication problems. First, change the mixed numbers to improper fractions; then cancel if you can. Make sure the answer is reduced to lowest terms.

Example:
\[ 1 \frac{3}{4} \times 2 \frac{4}{7} = \frac{7}{4} \times \frac{18}{7} = \frac{9}{2} = 4 \frac{1}{2} \]

1. \(3 \frac{1}{4} \times 4 \frac{4}{5} = \)
\[ \frac{13}{4} \times \frac{24}{5} = \]

5. \(8 \frac{1}{3} \times 6 \frac{2}{5} = \)

2. \(5 \frac{1}{2} \times 3 \frac{6}{11} = \)

6. \(6 \frac{2}{3} \times 2 \frac{1}{10} = \)

3. \(\frac{3}{4} \times 1 \frac{1}{3} = \)

7. \(1 \frac{1}{2} \times 1 \frac{6}{7} = \)

4. \(4 \frac{1}{5} \times 5 = \)

8. \(2 \frac{1}{4} \times 1 \frac{1}{9} = \)

Now work out the following multiplication problems. Make sure the answer is reduced to lowest terms.

9. \(\frac{2}{3} \times 4 \frac{1}{2} = \)

12. \(\frac{2}{3} \times \frac{5}{16} = \)

10. \(\frac{1}{7} \times 15 = \)

13. \(8 \frac{1}{8} \times 8 = \)

11. \(6 \frac{1}{8} \times \frac{5}{7} = \)

Now do these problems.

14. If it takes \(1 \frac{3}{4}\) yards of fabric to make 1 dress, how much fabric is needed to make 8 dresses?

15. The distance around a running track is \(\frac{1}{4}\) of a mile. If you run around the track 14 times, how many miles will you run?
Do the following multiplication problems. Reduce the answers to lowest terms.

1. \( \frac{8}{9} \times 3\ \frac{3}{4} = \) __________________________
2. \( 4\ \frac{2}{5} \times 1\ \frac{7}{8} = \) __________________________
3. \( \frac{4}{5} \) of \( \frac{9}{10} = \) __________________________
4. \( 2\ \frac{5}{9} \times 3\ \frac{3}{4} = \) __________________________
5. \( \frac{1}{8} \) of 12 = __________________________
6. \( \frac{2}{9} \times 3\ \frac{3}{4} = \) __________________________
7. \( 2\ \frac{1}{5} \times 4\ \frac{3}{8} = \) __________________________
8. \( \frac{4}{7} \times \frac{14}{15} = \) __________________________
9. \( \frac{11}{12} \times 6\ \frac{3}{4} = \) __________________________
10. \( 1\ \frac{3}{13} \times 4\ \frac{1}{6} = \) __________________________
11. \( \frac{2}{7} \times 28 = \) __________________________
12. \( 2\ \frac{4}{9} \times \frac{18}{19} = \) __________________________
13. \( \frac{3}{4} \) of \( \frac{2}{7} = \) __________________________
14. \( \frac{1}{2} \times 6 = \) __________________________
15. \( \frac{7}{8} \times \frac{2}{7} = \) __________________________
16. \( \frac{3}{8} \) of \( \frac{5}{7} = \) __________________________
17. \( \frac{9}{10} \) of 30 = __________________________
18. \( \frac{1}{2} \times 2\ \frac{14}{15} = \) __________________________
19. \( 6\ \frac{2}{3} \times 8\ \frac{1}{10} = \) __________________________
20. \( \frac{4}{9} \) of 2\ \frac{2}{3} = __________________________
21. \( \frac{1}{4} \) of 12 = __________________________
22. It takes \( \frac{13}{4} \) cups of sugar to make a batch of chocolate chip cookies. How much sugar is needed to make 4 batches of cookies?
23. Uncle Frank wants to give \$2.50 (2\ \frac{1}{2} \) dollars) to each of his 10 nephews and nieces for Christmas. How much money will he be giving all together?
Do the following multiplication problems. Make sure each answer is reduced to the lowest terms.

1. \( \frac{2}{3} \times \frac{3}{4} = \) 

2. \( \frac{3}{10} \times \frac{5}{6} = \) 

3. \( \frac{4}{5} \times \frac{3}{8} = \) 

4. \( \frac{9}{11} \) of 33 = 

5. \( \frac{4}{5} \) of 20 = 

6. \( \frac{7}{8} \) of \( \frac{4}{5} \) = 

7. \( 1 \frac{2}{3} \times 6 \frac{1}{2} = \) 

8. \( 4 \frac{1}{5} \times 2 \frac{3}{4} = \) 

9. \( 9 \frac{1}{2} \times 1 \frac{2}{5} = \) 

10. \( 7 \frac{3}{4} \times 2 \frac{5}{6} = \)
1. Figure out what $A$ is on the following number line.

\[ 18 \quad A \quad 22 \]

$A = \underline{\hspace{2cm}}$

2. Write four hundred thirty-five million in numbers.

\[ \underline{\hspace{2cm}} \]

3. Factor 40 three ways.

\[ \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}} \]

4. $65754 \div 8 = \underline{\hspace{2cm}}$

5. Find the average of 10, 12, 16, 13, and 19.

\[ \underline{\hspace{2cm}} \]

6. Write 8.13 in words.

\[ \underline{\hspace{2cm}} \]

7. $4.589 + 35 + 1.8 = \underline{\hspace{2cm}}$

8. $75.8 - 28.5 = \underline{\hspace{2cm}}$

9. Round off 372,586,211 to the nearest million.

\[ \underline{\hspace{2cm}} \]

10. Round off .42837941 to the nearest thousandth.

\[ \underline{\hspace{2cm}} \]

11. $2.71 \times 3.8 = \underline{\hspace{2cm}}$

12. Write 3,947 in Roman numerals.

\[ \underline{\hspace{2cm}} \]

13. $300.94 \div 8.2 = \underline{\hspace{2cm}}$

14. Five cubed = \[ \underline{\hspace{2cm}} \]

15. What fraction of the circle is shaded in?

\[ \underline{\hspace{2cm}} \]

16. If $\frac{14}{17}$ of a class is men, what fraction is women?

\[ \underline{\hspace{2cm}} \]

17. Complete the ratio.

$4 : 36 = 5 : \underline{\hspace{2cm}}$

18. $\frac{5}{6} - \frac{2}{9} = \underline{\hspace{2cm}}$

19. Reduce the following fractions to lowest terms.

\[ \frac{3}{35} \quad \frac{14}{16} = \underline{\hspace{2cm}} \]

20. Change $2\frac{5}{9}$ to an improper fraction.

\[ \underline{\hspace{2cm}} \]

21. $7 \frac{5}{7} + 8 \frac{6}{7} = \underline{\hspace{2cm}}$

22. $5 \frac{1}{3} - 2 \frac{2}{3} = \underline{\hspace{2cm}}$

23. Write point $B$ as a mixed number. Reduce your answer to the lowest terms.

\[ \underline{\hspace{3cm}} \]

\[ B = \underline{\hspace{2cm}} \]
Once you know how to multiply fractions and mixed numbers, dividing them is easy. Just turn the second fraction upside down and multiply. Cancel if you can, but make sure you don’t cancel until the second fraction is turned upside down.

Example:

\[
\begin{array}{c}
\frac{2}{7} + \frac{11}{14} = \frac{2}{7} \times \frac{14}{11} \rightarrow \text{now cancel and then multiply} \\
\text{turn upside down}
\end{array}
\]

\[ \frac{2}{7} \times \frac{14}{11} = \frac{4}{11} \text{ Answer} \]

Now try the following problems in division of fractions.

1. \( \frac{2}{9} \div \frac{2}{3} = \quad \times \quad = \quad \)
2. \( \frac{3}{10} \div \frac{4}{5} = \quad \times \quad = \quad \)
3. \( \frac{1}{8} \div \frac{2}{3} = \quad \times \quad = \quad \)
4. \( \frac{4}{7} \div \frac{5}{7} = \quad \times \quad = \quad \)
5. \( \frac{2}{5} \div \frac{7}{10} = \quad \times \quad = \quad \)
6. \( \frac{6}{7} \div \frac{12}{13} = \quad \times \quad = \quad \)
7. \( \frac{2}{15} \div \frac{4}{5} = \quad \times \quad = \quad \)
8. \( \frac{5}{12} \div \frac{5}{6} = \quad \times \quad = \quad \)
9. \( \frac{5}{6} \div \frac{7}{8} = \quad \times \quad = \quad \)
10. \( \frac{1}{3} \div \frac{4}{5} = \quad \times \quad = \quad \)
11. \( \frac{2}{15} \div \frac{2}{5} = \quad \times \quad = \quad \)
12. \( \frac{4}{11} \div \frac{9}{22} = \quad \times \quad = \quad \)
Dividing Fractions and Mixed Numbers 2

To divide fractions, turn the second fraction upside down, cancel if you can, and multiply.

Do the following problems. If any of the answers are improper (top heavy), change them to mixed numbers.

1. \(\frac{3}{8} + \frac{3}{4} = \_\times\_ = \_\_
2. \(\frac{4}{7} + \frac{1}{28} = \_\times\_ = \_\_
3. \(\frac{2}{9} + \frac{18}{27} = \_
4. \(\frac{3}{5} + \frac{17}{20} = \_

Work out the following problems. First change the mixed numbers to improper fractions; then divide. Cancel if you can.

Example:

\[
3 \frac{1}{3} + 4 \frac{4}{9} = \frac{10}{3} + \frac{40}{9} = \frac{10}{3} \times \frac{9}{40} = \frac{3}{4} \text{ Answer}
\]

9. \(2 \frac{1}{2} + 3 \frac{3}{4} = \_\_+\_\_\_\_\times\_\_ = \_

10. \(6 \frac{1}{8} + 7 \frac{7}{10} = \_

11. \(1 \frac{1}{2} + 2 \frac{3}{4} = \_

12. \(\frac{2}{3} + 1 \frac{1}{3} = \_

13. \(4 \frac{1}{6} + 7 \frac{1}{7} = \_

14. \(3 \frac{2}{3} + 5 \frac{1}{2} = \_

15. \(8 \frac{4}{7} + 11 \frac{3}{7} = \_

74
1. $1 \frac{2}{3} \times 3 \frac{1}{4} = \phantom{0}$
2. $\frac{4}{5} \times 2 \frac{1}{8} = \phantom{0}$
3. $4 \frac{3}{4} \times \frac{4}{19} = \phantom{0}$
4. $2 \frac{2}{3} \times 4 \frac{1}{4} = \phantom{0}$
5. $\frac{3}{4} \times \frac{4}{5} = \phantom{0}$
6. $\frac{8}{9}$ of 45 = \phantom{0}

7. Use a ruler to measure the line.

= \phantom{0}

Reduce the following to lowest terms.

8. $\frac{4}{20} = \phantom{0}$
9. $\frac{12}{16} = \phantom{0}$

10. $7 \frac{1}{7}$
11. $6 \frac{3}{5}$
-2 $\frac{4}{7}$
\phantom{0}
+7 $\frac{4}{5}$

12. Write $5 \frac{3}{5}$ as an improper fraction.

= \phantom{0}

13. If $\frac{4}{10}$ are wrong, how many are right?

= \phantom{0}

14. $\frac{4}{7} + \frac{5}{7} = \phantom{0}$
15. $\frac{8}{9} - \frac{1}{6} = \phantom{0}$
16. $\frac{2}{3} + \frac{1}{8} = \phantom{0}$

17. $2^5 = \phantom{0}$
18. Ten squared = \phantom{0}

19. $151.536 \div .42 = \phantom{0}$

20. $19.8 \times .53 = \phantom{0}$

21. Write CMLXXVI as an Arabic number.

= \phantom{0}

22. Find the average of 75 and 83.

= \phantom{0}

23. Round off .4738921 to the nearest thousandth.

= \phantom{0}

24. Round off 749 to the nearest hundred.

= \phantom{0}

25. $84.3 + 2.73 + 11 = \phantom{0}$

26. $80.5 - 21.413 = \phantom{0}$

27. Write two and seventeen hundredths in decimals.

= \phantom{0}

28. Write 908,000,000,000 in words.

= \phantom{0}

29. A jet fighter goes 1,258 miles an hour. How far can it go in 5 hours at this speed?

= \phantom{0}

30. A new car gets 15 miles to the gallon. There are 12.8 gallons left in the tank, and 194 miles to the nearest gas station. Will the car make it to the station?

= \phantom{0}

31. Circle the best metric measure for your weight.

- milligram
- gram
- kilogram

32. Circle the metric measure you would use to measure milk for a cake mix.

- milliliter
- liter
33. Circle the metric measure you would use to measure the length of a classroom.
   millimeter
   centimeter
   meter
   kilometer

34. How many seconds are in a minute?

35. How many hours are in a day? _____

36. How many quarts are in a gallon? _____

37. How many years are in a decade? _____

38. How many years are in a century? _____

39. How many cents are in a quarter? _____
Dividing Fractions and Mixed Numbers 3

Work out the following problems. If any of the answers are improper, change them to mixed numbers.

1. \( \frac{3}{7} + \frac{9}{14} = \)  
2. \( \frac{5\frac{4}{5}}{6} + \frac{1}{10} = \) 
3. \( 3\frac{3}{10} + \frac{6\frac{3}{5}}{5} = \) 
4. \( \frac{5}{6} + \frac{9}{14} = \) 
5. \( 12 + \frac{6}{7} = \) 
6. \( \frac{5}{6} + \frac{12}{13} = \) 
7. \( 2\frac{1}{4} + \frac{3}{4} = \) 
8. \( 8\frac{4}{7} + 2\frac{1}{7} = \) 
9. \( \frac{2}{9} + \frac{5}{6} = \) 
10. \( 10 + \frac{3}{4} = \) 
11. \( 9\frac{1}{3} + 1\frac{1}{6} = \) 
12. \( \frac{4}{11} + \frac{21}{22} = \) 
13. \( 16 + \frac{1}{2} = \) 
14. \( 4\frac{3}{4} + 9\frac{1}{2} = \)
Work out the following problems. Be careful—some are division problems, and some are multiplication problems.

1. $10 + 2 \frac{1}{4} = \quad$ 8. $4 \frac{1}{5} + 2 \frac{7}{10} = \quad$

2. $\frac{4}{21} + \frac{11}{14} = \quad$ 9. $8 + \frac{1}{4} = \quad$

3. $1 \frac{6}{7} + 3 \frac{5}{7} = \quad$ 10. $\frac{2}{3} + \frac{1}{3} = \quad$

4. $18 \times 2 \frac{1}{6} = \quad$ 11. $15 \div \frac{1}{2} = \quad$

5. $\frac{2}{9} + \frac{11}{12} = \quad$ 12. $3 \frac{3}{4} \times \frac{4}{5} = \quad$

6. $1 \frac{2}{9} \times \frac{2}{11} = \quad$ 13. $8 \frac{1}{3} + 2 \frac{2}{9} = \quad$

7. $6 \frac{3}{7} \div \frac{9}{14} = \quad$ 14. $9 \frac{2}{7} + \frac{5}{7} = \quad$
Test 28 — Dividing Fractions and Mixed Numbers

Work out the following problems. Make sure the answers are reduced to the lowest terms and, if necessary, turned into mixed numbers.

1. \( \frac{6}{11} + \frac{21}{22} = \) __________________________

2. \( \frac{7}{8} + 14 = \) __________________________

3. \( \frac{8}{9} + \frac{1}{12} = \) __________________________

4. \( \frac{5}{13} + \frac{10}{11} = \) __________________________

5. \( \frac{3}{5} + 2\frac{1}{4} = \) __________________________

6. \( \frac{2}{9} + \frac{10}{27} = \) __________________________

7. \( 12 + \frac{4}{5} = \) __________________________

8. \( 2\frac{1}{2} + 4\frac{2}{3} = \) __________________________

9. \( 1\frac{1}{3} + \frac{2}{5} = \) __________________________

10. \( \frac{3}{8} + 42 = \) __________________________
1. Find out what A is on the following number line.

\[ \frac{21}{\phantom{21}} \quad \frac{A}{\phantom{21}} \quad \frac{49}{\phantom{21}} \]

A = ______

2. Write 922,000,000,000,000 in words.

____________________________________

____________________________________

3. Factor 60 four ways._________ ________

____________________________________

4. \[ 48218 \div 8 = \] ________

5. Find the average of 822 and 900.

____________________________________

6. Write twelve and seven thousandths in decimals.

____________________________________

7. \[ 509 + 2.7 + 1.35 = \] ________

8. \[ 63.2 - 45.189 = \] ________

9. Round off 735,981 to the nearest thousand.

____________________________________

10. Round off 76.479315 to the nearest tenth.

____________________________________

11. \[ 685 \times .23 = \] ________

12. Write MMMDCCXLIV in Arabic numbers.

____________________________________

13. \[ 105.57 \div 2.7 = \] ________

14. \[ 4^4 = \] ________

15. What fraction of the circle is shaded in?

\[
\begin{array}{c}
\text{Shaded} \\
\hline
\text{Unshaded}
\end{array}
\]

16. If \[ \frac{17}{20} \] of a test is wrong, what fraction is right?

____________________________________

17. Complete the ratio.

\[ 5 : 40 = \quad : 56 \]

18. \[ \frac{3}{8} + \frac{1}{3} = \] ________

19. Reduce the following fractions to lowest terms.

\[ \frac{8}{40} = \] ________  \[ \frac{15}{20} = \] ________

20. Change \[ 7 \frac{1}{3} \] to an improper fraction.

____________________________________

21. \[ 9 \frac{8}{9} \]

\[ + 1 \frac{5}{9} \]

22. \[ 4 \frac{2}{7} \]

\[ - 2 \frac{4}{7} \]

23. Write point B as a mixed number. Reduce your answer to lowest terms.

\[ \frac{7}{\phantom{7}} \quad B \quad \frac{8}{\phantom{8}} \]

B = ______

24. \[ \frac{3}{8} \] of 24 = ________

80
Unit 29 — Fractions, Decimals, and Percent 1

A percent sign is made like this: %. Percent means “hundredths” or “out of one hundred,” so 23% is the same as .23 and \( \frac{23}{100} \). 8% is the same as .08 and \( \frac{8}{100} \).

Write the following percents as decimal fractions and as fractions.

1. \( 45\% = \frac{\_\_\_}{100} \)
2. \( 99\% = \frac{\_\_\_}{\_\_\_} \)
3. \( 21\% = \frac{\_\_\_}{\_\_\_} \)
4. \( 78\% = \frac{\_\_\_}{\_\_\_} \)
5. \( 33\% = \frac{\_\_\_}{\_\_\_} \)
6. \( 87\% = \frac{\_\_\_}{\_\_\_} \)

Write the following fractions as decimal fractions and then as percents.

7. \( \frac{13}{100} = \frac{\_\_\_}{\_\_\_} \% \)
8. \( \frac{45}{100} = \frac{\_\_\_}{\_\_\_} \)
9. \( \frac{25}{100} = \frac{\_\_\_}{\_\_\_} \)
10. \( \frac{75}{100} = \frac{\_\_\_}{\_\_\_} \)
11. \( \frac{50}{100} = \frac{\_\_\_}{\_\_\_} \)
12. \( \frac{90}{100} = \frac{\_\_\_}{\_\_\_} \)

Any fraction can be changed to a percent. But first you must change it to a decimal.

To change a fraction to a decimal, divide the bottom of the fraction into the top. Add a decimal point and two zeroes.

Example:

\[
\begin{align*}
\text{Fraction} & \quad \rightarrow \quad \text{Decimal} \\
\frac{1}{4} & \quad \rightarrow \quad .25 \\
4 \div 1.00 \quad & \quad \quad \quad \frac{8}{20} \\
\quad & \quad \quad \quad \frac{20}{00} \\
\frac{1}{4} & \quad = \quad .25
\end{align*}
\]

To change the decimal to a percent, move the decimal point two places to the right and add the percent sign (%).

Example:

\[
\begin{align*}
\text{Decimal} & \quad \rightarrow \quad \text{Percent} \\
.25 & \quad \rightarrow \quad .25 \rightarrow 25\% \\
\text{Note that everything to the left of the decimal is a whole number, so 25. and 25 are the same.}
\end{align*}
\]

Change the following fractions first to decimals and then to percents.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. ( \frac{3}{4} )</td>
<td>___</td>
<td>___</td>
<td>15. ( \frac{1}{2} )</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>14. ( \frac{4}{5} )</td>
<td>___</td>
<td>___</td>
<td>16. ( \frac{3}{5} )</td>
<td>___</td>
<td>___</td>
</tr>
</tbody>
</table>
Change each of the following fractions to a decimal; then change the decimal to a percent.

Example:

\[
\frac{1}{4} = \frac{.25}{4} \div 1.00 = \frac{8}{20} = \frac{20}{20} = .25 = 25\%.
\]

An asterisk (*) after a fraction means there will be a remainder when you divide to the hundredths place. Write the remainder as a fraction, move the decimal over two places to the right, and add the percent sign.

Example:

\[
\frac{1}{3} * = 3 \div 1.00 = \frac{9}{10} = \frac{1}{3} = .33 \frac{1}{3} = 33\frac{1}{3}\%.
\]

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (\frac{1}{2})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. (\frac{2}{5})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. (\frac{3}{4})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. (\frac{2}{3} *)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. (\frac{3}{10})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. (\frac{1}{8} *)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. (\frac{3}{8} *)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. (\frac{5}{8} *)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. (\frac{7}{8} *)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. (\frac{5}{5})</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. \( \frac{4}{9} + \frac{5}{6} = \) 
2. \( \frac{4}{11} + \frac{15}{22} = \) 
3. \( 2 \frac{1}{8} + 5 \frac{2}{3} = \) 
4. \( 5 \frac{2}{5} + \frac{11}{15} = \) 
5. \( \frac{6}{7} \times 1 \frac{1}{6} = \) 
6. \( 3 \frac{1}{8} \times 0 = \) 
7. \( \frac{9}{10} \times 2 \frac{1}{7} = \) 
8. \( 8 \frac{1}{3} \div 4 \frac{1}{7} = \) 
9. \( \frac{3}{4} + \frac{15}{16} = \) 
10. \( \frac{2}{9} \text{ of } 81 = \) 
11. \( \frac{9}{10} \times \frac{2}{3} = \) 
12. Use a ruler to measure this line. 

= ___

Reduce the following to the lowest terms.

13. \( \frac{14}{20} = \) 
14. \( \frac{9}{81} = \) 
15. Write \( 9 \frac{1}{7} \) as an improper fraction.

= ___

16. \( \frac{2}{3} + \frac{2}{3} = \) 
17. \( \frac{9}{10} - \frac{2}{3} = \) 
18. \( \frac{2}{5} + \frac{3}{8} = \) 

19. Two to the fifth = 
20. \( 9^2 = \) 
21. \( 14.906 - .58 = \) 
22. \( 37.9 \times 41 = \) 
23. Write 1,029 in Roman numerals. 

= ___

24. Find the average of 88, 39, and 41. 

= ___

25. \( 18.6 + 2.971 = \) 
26. \( 68 - 2.47 = \) 

27. Round off 4.93841 to the nearest hundredth. 

= ___

28. Round off 57,358 to the nearest thousand. 

= ___

29. Write 46.019 in words. 

= ___

30. Circle the measures of distance.

millimeters 
inches 
gallons 
tons 
miles 
kilometers 
centimeters 
yards 
cups 
liters 
grams 

31. Circle the metric measure you would use to weigh a feather.

millgram 
gram 
kilogram
32. Circle the metric measure you would use to measure the distance from Boston to New York.
   millimeter
   centimeter
   meter
   kilometer

33. How many quarts are in 4 gallons? ____

34. How many feet are in a mile? ____

35. How many days are in May? ____

36. Mr. Glenroy took his wife and five children out to a movie. All the children were over 12 and had to pay the full price. All the tickets together cost $24.50. How much did each ticket cost?

37. A Roman woman lived from the year CXXXVI until CCXIV. How old was she when she died? Answer in Arabic numbers.
Fill in the table below by finding fractions, decimals, and percents.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{1}{4})</td>
<td>.25</td>
<td>25%</td>
</tr>
</tbody>
</table>

1. \(\frac{3}{4}\)
2. \(\frac{1}{2}\)
3. \(\frac{1}{3}\)
4. \(\frac{2}{3}\)

Be sure to reduce these fractions to the lowest terms.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>.40</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>.60</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>.80</td>
<td></td>
</tr>
</tbody>
</table>

Work these out to the hundredths place and include the remainder as a fraction in the decimal and in the percent.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td></td>
<td>90%</td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.</td>
<td>(\frac{8}{8})</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>(\frac{7}{20})</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>(\frac{9}{20})</td>
<td></td>
</tr>
</tbody>
</table>

Solve the following two word problems.

19. A baseball player got 3 hits out of 8 times at bat. What is his batting average as a decimal?

20. What percent of the time did he hit?
Fill in the table below by finding fractions, decimals, and percents. If you have a remainder after dividing to the hundredths place, leave it as a fraction and include it in the decimal and in the percent. Remember to reduce the fractions to the lowest terms.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>2. (\frac{1}{4})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>4. (\frac{1}{3})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. (\frac{2}{3})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>7. (\frac{1}{5})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. (\frac{2}{5})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. (\frac{3}{5})</td>
<td></td>
<td>80%</td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>.99</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td>30%</td>
</tr>
<tr>
<td>14. (\frac{1}{8})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. (\frac{3}{8})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. (\frac{5}{8})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. (\frac{7}{8})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td>55%</td>
</tr>
<tr>
<td>19. (\frac{9}{10})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>.70</td>
<td></td>
</tr>
</tbody>
</table>

Now see if you can solve the two word problems below.

21. A baseball player gets 7 hits out of 26 times at bat. What is his batting average? (Divide to the ten-thousandths place and round off to the nearest thousandth.)

22. What percent of the time did he hit?
Fill in the table with the equivalent fractions, decimals, and percents. If you have a remainder after dividing to the hundredths place, leave it as a fraction and include it in the decimal and in the percent. Remember when finding the fraction to reduce it to the lowest terms.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \frac{1}{4} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ( \frac{3}{8} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. ( \frac{4}{5} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. ( \frac{1}{3} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. ( \frac{9}{10} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. .75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>( 66 \frac{2}{3} % )</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>.59</td>
<td></td>
</tr>
</tbody>
</table>
1. Figure out what A is on the following number line.

\[
\begin{array}{ccc}
18 & A & 26
\end{array}
\]

A = ______

2. Write five hundred thousand in numbers.

__________

3. Factor 88 three ways.

__________

4. \[21398 \div 7 = \] ______

5. Find the average of 19, 23, and 15.

__________

6. Write 6.11 in words.

__________

7. \[28.491 + 3.66 + 88 = \] ______

8. \[47.3 - 29.115 = \] ______

9. Round off 681,499,216 to the nearest million.

__________

10. Round off 88.935711 to the nearest one.

__________

11. \[8.39 \times .62 = \] ______

12. Write 2,389 in Roman numerals.

__________

13. \[26.372 \div .38 = \] ______

14. Three cubed = ______

15. What fraction of the circle is shaded in?

16. If \(\frac{13}{15}\) of a hotel is filled, what fraction is empty?

17. Complete the ratio.

\[9 : 54 = 10 : \] ______

18. \[\frac{9}{10} - \frac{2}{3} = \] ______

19. Reduce the following fractions to lowest terms.

\[\frac{6}{24} = \] ______ \[\frac{20}{22} = \] ______

20. Change \(6\frac{2}{3}\) to an improper fraction.

__________

21. \[4\frac{3}{5} + 4\frac{3}{5} = \] ______

22. \[5\frac{1}{9} - 2\frac{3}{9} = \] ______

23. Write point B as a mixed number. Reduce your answer to lowest terms.

\[
\begin{array}{ccc}
8 & B & 9
\end{array}
\]

B = ______

24. \[4\frac{5}{6} \times 2\frac{9}{10} = \] ______

25. \[\frac{1}{7} + \frac{16}{21} = \] ______
Percent means “hundredths.” To find the percent of something, you change the percent to a decimal and multiply.

Example:

\[
25\% \text{ of } 83 = \\
.25 \times 83 = \\
\frac{83}{\times .25} = \\
415 \\
166 \\
20.75 \text{ Answer}
\]

Work out the following problems.

1. 25% of 145 = 
6. 75% of 88 = 

2. 18% of 64 = 
7. 5% of 64 = 
\text{(Remember to add the zero.)}

3. 99% of 200 =
8. 12% of 214 =

4. 65% of 128 =
9. 49% of 1000 =

5. 50% of 44 = 
\text{(Can you think of a short cut for this one?)}
10. 2% of 215 =
\text{(Remember to add the zero.)}

Now solve this word problem.

11. A woman made $25,000 a year. She had to pay 32% of that in taxes. How much was her tax bill?
Percent 2

Remember: to find the percent of something, change the percent to a decimal and then multiply.

Work out the following percent problems.

1. 25% of 200 = .25 \times 200 = \underline{_______}
2. 78% of 423 = \underline{_______}
3. 7% of 2,000 = \underline{_______}
4. 18% of 25 = \underline{_______}
5. 99% of 100 = \underline{_______}
6. 50% of 94 = \underline{_______}

100% is all of something. It is 1.00 or 1, or one whole. More than 100% is more than 1.00 or more than one whole. 135% is 1.35 or one whole and \frac{35}{100}

Write the following percents first as whole numbers and decimals and then as mixed numbers.

7. 178% = 1.78 = \underline{_______}
8. 112% = \underline{_______}
9. 199% = \underline{_______}
10. 225% = \underline{_______}
11. 342% = \underline{_______}
12. 500% = \underline{_______}

Some percents like 37.5% or 66.7% are not exact hundredths. As you can see, these percents have decimal points in them. To change these percents to decimals, move the decimal point two places to the left. You may have to add a zero to do this.

Change the following percents to decimals.

Examples:

37.5% = .375 \hspace{1cm} 7.5% = .075

13. 66.7% = \underline{_______}
14. 62.5% = \underline{_______}
15. 33.3\% = \underline{_______}
16. 3.1\% = \underline{_______}
17. 4.91\% = \underline{_______}
18. 77.01\% = \underline{_______}
19. 125.3\% = \underline{_______}

Using what you have learned in the instructions above, carefully work out the following problems.

20. 125% of 60 = \underline{_______}
21. 150% of 212 = \underline{_______}
22. 33.3% of 85 = \underline{_______}
23. 29% of 63 = \underline{_______}
24. 175% of 18 = \underline{_______}
25. 215% of 69 = \underline{_______}
26. 87.5% of 72 = \underline{_______}
27. 4.5% of 900 = \underline{_______}
Write the following percents as fractions.
1. 90% =
2. 25% =
3. 80% =
4. $66\frac{2}{3}\% =$

Write the following fractions as percents.
5. $\frac{1}{2} =$
6. $\frac{1}{3} =$
7. $\frac{1}{4} =$
8. $\frac{1}{8} =$
9. $\frac{5}{8} =$
10. $\frac{1}{5} =$
11. $\frac{9}{9} =$
12. $\frac{1}{3}$ of 18 =

Reduce the following fractions to lowest terms.
13. $\frac{9}{45} =$
14. $\frac{4}{6} =$
15. $\frac{7}{8} + \frac{1}{2} =$

16. Use a ruler to measure the line.

17. $\frac{7\frac{2}{3}}{3} + 4\frac{1}{3}$
18. $8\frac{1}{5} - 1\frac{2}{5}$

19. Write $6\frac{2}{5}$ as an improper fraction.

20. $\frac{1}{5} + \frac{2}{3} =$
21. $\frac{6}{7} + \frac{4}{7} =$
22. $7^3 =$
23. Nine cubed =
24. $95.004 \div 6.3 =$
25. $2.08 \times .78 =$
26. Write 2,478 in Roman numerals.

27. Round off .98473718 to the nearest hundredth.

28. Round off 18 to the nearest ten.

29. $4.831 + 1.2 + 47 =$
30. $9 - 2.87 =$

31. Write fourteen and eight thousandths in decimals.

32. Write 318,000,000 in words.

33. How many feet are in a mile? 
34. How many days are in a year? 
35. How many pounds are in a ton? 
36. How many quarts are in a gallon? 
37. How many seconds are in five minutes?
38. Charlie wants to save a thousand dollars. He can save $5 a week. How many weeks will it take him to reach his goal?

39. About how many years is that, if there are 52 weeks in a year?

40. Mr. Gleason weighs 573 pounds. In March he loses 15.8 pounds; in April he loses 19.6 pounds; and in May he loses 14.5 pounds. Then in June he gains back 2.4 pounds. What does he weigh at the end of June?
Percent 3

Change the following percents to decimals.

1. 55% = ____________  
2. 67% = ____________  
3. 9% = ____________  
4. 73.1% = ____________  
5. 2% = ____________  
6. 125% = ____________  
7. 64% = ____________  
8. 7.3% = ____________  
9. 294% = ____________

Now work out the following word problems. Remember: change the percent to a decimal and multiply.

10. 60% of the children in a class of 25 are girls. How many girls are there?

11. A man puts $600 in a bank. The bank pays him 5% interest on that money each year. How much interest does the man make in one year?

12. A boy took a test with 25 questions and got 80% right. How many did he get right?

13. 200,000 people voted in an election. The winning candidate got 55% of the votes. How many votes did she get?

14. A school has 900 students. It is 35% black. How many black students are there?

Percent also means "out of a hundred." Subtract the percent from one hundred percent to answer the following questions.

15. 25% of a tank of gasoline is used up.  
What percent is left?

16. 99% of the people in a city are television owners. What percent is not?

17. 6% of the cars in a parking lot are foreign cars. What percent are not foreign?

18. 54% of the children in a class are girls.  
What percent of the students are boys?
Carefully work out the following problems. If an answer calls for a decimal point, don’t forget to put it in.

1. 65% of the people in a town of 24,000 are poor. How many people are poor?

How many are not poor?

2. 4% of a man’s corn crop was destroyed by heavy rains. If the total crop was 8,900 bushels, how much was destroyed?

How much was not destroyed?

3. A woman puts $7,800 in a bank and will get 5.3% interest a year. How much interest will she get each year?

4. A school has 900 students. It is 55% white, 35% black, and 10% Chinese.

How many white students are there?

How many black students are there?

How many Chinese students are there?

5. A spelling test had 50 questions. If a girl got 98% right, how many questions did she get right?

How many were wrong?

6. In a state with 450,000 people, three candidates were running for governor. Figure out how many votes each one got.

Harry Voteforme, 36% of the vote.

Ann Lawandorder, 22% of the vote.

Joe Prosperity, 42% of the vote.

7. A tank of gasoline is 76% used up. What percent is not used up?

8. A school is 49% boys. What percent is girls?

9. There were three candidates for office. One got 41% of the votes, the second 23%. What percent of the votes did the third candidate get?
Test 30 — Percent

Change the following percents to decimals.

1. 68% = ____  
2. 4% = ____  
3. 137% = ____

Work out the next three problems.

4. What is 15% of 400?

5. What is 125% of 64?

6. What is 90% of 500?

Now try these word problems.

7. A woman has $4,300 in a bank. How much interest will she get in one year if the bank pays 6% interest?

8. There were 50 questions on a spelling test. A boy got 96% right. How many questions did he get right?

9. 7% of the students in a school failed a test. What percent passed?

10. A class has 30 students. 40% of them are boys. How many girls are there? Be careful. First figure out how many boys there are.
1. Figure out what \( A \) is on the following number line.

\[
\begin{array}{c|c|c}
& 8 & A & 20 \\
\hline
\end{array}
\]

\( A = \) __________

2. Write 308,000,000,000 in words.

________________________

3. Factor 70 three ways.

________________________

4. \( 42465 \div 8 = \) __________

5. Find the average of 9, 14, 25, and 32.

________________________

6. Write seventeen and four thousandths in decimals.

________________________

7. \( 69 + 2.637 + 2.18 = \) __________

8. \( 2.7 - 1.342 = \) __________

9. Round off 28,723 to the nearest thousand.

________________________

10. Round off .4265943 to the nearest hundredth.

________________________

11. \( .273 \times 69 = \) __________

12. Write MMCDLXXIII in Arabic numbers.

________________________

13. \( 198.36 + 2.9 = \) __________

14. \( 5^4 = \) __________

15. What fraction of the circle is shaded in?

________________________

16. If \( \frac{9}{13} \) of a test is right, what fraction is wrong?

________________________

17. Complete the ratio.

\( 6 : 48 = \) __________ : 56

18. \( \frac{2}{7} + \frac{2}{3} = \) __________

19. Reduce the following fractions to lowest terms.

\( \frac{9}{8} = \) __________ \( \frac{12}{16} = \) __________

20. Change \( 9 \frac{3}{7} \) to an improper fraction.

________________________

21. \( 5 \frac{2}{5} + 7 \frac{4}{5} = \) __________

22. \( 9 \frac{1}{7} - 4 \frac{3}{7} = \) __________

23. Write point \( B \) as a mixed number. Reduce your answer to lowest terms.

\[
\begin{array}{c|c|c|c}
& 4 & & B & 5 \\
\hline
\end{array}
\]

\( B = \) __________

24. \( 1 \frac{9}{10} \) of \( \frac{2}{3} = \) __________

25. \( \frac{2}{5} + \frac{7}{10} = \) __________

26. \( \frac{1}{3} \) as a percent = __________

75% as a fraction = __________
There are three dimensions.

Lines have one dimension. They are called one-dimensional.

Flat shapes have two dimensions. They are called two-dimensional.

Solid objects have three dimensions. They are called three-dimensional.

Next to each shape, write how many dimensions it has. Try to remember the names of the shapes—they are all important. Under the name of each shape, make your own small drawing of it.

1. Triangle

2. Cube

3. Cone

4. Rectangle

5. Square

6. Pyramid

7. Circle

8. Box

9. Cylinder

10. Sphere

11. Line

12. Parallelogram

13. Rhombus

14. Ellipse

15. Trapezoid

16. Hexagon

17. Pentagon

18. Line
Shapes and Dimensions 2

After each shape, give examples of that shape in the world around you. Think of as many objects as you can for each shape.

### Two-dimensional Shapes
1. Triangle
2. Rectangle
3. Square
4. Circle
5. Parallelogram
6. Rhombus
7. Ellipse
8. Trapezoid
9. Pentagon
10. Hexagon

### Three-dimensional Shapes
11. Pyramid
12. Box
13. Cube
14. Sphere
15. Cone
16. Cylinder

Give the names of the following shapes.

17.  
18.  
19.  
20.  
21.  
22.  
23.  

98
Review 31

1. 50% of 72 =
2. 15% of 60 =
3. 92% of 980 =
4. 7.5% as a decimal =
5. 92% as a decimal =
6. 120% as a decimal =
7. If 48% is right, what percent is wrong?
   
8. If 99% is finished, what percent is unfinished?

Write the percent equivalent for each fraction below.

9. \( \frac{1}{3} \) =
10. \( \frac{2}{3} \) =
11. \( \frac{1}{2} \) =
12. \( \frac{3}{4} \) =
13. \( \frac{1}{4} \) =
14. \( \frac{2}{5} \) =
15. \( \frac{9}{10} \) =

Write the fraction equivalent for each percent below.

16. 99% =
17. 60% =
18. 10% =
19. 12\( \frac{1}{2} \)% =

20. Use a ruler to measure this line.

Reduce the following.

21. \( \frac{6}{48} \) =
22. \( \frac{14}{16} \) =

23. Write 14.09 in words.

24. Write twelve million in numbers.

25. Write 9\( \frac{1}{7} \) as an improper fraction.

26. \( \frac{8}{15} + \frac{4}{5} \) =
27. \( \frac{4}{7} \times \frac{14}{15} \) =
28. \( \frac{8}{9} + \frac{8}{9} \) =
29. \( \frac{7}{11} - \frac{1}{11} \) =
30. \( \frac{5\frac{2}{3}}{3} \) =
31. \( \frac{9}{10} - \frac{1}{4} \) =
32. \( \frac{3}{4} + \frac{1}{7} \) =
33. Four cubed =
34. 324.544 ÷ .64 =
35. Use Roman numerals to write 1,466.

36. 97.1 × 65 =
37. Round off 16.9342179 to the nearest thousandth.

99
38. \(69 - 14.691 = \)

39. A new color TV usually costs $418, but it is being sold at a 15% discount. How much is the discount?

40. How much does the TV cost now? _____

41. Manuel's piggy bank had 47 quarters, 211 dimes, 41 nickels, and 150 pennies in it. How much is all that in dollars and cents?

42. How many days are in March? _____

43. How many days are in November? _____

44. How many days are in January? _____

45. How many quarts are in 5 gallons? _____
Shapes and Dimensions 3

Give the names of the following shapes. Inside the shape, write the number of dimensions it has.

Example:

1. __________________________

2. __________________________

3. __________________________

4. __________________________

5. __________________________

6. __________________________

7. __________________________

8. __________________________

9. __________________________

10. __________________________

11. __________________________

12. __________________________

13. __________________________

14. __________________________

15. __________________________

Next to the name of each shape, draw a picture of it. Be neat!

16. Pyramid

17. Box

18. Rhombus

19. Square

20. Pentagon

(five sides)

21. Ellipse

22. Sphere

23. Triangle

24. Cube

25. Parallelogram

26. Cylinder

27. Rectangle

28. Circle

29. Trapezoid

30. Cone

31. Hexagon

(six sides)
Shapes and Dimensions 4

Next to each shape below, write its name and the number of dimensions it has.

Choose your answers from this list:

<table>
<thead>
<tr>
<th>Triangle</th>
<th>Rectangle</th>
<th>Parallelogram</th>
<th>Rhombus</th>
<th>Ellipse</th>
<th>Trapezoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square</td>
<td>Circle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pentagon</th>
<th>Hexagon</th>
<th>Cube</th>
<th>Sphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyramid</td>
<td>Cone</td>
<td>Cylinder</td>
<td></td>
</tr>
<tr>
<td>Box</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. [Diagram]
2. [Diagram]
3. [Diagram]
4. [Diagram]
5. [Diagram]
6. [Diagram]
7. [Diagram]
8. [Diagram]
9. [Diagram]
10. [Diagram]
11. [Diagram]
12. [Diagram]
13. [Diagram]
14. [Diagram]
15. [Diagram]
16. [Diagram]

17. What is the shape of a basketball?
18. What is the shape of a can of Coke?
19. What is the shape of a brick?
20. What is the shape of a party hat?
Test 31—Shapes and Dimensions

Next to each shape, write the number of dimensions it has.

1.  
2.  
3.  
4.  

Name the following shapes. Choose your answers from the list below.

- cylinder
- cone
- sphere
- cube
- box
- pyramid
- hexagon
- pentagon
- trapezoid
- ellipse
- rectangle
- circle
- triangle
- rhombus
- parallelogram
- square

5.  
6.  
7.  
8.  
9.  
10.  
11.  
12.  
13.  
14.  
15.  
16.  
17.  
18.  
19.  
20.  

103
1. Figure out what A is on the following number line.

\[ \begin{array}{c}
15 & & A & & 45 \\
\end{array} \]

\[ A = \quad \]

2. Write forty-seven million in numbers.

\[ \quad \]

3. Factor 48 four ways.

\[ \quad \]

4. \[ 45335 \div 9 = \quad \]

5. Find the average of 36, 29, and 43.

\[ \quad \]

6. Write 7.13 in words.

\[ \quad \]

7. \[ 293.774 + 3.6 + 18 = \quad \]

8. \[ 29.4 - 1.217 = \quad \]

9. Round off 271,435,628 to the nearest million.

\[ \quad \]

10. Round off .477921836 to the nearest thousandth.

\[ \quad \]

11. \[ 7.93 \times .64 = \quad \]

12. Write 2,739 in Roman numerals.

\[ \quad \]

13. \[ 23.154 \div .34 = \quad \]

14. Five cubed = \[ \quad \]

15. What fraction of the circle is shaded in?

\[ \quad \]

16. If \[ \frac{7}{11} \] of a race is finished, what fraction is left to go?

\[ \quad \]

17. Complete the ratio.

\[ 9 : 27 = 11 : \quad \]

18. \[ \frac{4}{5} - \frac{3}{8} = \quad \]

19. Reduce the following fractions to lowest terms.

\[ \frac{9}{45} = \quad \frac{4}{22} = \quad \]

20. Change \[ 4 \frac{7}{8} \] to an improper fraction.

\[ \quad \]

21. \[ \frac{4}{9} \quad + \frac{7}{9} \quad \frac{1}{5} \quad - \frac{4}{5} \]

22. \[ 7 \frac{1}{5} \]

23. Write point B as a mixed number.

Reduce the answer to lowest terms.

\[ \begin{array}{c}
2 & 3 \\
\end{array} \]

\[ B = \quad \]

24. \[ \frac{4}{9} \] of 27 = \[ \quad \]

25. \[ \frac{4}{7} \div \frac{20}{21} \]

26. \[ \frac{1}{5} \] as a percent = \[ \quad \]

\[ 66 \frac{2}{3} \% \text{ as a fraction} = \quad \]
27. 95% of 200 = ________________

28. If 47% of a test is wrong, what percent is right?
Unit 32 — Perimeter 1

The perimeter is the distance all the way around the outside of something. To find the perimeter of any shape, add up the lengths of its sides.

Find the perimeters of the following shapes. Mark your answers in feet, inches, or miles.

1. 16 feet
   - 25 feet
   - 16 feet
2. 12 inches
   - 12 inches
   - 12 inches
3. 4.7 miles
   - 9 miles
   - 26 inches
4. 20 inches
   - 21 yards
5. Square
   - 11 inches
6. 5 inches
7. 10 inches
   - 14 inches
   - 17 inches
8. 28 feet
   - 49 feet
9. 12 inches
   - 14 inches
   - 13 inches
   - 21 inches
10. 5 inches
    - 4 inches
    - 7 inches
11. 4 inches
    - 4 inches
    - 200 miles
12. 12 inches
    - 14 inches
    - 14 inches
    - 14 inches
13. Each side is 9 feet.
Perimeter 2

Remember: the perimeter is the distance all the way around the outside of something. Find the perimeters of the following shapes. Be sure to mark your answers in inches, feet, miles, or yards.

Rectangle

1. What is the perimeter of a rectangle 15 feet long and 10 feet wide?

2. What is the perimeter of a rectangle 24 inches long and 11 inches wide?

3. What is the perimeter of a rectangle 200 miles long and 150 miles wide?

4. What is the perimeter of a field 50 yards long and 29 yards wide?

5. What is the perimeter of a house 39 feet long and 28 feet wide?

6. What is the perimeter of a room 30 feet long and 22 feet wide?

7. What is the perimeter of a rug 12 feet long and 9 feet wide?

Square

8. What is the perimeter of a square whose sides are each 9 inches long?

9. What is the perimeter of a square whose sides are each 95 yards long?

10. What is the perimeter of a square whose sides are each 47 miles long?

Regular Hexagon

All sides are equal.

11. What is the perimeter of a hexagon whose sides are each 6 inches long?

12. What is the perimeter of a hexagon whose sides are each 49 feet long?

13. What is the perimeter of a hexagon whose sides are each 427 yards long?
After each shape, write its name. Then write the number of dimensions it has.

1. __________ 2. __________
3. __________ 4. __________
5. __________ 6. __________
7. __________ 8. __________
9. __________ 10. __________
11. __________ 12. __________

13. If 63% of the class is boys, what percent is girls?

14. 18% of 650 = ______

15. 80% as a fraction = ______

16. 25% as a fraction = ______

17. \( \frac{11}{12} + \frac{5}{6} \) = ______

18. \( \frac{1}{2} \) of 18 = ______

19. \( \frac{9}{10} \times \frac{6}{7} \) = ______

20. Use a ruler to measure the line.

Reduction the following fractions to lowest terms.

21. \( \frac{8}{20} = \) ______

22. \( \frac{9}{15} = \) ______

23. Write \( 2 \frac{1}{9} \) as an improper fraction.

24. \( \frac{8}{4} + 2 \frac{1}{4} \) = ______

25. \( 9 \frac{1}{7} - 2 \frac{6}{7} \) = ______

26. \( \frac{2}{3} + \frac{1}{6} \) = ______

27. \( \frac{3}{4} - \frac{1}{7} \) = ______

28. \( 7^2 + 9^2 \) = ______

29. \( 111.54 \div .26 \) = ______

30. Write MMCDXLIV as an Arabic number.

31. Round off 73.911113 to the nearest one.

32. Round off 56,277 to the nearest thousand.

33. Ms. Rumple drove her car 93,005 miles before it fell to pieces. She said that over the years the car went 19 miles for every gallon of gas. How much gas did the car use in its lifetime?

34. If gas cost an average of \$ .81 over the years, how much did Ms. Rumple spend on gas?
36. Helene got $5.00 and gave half of it to her brother. She spent half of what she had left on candy. How much money did she have then?

37. Which metric measure would you use to measure the thickness of a nickel?
   - millimeter
   - centimeter
   - meter
   - kilometer

38. Which metric measure would you use to measure the length of a cigarette?

39. How many quarts are in a gallon? _____

40. How many days are in a week? _____

41. How many days are in a leap year? _____

42. How many days are in February in a leap year? _____

43. How many years are in a century? _____

44. How many pounds are in 2 tons? _____

45. How many feet are in 2 miles? _____

46. How many inches are in 5 feet? _____
Below, there are six shapes which you will be using in the problems on this page. Remember which shape is which!

**Rectangle**  **Square**  **Triangle**  **Trapezoid**  **Hexagon**  **Pentagon**

**Answer the following questions.**

1. What is the perimeter of a rectangle 16 feet long and 11 feet wide?

2. What is the perimeter of a triangle with sides of 5 inches, 3 inches, and 9 inches?

3. What is the perimeter of a square with sides of 52 inches?

4. Each side of a pentagon measures 24 feet. What is the perimeter of the pentagon?

5. What is the perimeter of a triangle with sides of 93 miles, 28 miles, and 22 miles?

6. What is the perimeter of a rectangle 327 yards long and 216 yards wide?

7. Each side of a hexagon measures 71 feet. What is the perimeter of the hexagon?

8. What is the perimeter of a rectangle 91 miles long and 2 miles wide?

9. What is the perimeter of a trapezoid with sides of 8 feet, 9 feet, 11 feet, and 10 feet?
Perimeter 4

Work out the following problems. Make a small drawing of each shape if it will help you.

1. What is the perimeter of a rectangle 19 feet long and 16 feet wide?

2. What is the perimeter of a triangle whose sides are 12 inches, 10 inches, and 8 inches?

3. What is the perimeter of a hexagon whose sides are all 15 yards long?

4. What is the perimeter of a rectangle 325 yards long and 210 yards wide?

5. What is the perimeter of a pentagon whose sides are all 32 inches long?

6. What is the perimeter of a trapezoid whose sides are 28 feet, 35 feet, 28 feet, and 19 feet?

7. What is the perimeter of a rectangle 200 miles long and 15 miles wide?

8. What is the perimeter of a triangle with sides of 191 yards, 100 yards, and 85 yards?

9. What is the perimeter of a rectangle 85 miles long and 34 miles wide?

10. What is the perimeter of a square with sides 84 yards long?
Test 32 — Perimeter

Work out the following problems.

1. What is the perimeter of a rectangle 35 feet long and 19 feet wide?

2. What is the perimeter of a square whose sides are all 15 yards long?

3. What is the perimeter of a triangle with sides of 43 yards, 23 yards, and 18 yards?

4. What is the perimeter of a hexagon whose sides are all 4 miles long?

5. What is the perimeter of a pentagon whose sides are all 300 yards long?

6. What is the perimeter of a rectangle 341 miles long and 112 miles wide?

7. What is the perimeter of a trapezoid with sides of 32 inches, 21 inches, 14 inches, and 9 inches?

8. What is the perimeter of a square with sides of 98 yards?

9. What is the perimeter of a triangle with sides of 54 yards, 32 yards, and 29 yards?

10. What is the perimeter of a rectangle 465 miles long and 19 miles wide?
1. Figure out what $A$ is on the following number line.

\[ \begin{array}{c}
20 & & & & & A & & & & & 34 \\
\end{array} \]

$A = \underline{\phantom{000}}$

2. Write 907,000,000,000,000 in words.


3. Factor 56 three ways.

\[ \underline{\phantom{00000}} \quad \underline{\phantom{00000}} \]

4. $26243 \div 8 = \underline{\phantom{00000}}$

5. Find the average of 198 and 134.


6. Write sixteen and eleven thousandths in decimals.


7. $180 + 2.73 + 11.9 = \underline{\phantom{00000}}$

8. $61.97 - 4.385 = \underline{\phantom{00000}}$

9. Round off 257,991 to the nearest thousand.


10. Round off 78.273499 to the nearest one.


11. $234 \times .73 = \underline{\phantom{00000}}$

12. Write MMDCCXLVII as an Arabic number.


13. $624.96 \div 9.3 = \underline{\phantom{00000}}$

14. $4^4 = \underline{\phantom{00000}}$

15. What fraction of the circle is shaded in?

16. If $\frac{2}{15}$ of a job is done, what fraction remains to be done?

17. Complete the ratio.

$7 : 49 = \underline{\phantom{00000}} : 70$

18. $\frac{4}{5} + \frac{1}{8} = \underline{\phantom{00000}}$

19. Reduce the following fractions to lowest terms.

$\frac{7}{42} = \underline{\phantom{00000}} \quad \frac{15}{26} = \underline{\phantom{00000}}$

20. Change $8 \frac{1}{6}$ to an improper fraction.


21. $7 \frac{4}{7} + 8 \frac{5}{7} = \underline{\phantom{00000}}$

22. $9 \frac{1}{3} - 4 \frac{2}{3} = \underline{\phantom{00000}}$

23. Write point $B$ as a mixed number. Reduce your answer to lowest terms.

\[ \begin{array}{c}
7 & & & & & B & & & & & 8 \\
\end{array} \]

$B = \underline{\phantom{00000}}$

24. $\frac{7}{8}$ of 40 = \underline{\phantom{00000}}

25. $\frac{9}{10} \div \frac{11}{15} = \underline{\phantom{00000}}$

26. $\frac{1}{3}$ as a percent = \underline{\phantom{00000}}

50% as a fraction = \underline{\phantom{00000}}
27. 82% of 450 =

28. If 51% of a school is boys, what percent is girls?
To find the area of a rectangle, multiply the length by the width (how long times how wide). The area is how many square units there are on a flat surface, so you give the answer in square inches, square feet, square yards, or square miles.

Use the rule stated above to find the answers to the following problems.

1. Find the area of this box. Use the rule you just learned to figure out the answer. Don’t count all the square inches!

   \[
   \text{25 inches} \quad \text{13 inches} \quad \text{square inches}
   \]

2. What is the area of this box?

   \[
   \text{15 feet} \quad \text{10 feet}
   \]

3. What is the area of this box?

   \[
   \text{30 yards} \quad \text{6 yards}
   \]

4. What is the area of this box?

   \[
   \text{14 miles}
   \]

5. What is the area of a room 9 feet long and 8 feet wide?

6. What is the area of a field 100 yards long and 50 yards wide?

7. What is the area of a tabletop 18 inches long and 11 inches wide?

8. What is the area of a rectangular state 43 miles long and 16 miles wide?

9. What is the area of a piece of paper 11 inches long and 8 inches wide?

10. What is the area of a playground 40 yards long and 25 yards wide?

11. If you found the area of a piece of notebook paper, would your answer be in square feet, square inches, square yards, or square miles?

12. If you found the area of a basketball court, would your answer be in square inches, square yards, or square miles?
Find the area in the following problems. Remember: multiply the length by the width and give the answer in square inches, square feet, square yards, or square miles.

1. What is the area of a rug 12 feet long and 9 feet wide? __________ square feet

2. What is the area of a roof 15 yards long and 12 yards wide?

3. What is the area of a field 160 yards long and 92 yards wide?

4. What is the area of a piece of paper 18 inches long and 6 inches wide?

5. What is the area of a gymnasium floor 82 yards long and 40 yards wide?

6. What is the area of a room 22 feet long and 15 feet wide?

7. A man wants to put squares of carpet tile on the floor of a room. Each square of carpet tile is one square foot. How many tiles will he need if the room is 9 feet long and 8 feet wide?

Find the volume in the following problems. To find the volume, multiply the length by the width by the height (or depth). The volume of a solid object or space is the number of cubic units in it, so give your answers in cubic inches, cubic feet, cubic yards, or cubic miles.

8. How many cubic inches are there in this box?

9. How many cubic feet are there in this box?

10. What is the volume of a box 4 yards long, 3 yards wide, and 2 yards high?

11. What is the volume of a room 12 feet long, 9 feet wide, and 8 feet high?

12. What is the volume of a stick of butter 4 inches long, 1 inch wide, and 1 inch high?

13. If you found the area of a small bedroom, would your answer be in square inches, square feet, or square miles?

14. If you found the volume of the planet earth, would you state your answer in cubic inches, cubic feet, cubic yards, or cubic miles?
1. What is the perimeter of a square whose sides are 15 feet long?

2. What is the perimeter of a basketball court 20 yards long and 12 yards wide?

3. What is the perimeter of a garden 24 yards long and 13 yards wide?

Name each shape below.

4. 

5. 

6. 

7. 

8. If 29% of the group is men, what percent is women?

9. 65% of 240 = 

10. Use a ruler to measure the line. 

11. 20% as a fraction = 

12. \( \frac{1}{3} \) as a percent = 

13. \( \frac{4}{5} + \frac{17}{20} = \) 

14. \( \frac{9}{10} \times \frac{5}{6} = \) 

15. \( \frac{3}{4} - \frac{1}{7} = \) 

16. \( \frac{4}{5} + \frac{3}{4} = \) 

Reduce the following fractions to lowest terms.

17. \( \frac{9}{27} = \) 

18. \( \frac{18}{24} = \) 

19. Write \( 5\frac{3}{8} \) as an improper fraction.

20. \( 8\frac{1}{9} + 7\frac{8}{9} = \) 

21. \( 3\frac{1}{3} - 1\frac{2}{3} = \) 

22. \( 4^3 = \) 

23. Two to the fifth = 

24. \( 390.83 \div 1.9 = \) 

25. \( 16.8 - 14.913 = \) 

26. Round off \( .9648371 \) to the nearest hundredth.

27. How many days are in April? 

28. How many days are in July? 

29. How many days are in December? 

30. How many days are in February? 

31. How many feet are in a mile? 

32. How many inches are in a foot? 

33. How many feet are in a yard? 

34. How many pints are in a quart?
35. How many cents are in a half-dollar? _____

36. How many nickels are in a dollar? _____

37. How many minutes are in an hour? _____

38. Circle the metric measure you would use to measure the height of a house.
   millimeters
   centimeters
   meters
   kilometers

39. Circle the metric measure you would use to measure the amount of water in a swimming pool.
   milliliter
   liter

40. A car weighs 3,980 pounds. \( \frac{1}{5} \) of the weight of the car is the engine. How much does the engine weigh?

41. If 7 men divide up $3,000 so each gets the same amount, how much does each man get?

   How much is left over?

42. A man makes $118.35 in a week. How much does he make in 24 weeks?
Find the area in the following problems. Remember to give the answers in square units.

1. What is the area of a room 16 feet long and 9 feet wide?

2. What is the area of a rug 9 feet long and 7 feet wide?

3. What is the area of a lawn 16 yards long and 12 yards wide?

4. What is the area of a field 24 yards long and 17 yards wide?

5. What is the area of a piece of paper 6 inches long and 5 inches wide?

6. What is the area of a tabletop 18 inches long and 14 inches wide?

7. What is the area of a room 22 feet long and 19 feet wide?

Find the volume in the following problems. Remember to give the answers in cubic units.

8. What is the volume of a shoe box 12 inches long, 5 inches wide, and 4 inches deep?

9. What is the volume of a grave 6 feet long, 3 feet wide, and 6 feet deep?

10. What is the volume of a room 10 feet long, 9 feet wide, and 8 feet high?

11. What is the volume of a prison cell 8 feet long, 8 feet wide, and 7 feet high?

12. What is the volume of a desk drawer 14 inches long, 13 inches wide, and 5 inches deep?

13. What is the volume of a box 8 feet long, 8 feet wide, and 8 feet high?
Find the area or volume in the following problems. Remember to give the answers in square units or in cubic units.

1. What is the area of a piece of paper 17 inches long and 11 inches wide?

2. What is the area of a floor 19 yards long and 16 yards wide?

3. What is the volume of a box 14 inches long, 12 inches wide, and 4 inches deep?

4. What is the volume of a hole in the ground 26 yards long, 21 yards wide, and 16 yards deep?

5. What is the area of a field 180 feet long and 97 feet wide?

6. What is the volume of a box 4 inches long, 4 inches wide, and 3 inches high?

7. What is the volume of a room 10 yards long, 7 yards wide, and 4 yards high?

8. What is the area of a tabletop 21 inches long and 14 inches wide?

9. What is the area of a land area 47 miles long and 25 miles wide?
Test 33—Area and Volume

Work out the following problems.

1. What is the area of a football field 100 yards long and 50 yards wide?

2. What is the volume of a box 4 feet long, 3 feet wide, and 7 feet deep?

3. What is the volume of a room 10 feet long, 9 feet wide, and 7 feet high?

4. What is the area of a piece of paper 8 inches long and 11 inches wide?

5. What is the volume of a stick of butter 4 inches long, 4 inches wide, and 1 inch high?

6. What is the area of a piece of land 15 miles long and 12 miles wide?

7. What is the volume of a closet 5 feet long, 4 feet wide, and 9 feet high?

8. What is the area of a room’s floor that is 67 feet long and 40 feet wide?

9. What is the volume of the inside of a barn that is 47 feet long, 38 feet wide, and 20 feet high?

10. What is the area of a tabletop 35 inches long and 20 inches wide?
1. Figure out what $A$ is on the following number line.

\[ \begin{array}{cccc}
35 & & A & 65 \\
\end{array} \]

$A = \underline{5}$

2. Write nine hundred seventy billion in numbers.


3. Factor 40 three ways.


4. $42260 \div 7 = \underline{6037}$

5. Find the average of 99, 87, 22, and 32.


6. Write 3.05 in words.


7. $14.93 + 8.291 + 493 = \underline{516.221}$

8. $68.4 - 2.97 = \underline{65.43}$

9. Round off 888,888,888 to the nearest million.


10. Round off 29.347921 to the nearest tenth.


11. $.459 \times .38 = \underline{0.17322}$

12. Write 3,955 in Roman numerals.


13. $259.54 \div .38 = \underline{680.36842}$

14. Eight cubed = \underline{512}

15. What fraction of the square is shaded in?


16. If $\frac{14}{21}$ of a test is right, what fraction is wrong?


17. Complete the ratio.

$8 : 64 = 9 : \underline{72}$

18. $\frac{7}{8} - \frac{2}{3} = \underline{-\frac{1}{24}}$

19. Reduce the following fractions to lowest terms.

$\frac{4}{26} = \underline{\frac{2}{13}}$ 
$\frac{8}{12} = \underline{\frac{2}{3}}$

20. Change $7 \frac{2}{3}$ to an improper fraction.


21. $4 \frac{5}{11} + 3 \frac{8}{11} = \underline{8 \frac{3}{11}}$

22. $12 \frac{1}{7} - 1 \frac{5}{7} = \underline{10}$

23. Write point $B$ as a mixed number. Reduce your answer to lowest terms.

\[ \begin{array}{cccccc}
6 & & & & & B \\
\end{array} \]

$B = \underline{6 \frac{1}{8}}$

24. $2 \frac{4}{7} \times \frac{7}{8} = \underline{1 \frac{2}{7}}$

25. $\frac{5}{24} \div \frac{7}{8} = \underline{\frac{5}{21}}$

26. $\frac{4}{5}$ as a percent = \underline{80%}

$33 \frac{1}{3} \%$ as a fraction = \underline{\frac{100}{3}}
27. 92% of 150 = 

28. If 24% of a test is wrong, what percent is right?

29. What is the perimeter of a rectangle 7 miles long and 6 miles wide?
Learn the names of the following terms used with circles.

Circumference  Diameter  Radius  Chord  Tangent  Arc  Semicircle

Now answer the following questions.

1. Which line touches only the outside of the circle?

2. Which line goes from the center of the circle to the edge?

3. Which line touches the edge of the circle in two places but does not go through the center?

4. What do you call the distance around the circle?

5. What do you call half a circle?

6. What do you call a small part of the circumference?

7. What do you call the line that cuts the circle in two?

If you know the diameter of a circle, you can find the circumference by multiplying the diameter by 3.14. This is a special number called \( \pi \), discovered many years ago. It is from the Greek letter \( \pi \). You should remember that \( \pi = 3.14 \).

Work out the following problems on circumference.

8. What is the circumference of a circle whose diameter is 5 inches?

9. What is the circumference of a circle whose diameter is 3 feet?

10. What is the circumference of a circle whose diameter is 25 miles?

11. What is the circumference of a circle whose diameter is 65 yards?
Circumference and Area of the Circle 2

Remember the following terms used with circles.

<table>
<thead>
<tr>
<th>Circumference</th>
<th>Diameter</th>
<th>Radius</th>
<th>Chord</th>
<th>Tangent</th>
<th>Arc</th>
<th>Semicircle</th>
</tr>
</thead>
</table>

Using the diagram to the right, find the letters and write the terms which are used with the circle. For example, the term for AC on the diagram (the line between A and C) is radius.

1. AD ____________________________
2. BE ____________________________
3. FEG ____________________________
4. CAE ____________________________
5. AB ____________________________
6. BC ____________________________
7. BCDEB ____________________________
8. EDC ____________________________

To find the area of a circle, use this formula: Area = πr².
This means you should multiply the radius by itself, and multiply the answer by pi (π) or 3.14. Give the answer in square units.

Work out the following problems. You’ve been given a little help with the first one.

9. What is the area of a circle whose radius is 5 inches?
   \[ \text{Area} = \pi r^2 = 3.14 \times 5^2 = 3.14 \times 25 = \text{square inches} \]

10. What is the area of a circle whose radius is 3 feet?

11. What is the area of a city whose radius is 8 miles?
Label each of the following as inches, square inches, or cubic inches.

1. Area of a table __________________________
2. Volume of a shoebox __________________________
3. Perimeter of a paper __________________________
4. Area of a paper __________________________
5. Volume of an engine __________________________
6. Perimeter of a table __________________________

7. What is the perimeter of a room 27 feet long and 26 feet wide?

8. If 29% of a group is male, what percent is female?

9. 89% of 2,400 __________________________

10. \( \frac{7}{10} \) as a percent = __________________________

11. 75% as a fraction = __________________________

12. \( \frac{7}{8} \times \frac{4}{5} = \) __________________________

13. \( \frac{2}{3} \) of 39 = __________________________

14. \( \frac{3}{4} + \frac{7}{8} = \) __________________________

15. Use a ruler to measure the line.

16. \( \frac{9}{12} = \) ________

17. \( \frac{15}{45} = \) ________

18. \( \frac{7}{3} - \frac{11}{9} + \frac{9}{11} - \frac{4}{7} = \)

19. \( 9 \frac{1}{7} - 1 \frac{4}{7} = \)

20. Round off 4.743992 to the nearest hundredth.

21. Write \( 7 \frac{3}{5} \) as an improper fraction.

22. \( 2^5 = \) __________________________

23. \( \frac{3}{5} + \frac{4}{5} = \) __________________________

24. \( \frac{7}{8} - \frac{2}{3} = \) __________________________

25. \( \frac{5}{7} + \frac{1}{2} = \) __________________________

26. \( 78.728 + .26 = \) __________________________

27. Write MCDLXIV as an Arabic number.

28. \( 47.9 + 2.73 + 90 = \) __________________________

29. \( 14.8 - 7.219 = \) __________________________

30. How many dimensions does each of the following shapes have?

31. __________________________

32. __________________________

33. __________________________

34. __________________________

35. __________________________
36. 

37. 

38. 

39. Circle the metric measure which is closest to a mile.

- millimeter
- centimeter
- meter
- kilometer

40. Circle the metric measure which is closest to a pound.

- milligram
- gram
- kilogram

41. Which metric measure would you use to measure a football field?

42. Which metric measure would you use to measure the milk on a milk truck?

43. How many years are in a century? _____

44. How many cups are in a pint? _____

45. How many inches are in a foot? _____

46. How many seconds are in a minute? _____

47. How many hours are in a day? _____

48. Hamburger meat costs $1.95 a pound. How much would it cost a restaurant to buy a ton of hamburger meat?

49. Mr. Spache has $1,218.43 in his savings account. He puts in $531 in May, $117.21 in June, and $219.11 in July. Then in August he takes out $900 to pay for a trip to Europe. How much is left in his account?
Circumference and Area of the Circle 3

Remember the following terms used with the circle.

- **Circumference**: Distance around the circle
- **Diameter**: Line cutting the circle in two
- **Radius**: Line from the center to the edge
- **Tangent**: Line touching only the outside of the circle
- **Arc**: A small part of the circumference
- **Semicircle**: Half a circle
- **Chord**: Line touching the edge of the circle in two places but not going through the center

Using the diagram to the right, find the letters and write the terms which are used with the circle.

Example: \( GF = \) Radius

1. \( BG \)  
2. \( BD \)  
3. \( BDEFB \)  
4. \( ABC \)  
5. \( EG \)  

6. \( BGE \)  
7. \( DE \)  
8. \( BDE \)  
9. \( BFE \)  

On each circle below, make a drawing to show that you understand the term written above the circle.

10. Circumference  
11. Tangent  
12. Semicircle  
13. Radius  
14. Arc  
15. Chord  
16. Diameter

17. What is the number you multiply by the diameter to get the circumference?  
   \[
   \text{_____} \quad (\pi \text{ or } \pi)
   \]
   If you don’t know this number, learn it!

18. What is the circumference of a circle whose diameter is 7 inches?  

19. What is the circumference of a circle whose diameter is 9 miles?  

20. What is the circumference of a circle whose diameter is 32 yards?  

21. What is the area of a round swimming pool whose radius is 7 yards?  

22. What is the area of a frying pan whose radius is 5 inches?  

23. What is the area of a circle whose radius is 2 miles?  

24. What is the area of a circle whose radius is 1 foot?
Circumference and Area of the Circle 4

On the line, write the term which goes with each group of letters. Use the letters in the drawing to figure out these terms used with the circle. Choose your answers from the list next to the drawing.

1. EFG
2. FD
3. BEC
4. FG
5. DG
6. GDE
7. ADC
8. DE
9. FE
10. GDEG

Remember two important formulas:
Circumference = \pi d
Area = \pi r^2 (square units)

Use these formulas to figure out the following problems.

11. What is the area of a circle whose radius is 5 feet?

12. What is the circumference of a circle whose diameter is 32 inches?

13. What is the circumference of a baseball field whose diameter is 450 feet?

14. What is the area of a circle whose radius is 4 miles?

15. What is the area of a circle whose radius is 10 feet?

16. What is the circumference of a circle whose diameter is 19 yards?

17. What is the area of a circle whose radius is 12 miles?
Test 34 — Circumference and Area of the Circle

On the line, write the term which goes with each group of letters. Use the letters in the drawing to figure out these terms used with the circle. Choose your answers from the list next to the drawing.

1. FE
2. GD
3. BF
4. ABC
5. BGE
6. BDEFB
7. BDE

Work out the following problems.

8. What is the circumference of a circle whose diameter is 3 inches?

9. What is the circumference of a circle whose diameter is 6 miles?

10. What is the circumference of a circle whose diameter is 8 yards?

11. What is the circumference of a circle whose radius is 2 inches?

12. What is the area of a circle whose radius is 4 miles?

13. What is the area of a circle whose radius is 2 feet?

14. What is the area of a circle whose radius is 9 yards?

15. What is the area of a circle whose radius is 1 inch?
1. Figure out what $A$ is on the following number line.

\[ \begin{array}{c}
18 \quad \quad \quad A \quad \quad \quad 63 \\
\end{array} \]

$A = \underline{\quad \quad \quad \quad \quad \quad} \quad$

2. Write 900,000,000 in words.

3. Factor 30 three ways.

4. \[ 75065 + 9 = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

5. Find the average of 36, 44, and 52.

6. Write fifteen and three thousandths in decimals.

7. \[ 8 + 9.3 + 16.702 = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

8. \[ 68.59 - 2.473 = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

9. Round off 278,522 to the nearest thousand.

10. Round off .4283759 to the nearest hundredth.

11. \[ 3.75 \times 2.9 = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

12. Write CMXLIV as an Arabic number.

13. \[ 435.84 \div 6.4 = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

14. \[ 9^2 = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

15. What fraction of the circle is shaded in?

16. If \( \frac{11}{47} \) of a group of teachers is men, what fraction is women?

17. Complete the ratio.

\[ 7 : 35 = \underline{\quad \quad \quad \quad \quad \quad} : 45 \quad \]

18. \[ \frac{3}{4} + \frac{1}{7} = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

19. Reduce the following fractions to lowest terms.

\[ \frac{7}{63} = \underline{\quad \quad \quad \quad \quad \quad} \quad \frac{32}{40} = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

20. Change \( 2\frac{9}{10} \) to an improper fraction.

21. \[ \begin{array}{c}
9 \frac{4}{5} \\
\end{array} + 8 \frac{3}{5} = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

22. \[ \begin{array}{c}
2 \frac{1}{7} \\
\end{array} - 1 \frac{4}{7} = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

23. Write point $B$ as a mixed number. Reduce your answer to lowest terms.

\[ \begin{array}{c}
3 \quad \quad \quad \quad \quad B \quad \quad \quad \quad \quad \quad 4 \\
\end{array} \]

$B = \underline{\quad \quad \quad \quad \quad \quad} \quad$

24. \[ \frac{7}{9} \text{ of } 81 = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

25. \[ \frac{9}{10} \div 1\frac{3}{4} = \underline{\quad \quad \quad \quad \quad \quad} \quad \]

26. $\frac{1}{2}$ as a percent = \underline{\quad \quad \quad \quad \quad \quad} \quad

75% as a fraction = \underline{\quad \quad \quad \quad \quad \quad}
27. 35% of 240 = 

28. If 18% of a group is male, what percent is female?

29. What is the perimeter of a rectangle 14 miles long and 10 miles wide?

30. What is the area of the rectangle in question 29?

31. What is the volume of a box 8 inches long, 4 inches wide, and 2 inches high?
Our number system is called *base ten* because there are ten different single numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The way we can count higher than 9 is by putting numbers in different places, as in the tens or the hundreds or the millions place.

But base ten isn’t the only way to write numbers. We use it mainly because we have ten fingers. What if we had only eight fingers? Or seven? It is possible to write numbers in base eight or base seven or any other base.

Count the Xs in each line below. Then figure out the number of Xs in each base. The first one has been done for you.

<table>
<thead>
<tr>
<th>Xs</th>
<th>Base Ten groups of ten</th>
<th>Base Eight groups of eight</th>
<th>Base Seven groups of seven</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xs</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

1. Xs

2. Xs

3. Xs

4. Xs

5. Xs

6. Xs

7. Xs

8. Xs

9. Xs

10. Xs

11. Xs

12. Xs

13. Xs
Different Bases 2

For each line below, figure out the number of Xs in each base. You will have to count the number of Xs in each line.

<table>
<thead>
<tr>
<th>Base Ten</th>
<th>Base Five</th>
<th>Base Eight</th>
</tr>
</thead>
<tbody>
<tr>
<td>groups of ten</td>
<td>groups of five</td>
<td>groups of eight</td>
</tr>
<tr>
<td>↓</td>
<td>↓</td>
<td>↓</td>
</tr>
</tbody>
</table>

| X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1 | 1 | 2 | 1 | 1 | 3 |

1. XXXXX
2. XXXXXXXXXXXXXX
3. XXXXXXXXXXXXXXXXXXX
4. XXXXXXXXXXXXXXXXXXXX
5. XXXXXXXXXXXXXXXXXXXXXX
6. XXXXXXXXXXXXXXXXXXXXXXX
7. XXXXXXXXXXXXXXXXXXXXXXXX
8. XXXXXXX
9. XXXXXXXXXXXXXXXXXXXXXXXXXXXX
10. XX

The numbers below are given in base six or base nine. Change them to base ten (our number system). Study the examples first.

<table>
<thead>
<tr>
<th>Base Six</th>
<th>Base Ten</th>
</tr>
</thead>
<tbody>
<tr>
<td>sixes</td>
<td>ones</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
11. 1 | 4 | \(1 \times 6 + 4 =\) |
12. 3 | 5 |
13. 2 | 1 |
14. 1 | 1 |
15. 5 | 5 |
16. 2 | 4 |

<table>
<thead>
<tr>
<th>Base Nine</th>
<th>Base Ten</th>
</tr>
</thead>
<tbody>
<tr>
<td>nines</td>
<td>ones</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
17. 1 | 4 |
18. 3 | 5 |
19. 6 | 1 |
20. 4 | 3 |
21. 8 | 8 |
22. 1 | 1 |
1. $1207 \times 427 = \ldots$

2. What is the area of a circle whose radius is 2 miles?

3. What is the area of a rectangle 17 feet long and 8 feet wide?

4. What is the circumference of a circle whose diameter is 9 yards?

5. What is the volume of a box 3 inches long, 3 inches wide, and 2 inches high?

6. What is the perimeter of a hexagon whose sides are all 7 inches long?

7. If 77% of the rooms in a hotel are full, what percent are empty?

8. $25\%$ of 96 = \ldots

9. $\frac{2}{5}$ as a percent = \ldots

10. $80\%$ written as a fraction = \ldots

11. $54.162 + .18 = \ldots$

12. Measure the line. \ldots = \ldots

13. $\frac{7}{8}$ of 72 = \ldots

14. $\frac{2}{3} + \frac{7}{9} = \ldots$

15. $\frac{7}{11} \times \frac{4}{21} = \ldots$

16. $7\frac{4}{5} + 9\frac{1}{5} = \ldots$

17. $9\frac{1}{3} - 1\frac{2}{3} = \ldots$

18. Round off 69.51137 to the nearest one.

19. Write $2\frac{7}{8}$ as an improper fraction.

Reduce the following fractions to lowest terms.

20. $\frac{6}{36} = \ldots$

21. $\frac{4}{50} = \ldots$

22. $10^2 + 5^3 = \ldots$

23. Write 1,551 in Roman numerals.

24. $147.9 + 8.3 + 1 = \ldots$

25. $16 - .37 = \ldots$

Identify the following shapes by name.

26. \ldots

27. \ldots

28. \ldots

29. \ldots

30. \ldots

31. \ldots
32. How many days are in January? ______
33. How many days are in June? ______
34. How many days are in September? ______
35. How many days are in November? ______
36. How many feet are in a mile? ______
37. How many days are in a non-leap year? ______
38. How many ounces are in a pound? ______
39. How many quarts are in a gallon? ______
40. How many years are in a decade? ______
41. How many pounds are in a ton? ______

42. Circle the metric measure which is closest to a mile.
   - meter
   - centimeter
   - kilometer
   - millimeter

43. Circle the metric measure which is closest to a quart.
   - milliliter
   - liter

44. Mr. Small, a farmer, decided to walk all the way around the outside of a large field on his farm to check the fence for holes. If the field was 285 yards long and 116 yards wide, how far did he walk?

45. How many feet is that? ________________
### Different Bases 3

For each line below, figure out the number of Xs in each base.

<table>
<thead>
<tr>
<th>Base Ten tens ones</th>
<th>Base Nine nines ones</th>
<th>Base Eleven elevens ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. XXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. XXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. XXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. XXXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. XXXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. XXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. XXXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. XXXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. XXXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. XXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. XXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The numbers below are given in bases different from our number system. Change these numbers to base-ten numbers (our system).

<table>
<thead>
<tr>
<th>Base Five fives ones</th>
<th>Base Ten</th>
<th>Base Seven sevens ones</th>
<th>Base Ten</th>
<th>Base Eleven elevens ones</th>
<th>Base Ten</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. 2 4 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. 3 1 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. 4 3 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. 1 0 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. 3 4 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. 1 6 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. 2 1 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. 3 5 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. 5 6 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. 3 0 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. 9 4 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. 6 1 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. 2 3 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. 2 0 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. 8 3 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Different Bases 4

Below are base-ten numbers. Write them as base-six, base-eight, and base-eleven numbers.

<table>
<thead>
<tr>
<th>Base Ten</th>
<th>Base Six</th>
<th>Base Eight</th>
<th>Base Eleven</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tens</td>
<td>sixes</td>
<td>eights</td>
</tr>
<tr>
<td>ones</td>
<td></td>
<td>ones</td>
<td>ones</td>
</tr>
<tr>
<td>1.</td>
<td>1 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>2 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>3 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>2 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The numbers below are written in different bases. Change them all to base-ten numbers.

<table>
<thead>
<tr>
<th>Base Seven</th>
<th>Base Ten</th>
<th>Base Four</th>
<th>Base Ten</th>
<th>Base Five</th>
<th>Base Ten</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tens</td>
<td>sixes</td>
<td>eights</td>
<td>elevens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ones</td>
<td>ones</td>
<td>ones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 1 6 =</td>
<td></td>
<td></td>
<td>12. 3 1 =</td>
<td></td>
<td>18. 4 2 =</td>
</tr>
<tr>
<td>7. 2 4 =</td>
<td></td>
<td></td>
<td>13. 1 3 =</td>
<td></td>
<td>19. 1 4 =</td>
</tr>
<tr>
<td>8. 4 6 =</td>
<td></td>
<td></td>
<td>14. 2 2 =</td>
<td></td>
<td>20. 2 0 =</td>
</tr>
<tr>
<td>9. 2 0 =</td>
<td></td>
<td></td>
<td>15. 3 0 =</td>
<td></td>
<td>21. 4 4 =</td>
</tr>
<tr>
<td>10. 1 1 =</td>
<td></td>
<td></td>
<td>16. 1 1 =</td>
<td></td>
<td>22. 1 1 =</td>
</tr>
<tr>
<td>11. 3 3 =</td>
<td></td>
<td></td>
<td>17. 3 2 =</td>
<td></td>
<td>23. 3 3 =</td>
</tr>
</tbody>
</table>
Test 35 — Different Bases

Below are base-ten numbers. Write them as base-seven, base-eight, and base-five numbers.

<table>
<thead>
<tr>
<th>Base Ten</th>
<th>Base Seven</th>
<th>Base Eight</th>
<th>Base Five</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The numbers below are written in different bases. Change them all to base-ten numbers.

<table>
<thead>
<tr>
<th>Base Six</th>
<th>Base Ten</th>
<th>Base Three</th>
<th>Base Ten</th>
<th>Base Eleven</th>
<th>Base Ten</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. 54</td>
<td></td>
<td>8. 12</td>
<td></td>
<td>11. 71</td>
<td></td>
</tr>
<tr>
<td>6. 12</td>
<td></td>
<td>9. 22</td>
<td></td>
<td>12. 98</td>
<td></td>
</tr>
<tr>
<td>7. 33</td>
<td></td>
<td>10. 10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Figure out what A is on the following number line.

\[ \begin{array}{cccc}
10 & & A & 70
\end{array} \]

A =

2. Write nine hundred eight trillion in numbers.

3. Factor 24 three ways.

4. \( 42611 + 7 = \)

5. Find the average of 18, 23, and 40.

6. Write 17.012 in words.

7. \( 144 + 8.38 + 22.105 = \)

8. \( 22.9 - 4.733 = \)

9. Round off 67,288,920 to the nearest million.

10. Round off 16.93758264 to the nearest thousandth.

11. \( .289 \times 47 = \)

12. Write 2,847 in Roman numerals.

13. \( 24.447 + .29 = \)

14. Five cubed =

15. What fraction of the circle is shaded in?

16. If \( \frac{15}{19} \) of a house is painted, what fraction remains to be painted?

17. Complete the ratio.
\[ 8 : 96 = 7 : \]

18. \( \frac{2}{3} - \frac{3}{5} = \)

19. Reduce the following fractions to lowest terms.
\[ \frac{6}{42} = \quad \frac{18}{21} = \]

20. Change \( 9 \frac{1}{2} \) to an improper fraction.

21. \[ 5 \frac{4}{5} + 4 \frac{3}{5} = \quad 9 \frac{1}{3} - 4 \frac{2}{3} = \]

22. Write point B as a mixed number. Reduce your answer to lowest terms.

\[ \begin{array}{cccc}
7 & & B & 8
\end{array} \]

B =

23. \( \frac{2}{3} \times 1 \frac{9}{10} = \)

24. \[ \frac{4}{5} + \frac{8}{9} = \]

25. \( \frac{3}{8} \) as a percent =

66 \( \frac{2}{3} \) as a fraction =
27. 25% of 740 = 

28. If 63% of a job is done, what percent remains to be done?

29. What is the perimeter of a rectangle 19 miles long and 7 miles wide?

30. What is the area of a rectangle 5 inches long and 4 inches wide?

31. What is the volume of a box 14 feet long, 10 feet wide, and 6 feet high?

32. What is the circumference of a circle whose diameter is 7 feet?

33. What is the area of a circle whose radius is 4 inches?
1. Figure out what \( B \) is on the following number line.

\[
\begin{array}{c|c|c|c}
14 & B & 42 \\
\end{array}
\]

\[ B = \_\_\_\_ \]

2. Write 371,000,000,000 in words.

_____________________________

_____________________________

3. Factor 63 two ways.

_____________________________

_____________________________

4. 16525 ÷ 8 =

_____________________________

5. Find the average of 8, 25, and 12.

_____________________________

6. Write 7.009 in words.

_____________________________

_____________________________

Write twelve and fifteen hundredths in decimals.

_____________________________

7. 45.762 + 396 =

_____________________________

8. 6.8 - 2.472 =

_____________________________

9. Round off 45,632 to the nearest thousand.

_____________________________

10. Round off .6749831 to the nearest hundredth.

_____________________________

11. 43.7 \times 3.9 =

_____________________________

12. Write MMCLXVII in Arabic numbers.

_____________________________

Write 3,424 in Roman numerals.

_____________________________

13. 11.388 ÷ 2.6 =

_____________________________

14. Five cubed + nine squared =

\[ 4^5 = \]

_____________________________

15. What fraction of the circle is shaded in?

_____________________________

16. If \( \frac{9}{10} \) of a test is right, what fraction is wrong?

_____________________________

17. Complete the ratios.

\[
\begin{array}{c:cc}
6 : 18 & = & 8 : \_\_\_\_ \\
3 : 12 & = & \_\_\_\_ : 16 \\
\end{array}
\]

18. \( \frac{2}{3} + \frac{1}{4} = \)

_____________________________

19. Reduce the following fractions to lowest terms.

\[
\begin{array}{ccc}
\frac{4}{24} = & \_\_\_\_ & \frac{14}{16} = \_\_\_\_ \\
\end{array}
\]

20. Write \( 4\frac{1}{8} \) as an improper fraction.

_____________________________

21. \[
\begin{array}{c}
4 \frac{2}{3} \quad + \quad 8 \frac{2}{3}
\end{array}
\]

22. \[
\begin{array}{c}
5 \frac{1}{5} \quad - \quad 2 \frac{4}{5}
\end{array}
\]
23. Write point $A$ as a mixed number. Reduce your answer to lowest terms.

\[
\begin{array}{cccc}
\vdots & & & \vdots \\
3 & A & & 4 \\
\end{array}
\]

\[A = \quad \]

24. \(2 \frac{4}{5} \times 1 \frac{5}{8} = \quad \]

25. \(\frac{1}{7} + \frac{3}{14} = \quad \]

26. \(\frac{1}{4}\) as a percent = \(\quad \)

\(33 \frac{1}{3}\%\) as a fraction = \(\quad \)

27. \(45\%\) of 640 = \(\quad \)

28. If 53\% of a school is boys, what percent is girls?

29. What is the perimeter of a rectangular garden 19 feet long and 14 feet wide?

30. What is the area of the garden in question 29?

31. What is the volume of a box 5 feet long, 5 feet wide, and 4 feet deep?

32. What is the circumference of a circle whose diameter is 8 feet?

33. What is the area of a circle whose radius is 3 inches?
Review Test Progress Graph

After each Review Test is corrected, make a bar graph by filling in the number of questions you got right. The top line climbing up the graph is the number of questions on each test, so if you touch the line, you got one hundred percent correct. The lower line climbing up the graph indicates eighty percent correct or the mastery level which you should reach. During the year, you'll be able to see your progress in math skills grow.
# Progress Chart

<table>
<thead>
<tr>
<th>Unit</th>
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* ■ = A, excellent (90-100%)  ■ = B, good (80-89%)  ■ = take again (0-79%)