



ALGEBRA

Prerequisite Skills Workbook: Remediation and Intervention

For use with
Glencoe Pre-Algebra
Glencoe Algebra 1
***Glencoe Algebra: Concepts
and Applications***



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Algebra Prerequisite Skills Workbook

1 2 3 4 5 6 7 8 9 10 024 11 10 09 08 07 06 05 04 03 02

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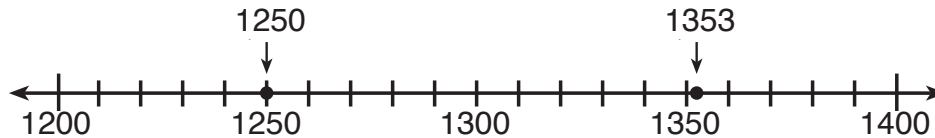
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Comparing and Ordering Whole Numbers

You can use a number line to compare whole numbers such as 1250 and 1353.



On a number line, values increase as you move to the right.

1250 is to the left of 1353.

1353 is to the right of 1250.

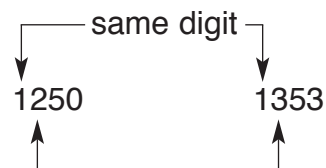
1250 is **less than** 1353.

1353 is **greater than** 1250.

$$1250 < 1353$$

$$1353 > 1250$$

You can compare numbers without a number line. Start at the left and compare the digits in each place-value position.



In the hundreds place, $2 < 3$.

So, $1250 < 1353$.

Examples

Replace each \bigcirc with $<$, $>$, or $=$ to make a true sentence.

1 5749 \bigcirc 5746

In the ones place, $9 > 6$.

So, $5749 > 5746$.

2 1432 \bigcirc 989

On a number line, 1432 is to the right of 989.

So, $1432 > 989$.

3 Order 34, 22, 39, and 105 from least to greatest.

Compare the hundreds. 105 is the greatest.

Compare the tens. 22 is the least.

Compare the ones. 34 is less than 39.

So the order from least to greatest is 22, 34, 39, 105

Write using the symbols $<$, $>$, or $=$.

1. 9 is greater than 7.

2. 38 is less than 83.

3. 480 is greater than 48.

4. 500 is greater than 498.

5. 832 is equal to 832.

6. 365 is less than 375.



Comparing and Ordering Whole Numbers *(continued)*

Fill in the blank with $<$, $>$, or $=$ to make a true sentence.

7. 435 _____ 534 8. 6739 _____ 6738
9. 8762 _____ 8672 10. 892 _____ 2531
11. 7059 _____ 7061 12. 629,356 _____ 630,200
13. 487,926 _____ 487,826 14. 74,923 _____ 74,923
15. 15,538 _____ 15,358 16. 124,462 _____ 124,433
17. 49,675 _____ 49,675 18. 753,021 _____ 743,012
19. 64,336 _____ 65,376 20. 819,461 _____ 803,642

Order the numbers from least to greatest.

21. 48 52 46 67 22. 102 120 112 201
23. 987 978 990 897 24. 2063 2060 2058
25. 99 989 809 26. 4007 4700 4070
27. 865 635 402 615 28. 2143 2413 2341
29. 602 206 620 260 30. 6300 6003 6030

Solve. Use the chart.

31. List the states in order of size from least to greatest.
32. Which state has an area between 57,000 and 60,000 square miles?

Areas of Some Midwestern States	
State	Area (square miles)
Illinois	56,345
Indiana	36,185
Michigan	58,527
Ohio	41,330
Wisconsin	56,123

SKILL 2

Name _____ Date _____ Period _____

Rounding Whole Numbers

The distance from Atlanta, Georgia, to Memphis, Tennessee, is 371 miles. If you tell a friend that the distance is about 400 miles, you have **rounded** the number.

On a number line, you can see that 371 is between 300 and 400. It is closer to 400. To the nearest hundred, 371 rounds to 400.

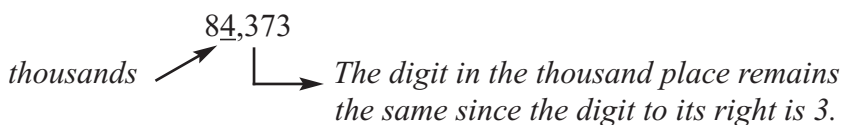


You can also round numbers without using a number line. First, look at the digit to the right of the place being rounded.

- If the digit to the right is 5, 6, 7, 8, or 9, round up.
- If the digit to the right is 0, 1, 2, 3, or 4, the underlined digit remains the same.

Examples

1 Round 84,373 to the nearest thousand.



To the nearest thousand, 84,373 rounds to 84,000.

2 Round 3,546,238 to the nearest million.



To the nearest million, 3,546,238 rounds to 4,000,000.

Round to the nearest ten. Use the number line if necessary.



1. 682 2. 675 3. 698 4. 661

Round to the nearest hundred. Use the number line if necessary.



5. 830 6. 850 7. 778
8. 879 9. 950 10. 1022

SKILL 2

Name _____ Date _____ Period _____

Rounding Whole Numbers *(continued)*

Round to the nearest thousand. Use the number line if necessary.



- | | | |
|----------|----------|----------|
| 11. 3100 | 12. 2500 | 13. 2262 |
| 14. 4700 | 15. 5860 | 16. 4082 |
| 17. 3643 | 18. 4216 | 19. 5910 |

Round to the underlined place-value position.

- | | |
|--------------------------|--------------------------|
| 20. <u>2</u> 67 | 21. 40 <u>9</u> 1 |
| 22. <u>4</u> 20,800 | 23. 5 <u>6</u> 7,000 |
| 24. 43, <u>7</u> 28 | 25. 30 <u>7</u> ,792 |
| 26. 14, <u>3</u> 50 | 27. <u>9</u> ,798 |
| 28. <u>3</u> ,398,000 | 29. 1 <u>8</u> ,499,898 |
| 30. 5 <u>3</u> 2,795 | 31. <u>8</u> 24,619 |
| 32. <u>6</u> ,321,510 | 33. 24, <u>0</u> 53,217 |
| 34. 12 <u>7</u> ,610,573 | 35. 34 <u>6</u> ,872,000 |

Solve. Use the chart.

36. List the oceans in order of size from least area to greatest area.
37. Round each area to the nearest million.

Areas of Oceans	
Ocean	Area (square kilometers)
Arctic	9,485,000
Atlantic	86,557,000
Indian	73,427,000
Pacific	166,241,000

SKILL 3

Name _____ Date _____ Period _____

Adding Whole Numbers

To add whole numbers, first add the ones. Then add the digits in each place from right to left.

Examples

$$\begin{array}{r}
 1 \quad 7056 \\
 + 973 \\
 \hline
 9
 \end{array}
 \longrightarrow
 \begin{array}{r}
 \overset{1}{7}056 \\
 + 973 \\
 \hline
 29
 \end{array}
 \longrightarrow
 \begin{array}{r}
 \overset{11}{7}056 \\
 + 973 \\
 \hline
 029
 \end{array}
 \longrightarrow
 \begin{array}{r}
 \overset{11}{7}056 \\
 + 973 \\
 \hline
 8029
 \end{array}$$

Add the ones.

Add the tens.

Add the hundreds.

Add the thousands.

2 \$406 + \$881 + \$75

$$\begin{array}{r}
 \overset{11}{\$}406 \\
 881 \\
 + 75 \\
 \hline
 \$1362
 \end{array}$$

Write in columns.

Add.

1. $\begin{array}{r} 72 \\ + 65 \\ \hline \end{array}$

2. $\begin{array}{r} 62 \\ + 83 \\ \hline \end{array}$

3. $\begin{array}{r} 39 \\ + 37 \\ \hline \end{array}$

4. $\begin{array}{r} 66 \\ + 85 \\ \hline \end{array}$

5. $\begin{array}{r} 768 \\ + 67 \\ \hline \end{array}$

6. $\begin{array}{r} 495 \\ + 48 \\ \hline \end{array}$

7. $\begin{array}{r} \$470 \\ + 583 \\ \hline \end{array}$

8. $\begin{array}{r} 237 \\ + 579 \\ \hline \end{array}$

9. $\begin{array}{r} 1570 \\ + 2823 \\ \hline \end{array}$

10. $\begin{array}{r} 5126 \\ + 2899 \\ \hline \end{array}$

11. $\begin{array}{r} 3973 \\ + 1689 \\ \hline \end{array}$

12. $\begin{array}{r} 1482 \\ + 3497 \\ \hline \end{array}$



Name _____ Date _____ Period _____

Adding Whole Numbers *(continued)*

$$\begin{array}{r} 13. \quad 4632 \\ + \quad 705 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 2039 \\ + \quad 758 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 6720 \\ + \quad 2385 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 7916 \\ + \quad 8295 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 14,832 \\ + \quad 6229 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 23,467 \\ + \quad 7324 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 15,732 \\ + \quad 8615 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 24,816 \\ + \quad 15,995 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 36 \\ \quad 54 \\ + \quad 21 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad 65 \\ \quad 89 \\ + \quad 23 \\ \hline \end{array}$$

$$\begin{array}{r} 23. \quad 168 \\ \quad 275 \\ + \quad 256 \\ \hline \end{array}$$

$$\begin{array}{r} 24. \quad 245 \\ \quad 87 \\ + \quad 316 \\ \hline \end{array}$$

$$\begin{array}{r} 25. \quad 43 \\ \quad 128 \\ + \quad 210 \\ \hline \end{array}$$

$$\begin{array}{r} 26. \quad 439 \\ \quad 64 \\ + \quad 87 \\ \hline \end{array}$$

$$\begin{array}{r} 27. \quad 518 \\ \quad 192 \\ + \quad 36 \\ \hline \end{array}$$

$$\begin{array}{r} 28. \quad 425 \\ \quad 376 \\ + \quad 124 \\ \hline \end{array}$$

$$29. \quad 5 + 27 + 168 =$$

$$30. \quad 463 + 309 + 1542 =$$

$$31. \quad \$46 + \$93 + \$18 + \$62 =$$

$$32. \quad 636 + 4923 + 481 =$$

Solve.

33. Karen had \$273 in her savings account. She makes deposits of \$15 and \$43. How much does Karen have in her savings account now?

34. One day, 148 copies of the student newspaper were sold. On the previous day, 164 copies were sold. How many copies were sold during these two days?

Subtracting Whole Numbers

To subtract whole numbers, first subtract the ones. Then subtract the digits in each place from right to left. Rename as needed.

Examples

$$\begin{array}{r}
 1 \quad 896 \\
 - 145 \\
 \hline
 1
 \end{array}
 \begin{array}{c}
 \longrightarrow \\
 \longrightarrow
 \end{array}
 \begin{array}{r}
 896 \\
 - 145 \\
 \hline
 51
 \end{array}
 \begin{array}{c}
 \longrightarrow \\
 \longrightarrow
 \end{array}
 \begin{array}{r}
 896 \\
 - 145 \\
 \hline
 751
 \end{array}$$

Subtract the ones.

Subtract the tens.

Subtract the hundreds.

$$\begin{array}{r}
 2 \quad 381 \\
 - 285 \\
 \hline
 \end{array}
 \begin{array}{c}
 \longrightarrow \\
 \longrightarrow
 \end{array}
 \begin{array}{r}
 381 \\
 - 285 \\
 \hline
 6
 \end{array}
 \begin{array}{c}
 \longrightarrow \\
 \longrightarrow
 \end{array}
 \begin{array}{r}
 381 \\
 - 285 \\
 \hline
 96
 \end{array}$$

Since $1 < 5$, rename 8 tens as 7 tens and 10 ones. Then, $10 \text{ ones} + 1 \text{ one} = 11 \text{ ones}$.

$$\begin{array}{r}
 3 \quad 506 \\
 - 238 \\
 \hline
 \end{array}
 \begin{array}{r}
 506 \\
 - 238 \\
 \hline
 8
 \end{array}
 \begin{array}{r}
 506 \\
 - 238 \\
 \hline
 268
 \end{array}$$

Since $6 < 8$, rename 50 tens as 49 tens 10 ones. Then, $10 \text{ ones} + 6 \text{ ones} = 16 \text{ ones}$.

Subtract.

$$\begin{array}{r}
 1. \quad 87 \\
 - 53 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 2. \quad 56 \\
 - 40 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 3. \quad 854 \\
 - 630 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 4. \quad 695 \\
 - 132 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 5. \quad 34 \\
 - 8 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 6. \quad 70 \\
 - 28 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 7. \quad \$78 \\
 - 59 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 8. \quad 480 \\
 - 63 \\
 \hline
 \end{array}$$



Name _____ Date _____ Period _____

Subtracting Whole Numbers *(continued)*

9.
$$\begin{array}{r} 407 \\ - 139 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 908 \\ - 439 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 320 \\ - 152 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 300 \\ - 105 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 515 \\ - 298 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 735 \\ - 596 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 810 \\ - 635 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 401 \\ - 293 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 6827 \\ - 5752 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 1297 \\ - 898 \\ \hline \end{array}$$

19.
$$\begin{array}{r} 6243 \\ - 4564 \\ \hline \end{array}$$

20.
$$\begin{array}{r} 5690 \\ - 792 \\ \hline \end{array}$$

21. $1516 - 835 =$

22. $8312 - 5943 =$

23. $16,202 - 9814 =$

24. $12,915 - 8036 =$

25. $51,520 - 35,630 =$

26. $37,982 - 19,395 =$

27. $70,605 - 38,296 =$

28. $30,005 - 17,008 =$

Solve.

29. A cassette recorder costs \$340 at one store. At another store, the same brand costs \$298. How much would you save by buying the recorder at the second store?

30. The Colorado River is 1,450 miles long. The Yukon River is 1,770 miles long. How much longer is the Yukon River?

SKILL 5

Name _____ Date _____ Period _____

Multiplying Whole Numbers

To multiply by a one-digit whole number, first multiply the ones.
Then multiply the digits in each place from right to left.

Example

1 $\begin{array}{r} 835 \\ \times 6 \\ \hline 0 \end{array}$	→	$\begin{array}{r} 835 \\ \times 6 \\ \hline 10 \end{array}$	→	$\begin{array}{r} 835 \\ \times 6 \\ \hline 5010 \end{array}$
<i>Multiply the ones.</i>		<i>Multiply the tens. Add 3.</i>		<i>Multiply the hundreds. Add 2.</i>

To multiply by a two digit whole number, first multiply by the ones.
Then multiply by the tens.

Examples

2 $\begin{array}{r} 2609 \\ \times 78 \\ \hline \end{array}$	→	$\begin{array}{r} 2609 \\ \times 78 \\ \hline 20872 \end{array}$	→	$\begin{array}{r} 2609 \\ \times 78 \\ \hline 20872 \\ 182630 \\ \hline 203,502 \end{array}$
3 $\begin{array}{r} 1047 \\ \times 60 \\ \hline \end{array}$	→	$\begin{array}{r} 1407 \\ \times 60 \\ \hline 0 \end{array}$	→	$\begin{array}{r} 1407 \\ \times 60 \\ \hline 62,820 \end{array}$
		<i>Any number multiplied by zero is zero.</i>		

Multiply.

1. $\begin{array}{r} 700 \\ \times 25 \\ \hline \end{array}$	2. $\begin{array}{r} 602 \\ \times 4 \\ \hline \end{array}$	3. $\begin{array}{r} 218 \\ \times 63 \\ \hline \end{array}$	4. $\begin{array}{r} \$189 \\ \times 42 \\ \hline \end{array}$
5. $\begin{array}{r} \$125 \\ \times 11 \\ \hline \end{array}$	6. $\begin{array}{r} 264 \\ \times 40 \\ \hline \end{array}$	7. $\begin{array}{r} 3265 \\ \times 72 \\ \hline \end{array}$	8. $\begin{array}{r} 6019 \\ \times 94 \\ \hline \end{array}$



Name _____ Date _____ Period _____

Multiplying Whole Numbers *(continued)*

9.
$$\begin{array}{r} 3841 \\ \times 65 \\ \hline \end{array}$$

10.
$$\begin{array}{r} \$7903 \\ \times 3 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 16,009 \\ \times 80 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 28,706 \\ \times 49 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 4216 \\ \times 8 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 5310 \\ \times 50 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 8020 \\ \times 16 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 19,634 \\ \times 25 \\ \hline \end{array}$$

17. $819 \times 8 =$

18. $438 \times 6 =$

19. $6420 \times 40 =$

20. $7253 \times 38 =$

21. $\$8053 \times 5 =$

22. $450 \times 30 =$

23. $\$605 \times 15 =$

24. $79,025 \times 61 =$

Solve.

25. There are 42 rows of seats in the theater. There are 36 seats in each row. How many seats are in the theater?

26. A truck carries 278 crates. Each crate holds 45 pounds of fruit. How many pounds of fruit does the truck carry?

SKILL 6

Name _____ Date _____ Period _____

Dividing Whole Numbers

To divide whole numbers, start with the digit in the left most position.
Then divide the digit in each place from left to right.

Examples

$$\begin{array}{r}
 1 \\
 4 \overline{)508} \\
 \underline{-4} \downarrow \\
 10
 \end{array}
 \longrightarrow
 \begin{array}{r}
 12 \\
 4 \overline{)508} \\
 \underline{-4} \downarrow \\
 10 \\
 \underline{-8} \downarrow \\
 28
 \end{array}
 \longrightarrow
 \begin{array}{r}
 127 \\
 4 \overline{)508} \\
 \underline{-4} \downarrow \\
 10 \\
 \underline{-8} \downarrow \\
 28 \\
 \underline{-28} \\
 0
 \end{array}$$

*Start with
the hundreds.*

Divide the tens.

*Divide the ones.
The remainder is 0.*

$$\begin{array}{r}
 9 \\
 26 \overline{)2365} \\
 \underline{-234} \\
 2
 \end{array}
 \longrightarrow
 \begin{array}{r}
 90 \\
 26 \overline{)2365} \\
 \underline{-234} \downarrow \\
 25 \\
 \underline{-0} \\
 25
 \end{array}
 \longrightarrow
 \begin{array}{r}
 90 \text{ R } 25 \\
 26 \overline{)2365} \\
 \underline{-234} \downarrow \\
 25 \\
 \underline{-0} \\
 25
 \end{array}$$

$$\begin{array}{r}
 3468 \div 17 \\
 2 \\
 17 \overline{)3468} \\
 \underline{-34} \\
 0
 \end{array}
 \longrightarrow
 \begin{array}{r}
 20 \\
 17 \overline{)3468} \\
 \underline{-34} \downarrow \\
 06
 \end{array}
 \longrightarrow
 \begin{array}{r}
 204 \\
 17 \overline{)3468} \\
 \underline{-34} \downarrow \\
 068 \\
 \underline{-68} \\
 0
 \end{array}$$

*Since $6 < 17$, the
quotient has 0 tens.*

Divide.

1. $5 \overline{)3255}$

2. $70 \overline{)359}$

3. $47 \overline{)517}$

4. $18 \overline{)901}$



Name _____ Date _____ Period _____

Dividing Whole Numbers *(continued)*

Divide.

5. $65 \overline{)1300}$

6. $50 \overline{)2500}$

7. $59 \overline{)3776}$

8. $23 \overline{)1187}$

9. $15 \overline{)1260}$

10. $9 \overline{)769}$

11. $6 \overline{)5246}$

12. $12 \overline{)1176}$

13. $27 \overline{)1435}$

14. $37 \overline{)592}$

15. $37 \overline{)1000}$

16. $81 \overline{)5430}$

17. $46 \overline{)\$1656}$

18. $42 \overline{)2480}$

19. $86 \overline{)3440}$

20. $62 \overline{)1858}$

21. $72 \overline{)43,704}$

22. $46 \overline{)20,700}$

23. $5202 \div 18 =$

24. $2619 \div 3 =$

25. $37,513 \div 4 =$

26. $4886 \div 17 =$

Solve.

27. Each tent is put up with 12 poles.
How many tents can be put up with
200 poles?

18. Gary buys backpacks to sell at his
sporting goods store. Each backpack
costs \$38. How many backpacks can
he buy for \$270?



Divisibility Rules

The following rules will help you determine if a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10.

A number is divisible by:

- 2 if the ones digit is divisible by 2.
- 3 if the sum of the digits is divisible by 3.
- 4 if the number formed by the last two digits is divisible by 4.
- 5 if the ones digit is 0 or 5.
- 6 if the number is divisible by 2 and 3.
- 8 if the number formed by the last three digits is divisible by 8.
- 9 if the sum of the digits is divisible by 9.
- 10 if the ones digit is 0.

Example Determine whether 2120 is divisible by 2, 3, 4, 5, 6, 9, or 10.

- 2: The ones digit is divisible by 2.
2120 is divisible by 2.
 - 3: The sum of the digits $2 + 1 + 2 + 0 = 5$, is not divisible by 3.
2120 is not divisible by 3.
 - 4: The number formed by the last two digits, 20, is divisible by 4.
2120 is divisible by 4.
 - 5: The ones digit is 0.
2120 is divisible by 5.
 - 6: The number is divisible by 2 but not by 3.
2120 is not divisible by 6.
 - 8: The number formed by the last 3 digits, 120, is divisible by 8.
2120 is divisible by 8.
 - 9: The sum of the digits, $2 + 1 + 2 + 0 = 5$, is not divisible by 9.
2120 is not divisible by 9.
 - 10: The ones digit is 0.
2120 is divisible by 10.
- 2120 is divisible by 2, 4, 5, 8, and 10.

Determine whether the first number is divisible by the second number. Write yes or no.

- | | | |
|---------------|------------|-------------|
| 1. 4829; 9 | 2. 482; 2 | 3. 1692; 6 |
| 4. 1355; 10 | 5. 633; 3 | 6. 724; 4 |
| 7. 3714; 8 | 8. 912; 9 | 9. 559; 5 |
| 10. 20,454; 6 | 11. 616; 8 | 12. 3000; 4 |



Name _____ Date _____ Period _____

Divisibility Rules *(continued)*

Determine whether each number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10.

13. 80

14. 91

15. 180

16. 333

17. 1024

18. 11,010

19. Is 9 a factor of 154?

20. Is 6 a factor of 102?

21. Is 486 divisible by 6?

22. Is 441 divisible by 9?

Determine whether the first number is divisible by the second number.

23. 4281; 2

24. 2670; 10

25. 3945; 6

26. 6132; 4

27. 8304; 3

28. 6201; 9

29. 4517; 9

30. 2304; 8

31. 7000; 5

32. 10,000; 8

33. 9420; 6

34. 822; 4

Use mental math to find a number that satisfies the given conditions.

35. a number divisible by both 3 and 5

36. a four-digit number divisible by 3, but *not* by 9

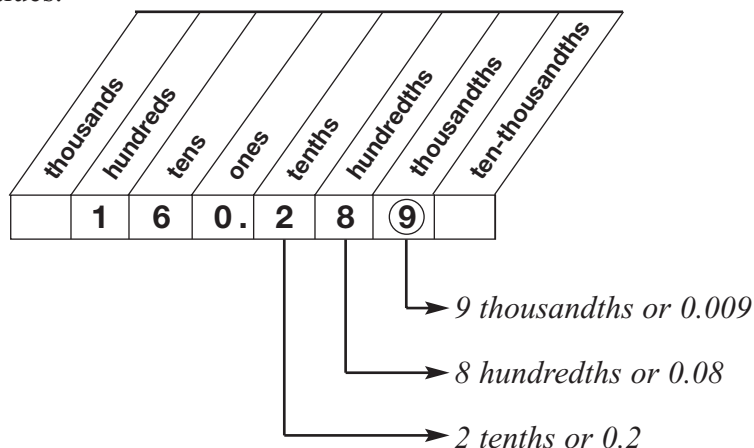
37. a five-digit number *not* divisible by 3 or 10

38. a four-digit number divisible by 2 and 4, but *not* by 8

Decimals and Place Value

You can use a place-value chart like the one below to help you write and read decimals and understand their values.

The decimal 160.289 is shown in the chart at the right. The place-value chart can be extended in either direction. The digit 9, together with its place value, names the number nine thousandths or 0.009.



Notice that the decimal point separates the ones and tenths places. It is read as *and*.

The decimal 160.289 is read as *one hundred sixty and two hundred eighty-nine thousandths*.

Examples 1 Write nine and five hundred twenty-six ten-thousandths as a number.
9.0526

2 Write 623.75 in words.
six hundred twenty-three and seventy-five hundredths

Write the number named by the underlined digit in words.

- 0.45
- 2.369
- 110.51
- 43.672
- 98.008
- 5.3126
- 16.09
- 2.0674
- 2.0674
- 0.087
- 0.0251
- 7.5857



Decimals and Place Value *(continued)*

Write each of the following as a decimal.

13. twelve hundredths
14. four and three tenths
15. five thousandths
16. fifty-one ten-thousandths
17. seventy-five and nine thousandths
18. one hundred four and thirty-four thousandths
19. twenty and four hundred forty-five ten-thousandths
20. sixteen and forty-five thousandths
21. fifty-six and thirty-four hundredths

Write each number in words.

22. 6.04
23. 0.017
24. 5.1648
25. 18.456
26. 145.007
27. 28.796
28. 787.462
29. 9.0045

In the 1996 Olympics, Michael Johnson won both the men's 200-meter and 400-meter track competitions.

- | | |
|---|---|
| 30. His time for the 200-meter competition was 19.32 seconds.
Write this decimal in words. | 31. His time for the 400-meter competition was forty-three and forty-nine hundredths seconds.
Write this as a decimal. |
|---|---|



Name _____ Date _____ Period _____

Rounding Decimals

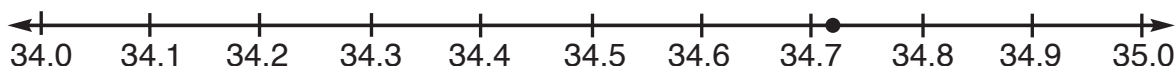
Round 34.725 to the nearest tenth.

You can use a number line.

Find the approximate location of 34.725 on the number line.

34.725 is closer to 34.7 than to 34.8

34.725 rounded to the nearest tenth is 34.7.



You can also round without a number line.

Find the place to which you want to round.

Look at the digit to the right.

If the digit is less than 5, round down.

If the digit is 5 or greater, round up.

2 is less than 5.

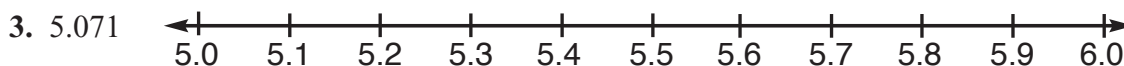
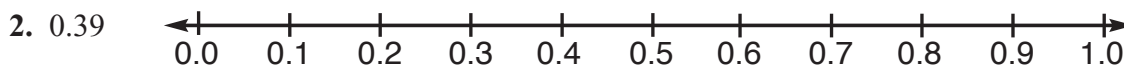
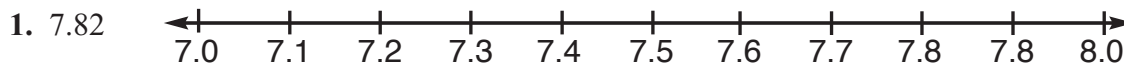
Round down.

34.725

34.725

34.7

Use each number line to show how to round the decimal to the nearest tenth.



Round each number to the underlined place-value position.

4. 6.32

5. 0.4721

6. 26.444

7. 1.161

8. 362.0846

9. 15.553

10. 151.391

11. 0.55

12. 631.0008

13. 17.327

14. 3.09

15. 1.58



Name _____ Date _____ Period _____

Rounding Decimals *(continued)*

Round each number to the underlined place-value position.

16. 1.726

17. 54.38

18. 0.58

19. 0.9142

20. 80.659

21. 232.1

22. 1.063

23. 0.55

24. 0.8194

25. 0.496

26. 3.0182

27. 71.405

28. 9.63

29. 32.71

30. 2.671

31. 4.0507

32. 89.95

33. 0.134

34. 5.893

35. 520.6

36. 0.7098

37. 1.845

38. 34.55

39. 29.25

40. 56.0924

41. 1199.7

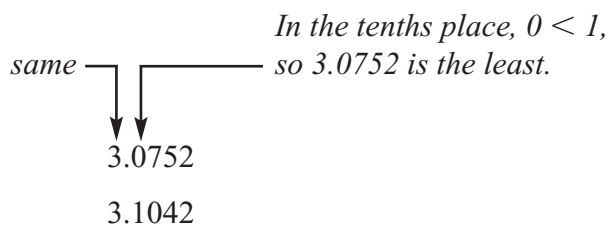
42. 0.46

43. 0.3546

Comparing and Ordering Decimals

To compare decimals, you compare digits in each place-value position from left to right.

Examples 1 Compare 3.0752 and 3.1042.



So, $3.0752 < 3.1042$.

2 Fill in the blank with $<$, $>$, or $=$ to make a true sentence.

14.19 _____ 14.103

In the hundredths place, $9 > 0$. So $14.19 > 14.103$.

3 Order the following set of decimals from least to greatest.

8.4, 8.41, 8.406, 8.442

Annex zeros so all decimals have the same number of place-value positions.

8.400, 8.410, 8.406, 8.442

So, $8.400 < 8.406 < 8.410 < 8.442$.

The decimals in order from least to greatest are

8.4, 8.406, 8.41, 8.442.

State whether each statement is true or false.

1. $0.3 = 0.30$

2. $0.001 = 0.01$

3. $0.7 > 0.8$

4. $0.204 < 0.24$

5. $17 = 17.00$

6. $0.9 > 2.0$



Name _____ Date _____ Period _____

Comparing and Ordering Decimals *(continued)*

Fill in the blank with $<$, $>$, or $=$ to make a true sentence.

- | | |
|-----------------------|------------------------|
| 7. 0.205 _____ 0.250 | 8. 6.035 _____ 6.0353 |
| 9. 0.40 _____ 0.400 | 10. 0.55 _____ 0.5 |
| 11. 6.4 _____ 6.400 | 12. 1.05 _____ 1.005 |
| 13. 0.002 _____ 0.02 | 14. 0.615 _____ 0.651 |
| 15. 7 _____ 7.00 | 16. 15.3 _____ 15.30 |
| 17. 11.01 _____ 11.10 | 18. 124.6 _____ 124.48 |

Order each set of decimals from least to greatest.

- | | |
|-------------------------------------|------------------------------|
| 19. 0.03, 0.3, 0.003, 3.0 | 20. 5.23, 5.203, 5.21, 5.3 |
| 21. 0.91, 0.866, 0.9, 0.87 | 22. 2.03, 2.13, 2.3, 2.033 |
| 23. 16.4, 16.04, 16.45, 16.001 | 24. 8.7, 8.07, 8.17, 8.01 |
| 25. 114.2, 114.02, 114.202, 114.002 | 26. 0.362, 0.306, 0.31, 0.36 |

Solve.

27. In gymnastics, Maria receives an average score of 9.7. Rebecca receives an average score of 9.69. Who is the winner?
28. Three golfers have the following stroke averages. Rank the golfers in order from lowest to highest stroke average.

Lopez	71.2
Higuchi	72.17
Blalock	72.15



Name _____ Date _____ Period _____

Adding Decimals

To add decimals, first line up the decimal points. Then add as with whole numbers.

Examples 1 Add: $36.801 + 8.945$.

$$\begin{array}{r} 36.801 \\ + 8.945 \\ \hline 45.746 \end{array}$$

2 Add: $7.3 + 9 + 8.45$.

$$\begin{array}{r} 7.30 \\ 9.00 \\ + 8.45 \\ \hline 24.75 \end{array}$$

Write 9 as 9.00.

3 Add: $\$415 + \29.05 .

$$\begin{array}{r} \$415.00 \\ + 29.05 \\ \hline \$444.05 \end{array}$$

Annex zeros to \$415 to help align the decimal points.

Add.

1. $\begin{array}{r} \$27.06 \\ + 7.06 \\ \hline \end{array}$

2. $\begin{array}{r} 1.034 \\ + 0.08 \\ \hline \end{array}$

3. $\begin{array}{r} 68.7 \\ + 8.41 \\ \hline \end{array}$

4. $\begin{array}{r} 42.6 \\ + 21.919 \\ \hline \end{array}$

5. $\begin{array}{r} 93.7 \\ + 24.85 \\ \hline \end{array}$

6. $\begin{array}{r} 140.98 \\ + 16.5 \\ \hline \end{array}$

7. $\begin{array}{r} 15.987 \\ + 9.07 \\ \hline \end{array}$

8. $\begin{array}{r} 478.98 \\ + 99.076 \\ \hline \end{array}$

9. $\begin{array}{r} 14.16 \\ + 8.9 \\ \hline \end{array}$

10. $\begin{array}{r} 67.032 \\ + 5.98 \\ \hline \end{array}$

11. $\begin{array}{r} 246.38 \\ + 19.976 \\ \hline \end{array}$

12. $\begin{array}{r} 17.32 \\ + 8.963 \\ \hline \end{array}$



Name _____ Date _____ Period _____

Adding Decimals (*continued*)

Add.

$$\begin{array}{r} 13. \quad 510.35 \\ + \quad 6.7 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 83.675 \\ + \quad 2.95 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 6.852 \\ + \quad 3.97 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 14.8 \\ + \quad 9.63 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 0.4 \\ \quad 0.6 \\ + \quad 0.7 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 6.5 \\ \quad 2.81 \\ + \quad 7.9 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 0.21 \\ \quad 0.619 \\ + \quad 0.394 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad \$3.33 \\ \quad 6.67 \\ + \quad 0.24 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 7.41 \\ \quad 2.835 \\ + \quad 0.9 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad \$19.99 \\ \quad 7.99 \\ + \quad 24.50 \\ \hline \end{array}$$

$$23. \quad 3.04 + 0.6 =$$

$$24. \quad 8 + 4.7 =$$

$$25. \quad 19.642 + 2.61 =$$

$$26. \quad 8.543 + 3.29 =$$

$$27. \quad 1.61 + 3.807 =$$

$$28. \quad 543 + 9.29 =$$

Solve.

29. A gymnast scored 9.65 on the beam, 9.59 on the floor, 9.76 on the bars, and 9.52 on the vault. What was the gymnast's total score?

30. A ticket to the game cost Andrea \$12. She also spent \$8.09 on food. How much did she spend in all?

Subtracting Decimals

To subtract decimals, line up the decimal points.
Then subtract as with whole numbers.

Examples 1 Subtract: $8.1 - 4.75$.

$$\begin{array}{r} 0.10 \\ 8.10 \\ - 4.75 \\ \hline 3.35 \end{array}$$

Annex a zero to 8.1 to help align the decimal points.

2 Subtract: $\$84 - \1.79 .

$$\begin{array}{r} 3.9.10 \\ \$84.00 \\ - 1.79 \\ \hline \$82.21 \end{array}$$

Annex two zeros to \$84 to help align the decimal points.

3 Subtract: $16.703 - 8$.

$$\begin{array}{r} 16.703 \\ - 8.000 \\ \hline 8.703 \end{array}$$

Annex three zeros to 8 to help align the decimal points.

Subtract.

1.
$$\begin{array}{r} 9.14 \\ - 2.075 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 712.53 \\ - 6.44 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 20.14 \\ - 8.093 \\ \hline \end{array}$$

4.
$$\begin{array}{r} \$12.65 \\ - 10.99 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 14.395 \\ - 2.654 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 2.42 \\ - 0.5 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 0.261 \\ - 0.09 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 9.407 \\ - 0.22 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 6.324 \\ - 0.75 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 42.903 \\ - 8.05 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 16.37 \\ - 5.609 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 18 \\ - 7.63 \\ \hline \end{array}$$



Name _____ Date _____ Period _____

Subtracting Decimals *(continued)*

Subtract.

$$\begin{array}{r} 13. \quad 142.6 \\ - 85.92 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 25.37 \\ - 8.889 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 48.3 \\ - 6.75 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 237.84 \\ - 6.964 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 581.2 \\ - 106.81 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 99.2 \\ - 38.576 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 12.752 \\ - 6.9 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 639.07 \\ - 64.961 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 4 \\ - 1.5 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad 0.4 \\ - 0.15 \\ \hline \end{array}$$

$$\begin{array}{r} 23. \quad 112.8 \\ - 81.93 \\ \hline \end{array}$$

$$\begin{array}{r} 24. \quad \$26 \\ - 0.81 \\ \hline \end{array}$$

$$\begin{array}{r} 25. \quad 1 \\ - 0.37 \\ \hline \end{array}$$

$$\begin{array}{r} 26. \quad 14.9 \\ - 8.261 \\ \hline \end{array}$$

$$\begin{array}{r} 27. \quad \$73 \\ - 9.69 \\ \hline \end{array}$$

$$\begin{array}{r} 28. \quad 5 \\ - 0.088 \\ \hline \end{array}$$

$$29. \quad 6.51 - 0.8 =$$

$$30. \quad 10.86 - 6.872 =$$

$$31. \quad 2.43 - 0.965 =$$

$$32. \quad \$81 - \$4.83 =$$

$$33. \quad 210 - 56.765 =$$

$$34. \quad 16.7 - 0.082 =$$

Solve.

35. Mrs. Taylor's class has earned \$190.32 for their class project. They need \$250. How much more do they need to earn?

36. Connie has 20 mL of sulfuric acid. Her experiment calls for 1.6 mL. How many mL will Connie have left after the experiment?

Multiplying Decimals by Whole Numbers

To multiply a decimal by a whole number, first multiply as with whole numbers. Then place the decimal point in the product. The product has the same number of decimal places as the decimal factor.

Examples 1 Multiply: 421×0.6 .

$$\begin{array}{r} 421 \\ \times 0.6 \\ \hline 252.6 \end{array}$$

← 1 decimal place in the decimal factor
← 1 decimal place in the product

2 Multiply: $\$6.16 \times 47$.

$$\begin{array}{r} \$6.16 \\ \times 47 \\ \hline 4312 \\ 24640 \\ \hline \$289.52 \end{array}$$

← 2 decimal places in the decimal factor
← 2 decimal places in the product

Multiply.

1. $\begin{array}{r} 23 \\ \times 0.8 \\ \hline \end{array}$

2. $\begin{array}{r} 45 \\ \times 0.9 \\ \hline \end{array}$

3. $\begin{array}{r} 216 \\ \times 0.2 \\ \hline \end{array}$

4. $\begin{array}{r} \$0.83 \\ \times 7 \\ \hline \end{array}$

5. $\begin{array}{r} \$4.16 \\ \times 15 \\ \hline \end{array}$

6. $\begin{array}{r} 27 \\ \times 0.6 \\ \hline \end{array}$

7. $\begin{array}{r} 0.63 \\ \times 4 \\ \hline \end{array}$

8. $\begin{array}{r} \$5.65 \\ \times 14 \\ \hline \end{array}$

9. $\begin{array}{r} 231 \\ \times 0.41 \\ \hline \end{array}$

10. $\begin{array}{r} 0.62 \\ \times 11 \\ \hline \end{array}$

11. $\begin{array}{r} \$7.44 \\ \times 26 \\ \hline \end{array}$

12. $\begin{array}{r} 218 \\ \times 0.54 \\ \hline \end{array}$



Name _____ Date _____ Period _____

Multiplying Decimals by Whole Numbers *(continued)*

Multiply.

13.
$$\begin{array}{r} 113 \\ \times 0.6 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 2.48 \\ \times 24 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 15.48 \\ \times 19 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 214.8 \\ \times 37 \\ \hline \end{array}$$

17.
$$\begin{array}{r} 438 \\ \times 0.85 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 395 \\ \times 2.63 \\ \hline \end{array}$$

19.
$$\begin{array}{r} 87 \\ \times 0.8 \\ \hline \end{array}$$

20.
$$\begin{array}{r} 416 \\ \times 0.38 \\ \hline \end{array}$$

21. $25 \times 0.15 =$

22. $206 \times \$0.49 =$

23. $\$0.23 \times 15 =$

24. $0.47 \times 35 =$

25. $19 \times 0.19 =$

26. $419 \times 2.3 =$

27. $4.67 \times 15 =$

28. $0.842 \times 93 =$

29. $\$16.50 \times 12 =$

30. $143 \times 0.55 =$

Solve.

31. Turkey is on sale for \$0.89 per pound. How much does William pay for a 14-pound turkey?

32. A clothing fabric factory needs 3.25 yards of fabric to make one skirt. How many yards are needed to make 2,000 skirts?



Name _____ Date _____ Period _____

Multiplying Decimals by Decimals

Multiply decimals just like you multiply whole numbers. The number of decimal places in the product is equal to the sum of the number of decimal places in the factors.

Example Multiply 0.038 and 0.17.

$$\begin{array}{r} 0.038 \quad \longleftarrow \text{three decimal places} \\ \times 0.17 \quad \longleftarrow \text{two decimal places} \\ \hline 266 \\ 38 \\ \hline 0.00646 \quad \longleftarrow \text{five decimal places} \end{array}$$

The product is 0.00646.

Place the decimal point in each product.

1. $1.47 \times 6 = 882$

2. $0.9 \times 2.7 = 243$

3. $6.48 \times 2.4 = 15552$

Multiply.

4. $\begin{array}{r} 0.8 \\ \times 7 \\ \hline \end{array}$

5. $\begin{array}{r} 0.04 \\ \times 0.3 \\ \hline \end{array}$

6. $\begin{array}{r} 0.16 \\ \times 26 \\ \hline \end{array}$

7. $\begin{array}{r} 0.003 \\ \times 4.2 \\ \hline \end{array}$

8. 12.2×0.06

9. 0.0015×0.15

10. 1.9×2.2

11. 3.59×0.02

12. 12.2×0.007

13. 0.7×3.11



Name _____ Date _____ Period _____

Multiplying Decimals by Decimals *(continued)*

Multiply.

14.
$$\begin{array}{r} 0.6 \\ \times 0.7 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 6.3 \\ \times 5.1 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 18.2 \\ \times 0.51 \\ \hline \end{array}$$

17. 0.52×0.03

18. 0.29×29.1

19. 6.1×0.0054

20. 6.8×0.39

21. 3.57×0.09

22. 3.72×8.4

Solve each equation.

23. $t = 0.32 \times 0.05$

24. $6.4 \times 3.9 = h$

25. $k = 0.09 \times 2.3$

26. $a = 0.4 \times 9$

27. $0.23 \times 0.003 = m$

28. $1.09 \times 6.24 = v$

Evaluate each expression if $m = 0.9$ and $n = 6.2$.

29. $m \cdot 0.43$

30. $0.002 \cdot n$

31. $17.4 \cdot m$

Evaluate each expression if $a = 0.4$ and $b = 5.8$.

32. $0.48 \cdot a$

33. $b \cdot 13.8$

34. $0.003 \cdot a$

35. $1.4 \cdot b$

36. $3.6 \cdot a$

37. $24.5 \cdot a$

Dividing Decimals by Whole Numbers

To divide a decimal by a whole number, first place the decimal point in the quotient directly above the decimal point in the dividend.
Then divide as with numbers.

Examples 1 Divide \$58.10 by 7.

$$\begin{array}{r}
 7 \overline{) \$58.10} \longrightarrow 7 \overline{) \$58.10} \longrightarrow 7 \overline{) \$58.10} \\
 \begin{array}{r}
 \\
 - 56 \\
 \hline
 2
 \end{array}
 \end{array}
 \longrightarrow
 \begin{array}{r}
 \$8.30 \\
 7 \overline{) \$58.10} \\
 \begin{array}{r}
 - 56 \\
 \hline
 21 \\
 - 21 \\
 \hline
 00 \\
 - 00 \\
 \hline
 0
 \end{array}
 \end{array}$$

Place the decimal point in the quotient.

2 Divide 17.5 by 14.

$$\begin{array}{r}
 14 \overline{) 17.5} \longrightarrow 14 \overline{) 17.50} \\
 \begin{array}{r}
 \\
 - 14 \\
 \hline
 35 \\
 - 28 \\
 \hline
 70 \\
 - 70 \\
 \hline
 0
 \end{array}
 \end{array}$$

Annex zeros in the dividend.

Divide until the remainder is 0.

Divide.

1. $9 \overline{) 12.6}$

2. $9 \overline{) \$4.14}$

3. $4 \overline{) \$23.64}$

4. $26 \overline{) 0.52}$

5. $16 \overline{) 25.6}$

6. $32 \overline{) \$2.88}$

7. $9 \overline{) 27.54}$

8. $4 \overline{) \$11.60}$



Name _____ Date _____ Period _____

Dividing Decimals by Whole Numbers *(continued)*

Divide.

9. $6 \overline{)1.5}$

10. $18 \overline{)25.2}$

11. $34 \overline{)53.72}$

12. $14 \overline{)37.8}$

13. $29 \overline{)104.4}$

14. $34 \overline{)12.92}$

15. $61 \overline{)103.7}$

16. $74 \overline{)26.64}$

17. $12 \overline{)301.8}$

18. $33 \overline{)89.1}$

19. $26 \overline{)50.7}$

20. $15 \overline{)\$62.40}$

21. $2.4 \div 96 =$

22. $5.59 \div 26 =$

23. $15.5 \div 50 =$

24. $34.55 \div 20 =$

25. $30.45 \div 35 =$

26. $27.93 \div 19 =$

27. $41.8 \div 55 =$

28. $411.84 \div 72 =$

Solve.

29. Eric bought an 8-ounce can of frozen orange juice on sale for \$0.72. What is the cost per ounce?

30. Lucy runs 4 miles in 22.7 minutes. What is her average time per mile?

SKILL 16

Name _____ Date _____ Period _____

Dividing Decimals by Decimals

To divide by a decimal, change the divisor to a whole number.

Example Find $0.5194 \div 0.49$.

$$\begin{array}{r} 1.06 \\ 0.49 \overline{)0.5194} \\ \underline{49} \\ 294 \\ \underline{294} \\ 0 \end{array}$$

Change 0.49 to 49.

Move the decimal point two places to the right.

Move the decimal point in the dividend the same number of places to the right.

Divide as with whole numbers.

Without finding or changing each quotient, change each problem so that the divisor is a whole number.

1. $3.4 \div 1.1$

2. $76.44 \div 0.006$

3. $0.56 \div 0.4$

4. $89.45 \div 0.908$

5. $5.675 \div 6.8$

6. $0.00864 \div 0.012$

7. $0.84 \div 0.2$

8. $1.02 \div 0.3$

9. $3.9 \div 1.3$

10. $13.6 \div 0.003$

11. $1.622 \div 1.4$

12. $0.00025 \div 0.035$

Divide.

13. $0.9 \overline{)6.3}$

14. $0.6 \overline{)0.540}$

15. $0.3 \overline{)129}$

16. $2.4 \overline{)0.192}$

17. $0.44 \overline{)5.28}$

18. $0.025 \overline{)0.04}$



Name _____ Date _____ Period _____

Dividing Decimals by Decimals *(continued)*

Divide.

19. $0.5 \overline{)9.5}$

20. $0.8 \overline{)0.048}$

21. $0.4 \overline{)82}$

22. $3.5 \overline{)2.38}$

23. $0.62 \overline{)600.16}$

24. $0.015 \overline{)0.06}$

25. $1.4 \overline{)121.8}$

26. $8 \overline{)0.0092}$

27. $0.38 \overline{)760.38}$

28. $1.3 \overline{)780}$

29. $0.08 \overline{)0.0012}$

30. $0.7 \overline{)5.95}$

Solve each equation.

31. $7.8 \div 2.6 = k$

32. $3.92 \div 0.08 = m$

33. $s = 149.73 \div 0.23$

34. $v = 155 \div 0.1$

35. $c = 1098 \div 6.1$

36. $3633.4 \div 3.7 = d$

37. $903.6 \div 25.1 = n$

38. $363.6 \div 5 = r$

39. $2.004 \div 0.2 = b$

40. $w = 84.7 \div 3.85$

41. $165.2 \div 8.26 = t$

42. $29.28 \div 1.22 = s$

43. $y = 0.0528 \div 0.06$

44. $16.84 \div 0.4 = m$

45. $k = 2.05 \div 0.5$

SKILL 17

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Multiplying Decimals by Powers of 10

You can find the product of a decimal and a power of 10 without using a calculator or paper and pencil. Suppose you wanted to find the product of 36 and powers of 10.

Decimal		Power of Ten		Quotient
36	÷	10^{-3} or 0.001	=	0.036
36	÷	10^{-2} or 0.01	=	0.36
36	÷	10^{-1} or 0.1	=	3.6
36	÷	10^0 or 1	=	36
36	÷	10^1 or 10	=	360
36	÷	10^2 or 100	=	3600
36	÷	10^3 or 1000	=	36,000
36	÷	10^4 or 10,000	=	360,000

For powers of 10 that are less than 1, the exponent in the power of 10 tells you the number of places to move the decimal point to the right. For powers of 10 that are greater than 1, the decimal point moves to the left.

Examples **1** $6 \cdot 10^3 = 6000$ *Move the decimal point 3 places to the right.*

2 $4.5 \cdot 10^{-2} = 0.045$ *Move the decimal point 2 places to the left.*

Multiply mentally.

1. $8 \cdot 0.01$

2. $55.8 \cdot 100$

3. $59 \cdot 10^4$

4. $14 \cdot 0.1$

5. $0.13 \cdot 10^{-3}$

6. $18 \cdot 10^2$

7. $17 \cdot 100$

8. $1.46 \cdot 0.001$

9. $12 \cdot 10^{-1}$



Name _____ Date _____ Period _____

Multiplying Decimals by Powers of 10 *(continued)*

Multiply mentally.

10. $77 \cdot 1000$

11. $143 \cdot 100$

12. $15 \cdot 10$

13. $15 \cdot 10^0$

14. $1.36 \cdot 1000$

15. $184 \cdot 10^{-3}$

16. $1.7 \cdot 0.01$

17. $0.08 \cdot 10^{-2}$

18. $1432 \cdot 10^4$

19. $43 \cdot 10$

20. $13.5 \cdot 0.01$

21. $55 \cdot 10^{-2}$

22. $137 \cdot 100$

23. $43 \cdot 1000$

24. $281 \cdot 10^2$

Solve each equation.

25. $v = 78 \cdot 10$

26. $q = 654 \cdot 10^0$

27. $m = 198 \cdot 0.001$

28. $r = 876 \cdot 100$

29. $s = 15 \cdot 10^{-2}$

30. $t = 12.5 \cdot 0.01$

31. $p = 1.4 \cdot 1000$

32. $q = 385 \cdot 10^{-3}$

33. $u = 8.8 \cdot 10$

34. $14 \cdot 100 = r$

35. $w = 1.34 \cdot 10^3$

36. $k = 14.8 \cdot 0.1$

37. $n = 123 \cdot 0.1$

38. $4326 \cdot 10^0 = y$

39. $81.18 \cdot 10^{-3} = j$

40. $480 \cdot 10^4 = m$

41. $r = 6820 \cdot 10^1$

42. $q = 2.813 \cdot 10^{-2}$

Dividing Decimals by Powers of 10

You can find the quotient of a decimal and a power of 10 without using a calculator or paper and pencil. Suppose you wanted to find the quotient of 5540 and powers of 10.

Decimal		Power of Ten		Quotient
5540	÷	10^{-3} or 0.001	=	5,540,000
5540	÷	10^{-2} or 0.01	=	554,000
5540	÷	10^{-1} or 0.1	=	55,400
5540	÷	100 or 1	=	5540
5540	÷	10^1 or 10	=	554
5540	÷	10^2 or 100	=	55.4
5540	÷	10^3 or 1000	=	5.54
5540	÷	10^4 or 10,000	=	0.554

For powers of 10 that are less than 1, the exponent in the power of 10 tells you the number of places to move the decimal point to the left. For powers of 10 that are greater than 1, the decimal point moves to the right.

Examples **1** $8 \div 10^3 = 0.008$

Move the decimal point 3 places to the left.

2 $0.34 \div 10^{-2} = 34$

Move the decimal point 2 places to the right.

Divide mentally.

1. $6 \div 0.01$

2. $35.7 \div 100$

3. $764 \div 10^4$

4. $18 \div 0.1$

5. $0.145 \div 10^{-3}$

6. $24 \div 10^2$

7. $47 \div 100$

8. $1.53 \div 0.001$

9. $61 \div 10^{-1}$



Name _____ Date _____ Period _____

Dividing Decimals by Powers of 10 *(continued)*

Divide mentally.

10. $88 \div 1000$

11. $234 \div 100$

12. $34 \div 10$

13. $19 \div 10^0$

14. $1.27 \div 1000$

15. $765 \div 10^{-3}$

16. $1.1 \div 0.01$

17. $0.04 \div 10^{-2}$

18. $1561 \div 10^4$

19. $54 \div 10$

20. $15.2 \div 0.01$

21. $66 \div 10^{-2}$

22. $128 \div 100$

23. $55,510 \div 1000$

24. $426 \div 10^2$

Solve each equation.

25. $v = 87 \div 10$

26. $q = 737 \div 10^0$

27. $m = 891 \div 0.001$

28. $r = 678 \div 100$

29. $s = 24 \div 10^{-2}$

30. $t = 16.4 \div 0.01$

31. $p = 1.3 \div 1000$

32. $q = 0.573 \div 10^{-3}$

33. $u = 9.9 \div 10$

34. $148 \div 100 = r$

35. $w = 1.28 \div 10^3$

36. $k = 16.5 \div 0.1$

37. $n = 154 \div 0.1$

38. $3546 \div 10^0 = y$

39. $41.14 \div 10^{-3} = j$

40. $360 \div 10^4 = m$

41. $r = 7610 \div 10^1$

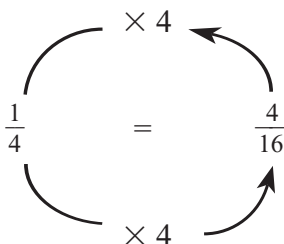
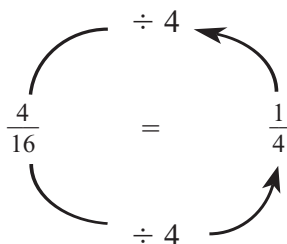
42. $q = 2.532 \div 10^{-2}$

SKILL 19

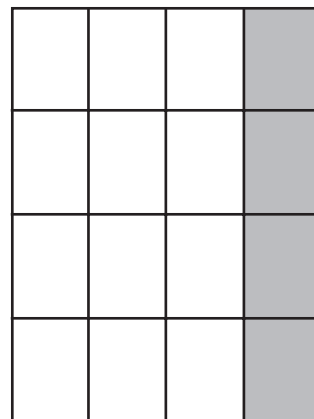
Name _____ Date _____ Period _____

Equivalent Fractions

To find equivalent fractions, multiply or divide the numerator and denominator by the same nonzero number.

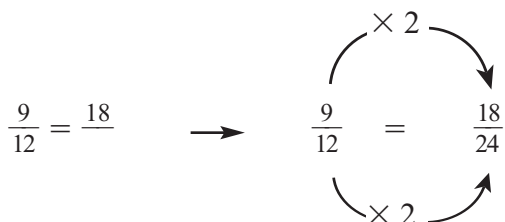


The shaded region at the right shows that $\frac{4}{16}$ and $\frac{1}{4}$ are equivalent.



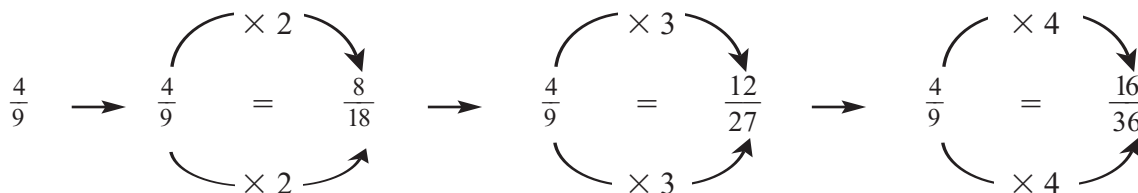
Examples

1 Complete $\frac{9}{12} = \frac{18}{\quad}$ so that the fractions are equivalent.



Since $9 \times 2 = 18$, multiply both the numerator and the denominator by 2.

2 Find three fractions equivalent to $\frac{4}{9}$.



Complete so that the fractions are equivalent.

1. $\frac{3}{4} = \frac{\quad}{12}$

2. $\frac{4}{9} = \frac{\quad}{18}$

3. $\frac{4}{5} = \frac{\quad}{20}$

4. $\frac{5}{8} = \frac{\quad}{24}$



Name _____ Date _____ Period _____

Equivalent Fractions *(continued)*

Complete so that the fractions are equivalent.

5. $\frac{3}{5} = \frac{15}{\quad}$

6. $\frac{5}{7} = \frac{10}{\quad}$

7. $\frac{4}{9} = \frac{12}{\quad}$

8. $\frac{3}{8} = \frac{6}{\quad}$

9. $\frac{2}{3} = \frac{\quad}{24}$

10. $\frac{5}{15} = \frac{\quad}{3}$

11. $\frac{5}{20} = \frac{\quad}{4}$

12. $\frac{7}{56} = \frac{\quad}{8}$

13. $\frac{16}{40} = \frac{2}{\quad}$

14. $\frac{27}{72} = \frac{3}{\quad}$

15. $\frac{40}{64} = \frac{5}{\quad}$

16. $\frac{10}{45} = \frac{2}{\quad}$

17. $\frac{16}{18} = \frac{8}{\quad}$

18. $\frac{4}{7} = \frac{\quad}{42}$

19. $\frac{6}{11} = \frac{\quad}{33}$

20. $\frac{5}{12} = \frac{25}{\quad}$

Find three fractions equivalent to each of the following.

21. $\frac{1}{2}$

22. $\frac{4}{5}$

23. $\frac{2}{3}$

24. $\frac{5}{6}$

25. $\frac{7}{8}$

26. $\frac{9}{10}$

Solve.

27. Ms. Yen works 10 months of 12 each year. Give two fractions that represent the fraction of a year she works.

28. During a basketball game, there are 10 players on the floor. Five of the players are on the home team. Give two fractions that represent the fraction of players on the floor that are on the home team.

Simplifying Fractions

To write a fraction in simplest form, divide both the numerator and denominator by their greatest common factor (GCF).

Example 1 Write $\frac{16}{100}$ in simplest form.

Step 1	Step 2
<p>Find the GCF of 16 and 100. You can use prime factorization.</p> $16 = \underbrace{(2)}_{\downarrow} \times \underbrace{(2)}_{\downarrow} \times 2 \times 2$ $100 = \underbrace{(2)}_{\downarrow} \times \underbrace{(2)}_{\downarrow} \times 5 \times 5$ <p>GCF: $2 \times 2 = 4$</p>	<p>Divide both 16 and 100 by their GCF, 4.</p> <p>$\frac{16}{100} = \frac{4}{25}$</p> <p><i>A fraction is in simplest form when the GCF of both its numerator and denominator is 1.</i></p>

The fraction $\frac{16}{100}$ written in simplest form is $\frac{4}{25}$.

Example 2 Write $\frac{6}{15}$ in simplest form.

$$6 = \underbrace{(3)}_{\downarrow} \times 2$$

$$15 = \underbrace{(3)}_{\downarrow} \times 5$$

GCF: 3

$\frac{6}{15} = \frac{2}{5}$

Write each fraction in simplest form.

1. $\frac{4}{6}$

2. $\frac{2}{4}$

3. $\frac{6}{12}$

4. $\frac{8}{10}$

5. $\frac{6}{14}$

6. $\frac{6}{9}$

7. $\frac{2}{8}$

8. $\frac{3}{12}$



Name _____ Date _____ Period _____

Simplifying Fractions *(continued)*

Write each fraction in simplest form.

9. $\frac{13}{26}$

10. $\frac{16}{24}$

11. $\frac{12}{18}$

12. $\frac{12}{16}$

13. $\frac{5}{15}$

14. $\frac{15}{25}$

15. $\frac{3}{15}$

16. $\frac{10}{30}$

17. $\frac{9}{21}$

18. $\frac{14}{30}$

19. $\frac{20}{36}$

20. $\frac{6}{24}$

21. $\frac{27}{9}$

22. $\frac{10}{100}$

23. $\frac{25}{40}$

24. $\frac{8}{16}$

25. $\frac{10}{25}$

26. $\frac{8}{40}$

27. $\frac{12}{30}$

28. $\frac{16}{20}$

29. $\frac{7}{42}$

30. $\frac{15}{30}$

31. $\frac{9}{33}$

32. $\frac{10}{16}$

Solve. Write the answer in simplest form.

33. Tara takes 12 vacation days in June, which has 30 days. What fraction of the month is she on vacation?
Express your answer in simplest form.

34. During a one-hour (60 minute) practice, Calvin shot free throws for 15 minutes. What fraction of an hour did he shoot free throws?
Express your answer in simplest form.

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Writing Improper Fractions as Mixed Numbers

A fraction such as $\frac{8}{5}$ is called an **improper fraction** because the numerator is greater than the denominator. Improper fractions are often expressed as mixed numbers. A **mixed number** is the sum of a whole number and a fraction. Follow the steps in Example 1 to write $\frac{8}{5}$ as a mixed number.

Example 1 Write $\frac{8}{5}$ as a mixed number in simplest form.

Step 1	Step 2
Divide the numerator by the denominator. $\begin{array}{r} 1 \\ 5 \overline{)8} \\ -5 \\ \hline 3 \end{array}$	Write the remainder as a fraction. $\begin{array}{r} 1\frac{3}{5} \\ 5 \overline{)8} \\ -5 \\ \hline 3 \end{array}$

Example 2 Write $\frac{38}{4}$ as a mixed number in simplest form.

$$9\frac{2}{4} = 9\frac{1}{2}$$

$$\begin{array}{r} 9 \\ 4 \overline{)38} \\ -36 \\ \hline 2 \end{array}$$

Write each improper fraction as a mixed number in simplest form.

1. $\frac{7}{5}$

2. $\frac{13}{8}$

3. $\frac{13}{4}$

4. $\frac{22}{7}$

5. $\frac{6}{4}$

6. $\frac{14}{8}$

7. $\frac{9}{6}$

8. $\frac{14}{10}$



Name _____ Date _____ Period _____

Writing Improper Fractions as Mixed Numbers *(continued)*

Write each improper fraction as a mixed number in simplest form.

9. $\frac{28}{16}$

10. $\frac{25}{10}$

11. $\frac{33}{9}$

12. $\frac{40}{16}$

13. $\frac{13}{5}$

14. $\frac{9}{2}$

15. $\frac{15}{3}$

16. $\frac{21}{8}$

17. $\frac{17}{12}$

18. $\frac{12}{5}$

19. $\frac{13}{3}$

20. $\frac{15}{10}$

21. $\frac{28}{12}$

22. $\frac{21}{5}$

23. $\frac{19}{6}$

24. $\frac{31}{8}$

25. $\frac{16}{5}$

26. $\frac{27}{15}$

27. $\frac{32}{12}$

28. $\frac{48}{24}$

29. $\frac{36}{24}$

30. $\frac{25}{20}$

31. $\frac{30}{12}$

32. $\frac{24}{10}$

Solve. Write each answer as a mixed number in simplest form.

33. Carrie rode her bike 22 miles in 3 hours. What is the average number of miles she rode in one hour?

34. Mr. Steele has managed the Classic Theater for 21 months. How many years has he managed the Classic Theater?

Writing Mixed Numbers as Improper Fractions

Follow the steps in Example 1 to change a mixed number to an improper fraction.

Example 1 Write $3\frac{1}{2}$ as an improper fraction.

Step 1	Step 2
<p>First multiply the whole number by the denominator and add the numerator. Then write this sum over the denominator.</p> $3\frac{1}{2} = \frac{(3 \times 2) + 1}{2}$	<p>Simplify.</p> $\frac{(3 \times 2) + 1}{2} = \frac{6 + 1}{2} \text{ or } \frac{7}{2}$

Example 2 Write $8\frac{3}{5}$ as an improper fraction.

$$8\frac{3}{5} = \frac{(8 \times 5) + 3}{5} = \frac{43}{5}$$

Write each mixed number as an improper fraction.

1. $6\frac{1}{3}$

2. $5\frac{3}{4}$

3. $7\frac{1}{6}$

4. $9\frac{1}{8}$

5. $2\frac{3}{16}$

6. $4\frac{3}{10}$

7. $4\frac{2}{3}$

8. $3\frac{3}{5}$

9. $5\frac{6}{7}$

10. $3\frac{7}{9}$

11. $2\frac{11}{12}$

12. $4\frac{7}{8}$



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Writing Mixed Numbers as Improper Fractions *(continued)*

Write each mixed number as an improper fraction.

13. $1\frac{3}{8}$

14. $5\frac{2}{5}$

15. $2\frac{3}{4}$

16. $1\frac{7}{8}$

17. $1\frac{7}{12}$

18. $4\frac{1}{2}$

19. $2\frac{9}{10}$

20. $3\frac{5}{8}$

21. $3\frac{2}{3}$

22. $4\frac{3}{4}$

23. $5\frac{2}{3}$

24. $5\frac{1}{8}$

25. $5\frac{9}{10}$

26. $6\frac{7}{8}$

27. $4\frac{3}{10}$

28. $10\frac{2}{3}$

29. $9\frac{7}{12}$

30. $8\frac{5}{11}$

31. $15\frac{2}{7}$

32. $12\frac{4}{7}$

33. $11\frac{4}{5}$

34. $18\frac{2}{3}$

35. $20\frac{1}{4}$

36. $16\frac{4}{9}$

37. $5\frac{12}{13}$

38. $16\frac{2}{13}$

39. $24\frac{1}{3}$

40. $8\frac{16}{17}$

41. $9\frac{5}{17}$

42. $7\frac{6}{19}$

43. $5\frac{8}{9}$

44. $16\frac{10}{13}$

Comparing and Ordering Fractions

One way to compare fractions is to express them as fractions with the same denominator. The **least common denominator (LCD)** is the least common multiple of the denominators.

Example Replace the \bigcirc with $<$, $>$, or $=$ to make a true sentence.

$$\frac{5}{8} \bigcirc \frac{2}{3}$$

The LCM of 8 and 3 is 24. Express $\frac{5}{8}$ and $\frac{2}{3}$ as fractions with a denominator of 24.

$$\frac{5}{8} \xrightarrow{\times 3} \frac{15}{24}$$

$$\frac{2}{3} \xrightarrow{\times 8} \frac{16}{24}$$

$$\frac{15}{24} \bigcirc \frac{16}{24}$$

Compare the numerators. Since $15 < 16$,

$\frac{15}{24} < \frac{16}{24}$. Therefore, $\frac{5}{8} < \frac{2}{3}$.

Find the LCD for each pair of fractions.

1. $\frac{2}{5}, \frac{1}{3}$

2. $\frac{3}{4}, \frac{5}{6}$

3. $\frac{1}{2}, \frac{4}{7}$

4. $\frac{4}{5}, \frac{2}{3}$

5. $\frac{5}{8}, \frac{7}{12}$

6. $\frac{1}{2}, \frac{6}{7}$

7. $\frac{1}{6}, \frac{9}{10}$

8. $\frac{3}{4}, \frac{2}{9}$

9. $\frac{5}{12}, \frac{3}{16}$

Replace each \bigcirc with $<$, $>$, or $=$ to make a true sentence.

10. $\frac{3}{4} \bigcirc \frac{4}{5}$

11. $\frac{3}{8} \bigcirc \frac{9}{24}$

12. $\frac{2}{3} \bigcirc \frac{9}{15}$

13. $\frac{7}{12} \bigcirc \frac{2}{3}$

14. $\frac{5}{11} \bigcirc \frac{1}{3}$

15. $\frac{27}{36} \bigcirc \frac{3}{4}$

Comparing and Ordering Fractions *(continued)*

Replace each \bigcirc with $<$, $>$, or $=$ to make a true sentence.

16. $\frac{5}{6} \bigcirc \frac{7}{8}$

17. $\frac{6}{7} \bigcirc \frac{4}{5}$

18. $\frac{3}{9} \bigcirc \frac{1}{3}$

19. $\frac{5}{8} \bigcirc \frac{7}{12}$

20. $\frac{5}{7} \bigcirc \frac{7}{10}$

21. $\frac{2}{3} \bigcirc \frac{3}{4}$

22. $\frac{2}{15} \bigcirc \frac{1}{6}$

23. $\frac{3}{8} \bigcirc \frac{6}{16}$

24. $\frac{5}{12} \bigcirc \frac{2}{5}$

25. $\frac{3}{10} \bigcirc \frac{5}{14}$

26. $\frac{4}{9} \bigcirc \frac{3}{7}$

27. $\frac{1}{6} \bigcirc \frac{2}{12}$

28. $\frac{3}{5} \bigcirc \frac{5}{9}$

29. $\frac{7}{9} \bigcirc \frac{4}{7}$

30. $\frac{9}{10} \bigcirc \frac{11}{12}$

31. $\frac{1}{4} \bigcirc \frac{2}{8}$

32. $\frac{2}{9} \bigcirc \frac{4}{15}$

33. $\frac{8}{9} \bigcirc \frac{7}{8}$

Order the following fractions from least to greatest.

34. $\frac{3}{4}, \frac{2}{5}, \frac{5}{8}, \frac{1}{2}$

35. $\frac{2}{3}, \frac{4}{9}, \frac{5}{6}, \frac{7}{12}$

36. $\frac{1}{3}, \frac{2}{7}, \frac{3}{14}, \frac{1}{6}$

37. $\frac{7}{15}, \frac{3}{5}, \frac{5}{12}, \frac{1}{2}$

38. $\frac{11}{12}, \frac{5}{6}, \frac{3}{4}, \frac{9}{16}$

39. $\frac{4}{5}, \frac{2}{3}, \frac{11}{35}, \frac{7}{9}$

40. $\frac{7}{8}, \frac{4}{5}, \frac{3}{4}, \frac{9}{10}$

41. $\frac{1}{3}, \frac{2}{5}, \frac{3}{12}, \frac{3}{10}$

42. $\frac{1}{2}, \frac{3}{5}, \frac{2}{7}, \frac{5}{9}$

43. $\frac{1}{10}, \frac{2}{3}, \frac{1}{12}, \frac{5}{6}$

Multiplying Fractions

To multiply fractions, multiply the numerators. Then multiply the denominators. Simplify the product if possible.

Examples 1 Multiply $\frac{4}{7}$ times $\frac{5}{9}$.

$$\frac{4}{7} \times \frac{5}{9} = \frac{4 \times 5}{7 \times 9}$$

Multiply the numerators.

Multiply the denominators.

$$= \frac{20}{63}$$

The product of $\frac{4}{7}$ and $\frac{5}{9}$ is $\frac{20}{63}$.

2 Multiply $\frac{5}{6}$ times $\frac{3}{5}$.

$$\frac{5}{6} \times \frac{3}{5} = \frac{5 \times 3}{6 \times 5}$$

Multiply the numerators.

Multiply the denominators.

$$= \frac{15}{30} \text{ or } \frac{1}{2}$$

Simplify.

The product of $\frac{5}{6}$ and $\frac{3}{5}$ is $\frac{1}{2}$.

Multiply.

1. $\frac{2}{3} \times \frac{1}{4}$

2. $\frac{3}{7} \times \frac{1}{2}$

3. $\frac{1}{3} \times \frac{3}{5}$

4. $\frac{1}{2} \times \frac{6}{7}$

5. $\frac{7}{10} \times \frac{5}{7}$

6. $\frac{1}{4} \times \frac{1}{4}$

7. $\frac{1}{3} \times \frac{1}{5}$

8. $\frac{5}{8} \times \frac{1}{2}$

9. $\frac{4}{9} \times \frac{3}{4}$

10. $\frac{2}{3} \times \frac{3}{8}$

11. $\frac{1}{7} \times \frac{1}{7}$

12. $\frac{2}{9} \times \frac{1}{2}$

13. $\frac{3}{5} \times \frac{5}{6}$

14. $\frac{2}{7} \times \frac{1}{3}$

15. $\frac{5}{12} \times \frac{1}{5}$

16. $\frac{1}{2} \times \frac{1}{5}$

17. $\frac{6}{7} \times \frac{8}{15}$

18. $\frac{8}{9} \times \frac{9}{10}$

19. $\frac{4}{5} \times \frac{5}{14}$

20. $\frac{7}{8} \times \frac{4}{9}$

21. $\frac{5}{8} \times \frac{3}{4}$



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Multiplying Fractions *(continued)*

Use the recipe for lemon chicken saute below to answer Exercises 22–25.

6 boneless chicken breasts, rolled in flour	$\frac{1}{3}$ cup teriyaki sauce
$\frac{1}{4}$ cup butter	$\frac{1}{2}$ teaspoon sugar
3 tablespoons lemon juice	$\frac{1}{8}$ teaspoon pepper
1 teaspoon garlic	

22. If Julie wants to make half of this recipe, how much pepper should she use?
23. If Julie wants to make one-third of this recipe, how much teriyaki sauce should she use?
24. If Julie wants to make two-thirds of this recipe, how much sugar should she use?
25. If Julie wants to make two-thirds of this recipe, how much butter should she use?
26. If about $\frac{1}{3}$ of Earth is able to be farmed and $\frac{2}{5}$ of this land is planted in grain crops, what part of Earth is planted in grain crops?
27. Two fifths of the students at Main Street Middle School are in seventh grade. If half of the students in seventh grade are boys, what fraction of the students are seventh grade boys?



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Multiplying Fractions and Mixed Numbers

To multiply fractions:

Multiply the numerators.
Then multiply the denominators.

$$\frac{5}{6} \times \frac{3}{5} = \frac{5 \times 3}{6 \times 5} = \frac{15}{30} = \frac{1}{2}$$

To multiply mixed numbers: Rename each mixed number as a fraction.
Multiply the fractions.

$$7 \times 1\frac{1}{4} = \frac{7}{1} \times \frac{5}{4} = \frac{35}{4} = 8\frac{3}{4}$$

Multiply. Write each product in simplest form.

1. $\frac{2}{3} \times \frac{1}{4}$

2. $\frac{3}{7} \times \frac{1}{2}$

3. $\frac{1}{3} \times \frac{3}{5}$

4. $\frac{1}{2} \times \frac{6}{7}$

5. $\frac{3}{8} \times 4$

6. $\frac{7}{10} \times \frac{5}{7}$

7. $\frac{4}{9} \times 3$

8. $\frac{1}{4} \times \frac{1}{4}$

9. $1\frac{1}{2} \times 6$

10. $\frac{3}{4} \times 1\frac{2}{3}$

11. $3\frac{1}{3} \times 2\frac{1}{2}$

12. $4\frac{1}{5} \times \frac{1}{7}$



Name _____ Date _____ Period _____

Multiplying Fractions and Mixed Numbers *(continued)*

Multiply. Write each product in simplest form.

13. $1\frac{1}{9} \times \frac{3}{5}$

14. $6 \times \frac{11}{12}$

15. $\frac{1}{2} \times 2\frac{2}{3}$

16. $\frac{2}{3} \times \frac{1}{2}$

17. $\frac{3}{4} \times \frac{1}{9}$

18. $3 \times \frac{4}{9}$

19. $\frac{1}{5} \times \frac{1}{4}$

20. $\frac{1}{4} \times \frac{4}{5}$

21. $\frac{4}{9} \times \frac{3}{4}$

22. $\frac{13}{21} \times \frac{7}{13}$

23. $\frac{7}{8} \times \frac{4}{9}$

24. $\frac{5}{7} \times \frac{7}{10}$

25. $\frac{4}{5} \times \frac{5}{14}$

26. $\frac{1}{4} \times \frac{5}{8}$

27. $\frac{2}{3} \times \frac{5}{9}$

28. $\frac{4}{5} \times 7$

29. $2\frac{2}{5} \times 1\frac{3}{7}$

30. $6 \times \frac{2}{3}$

31. $3\frac{3}{4} \times \frac{1}{2}$

32. $1\frac{5}{9} \times 2\frac{4}{7}$

33. $4\frac{1}{3} \times \frac{1}{2}$

Dividing Fractions

To divide by a fraction, multiply by its reciprocal.
Simplify the quotient if possible.

Examples 1 Divide $\frac{2}{3}$ by $\frac{5}{7}$.

$$\begin{aligned}\frac{2}{3} \div \frac{5}{7} &= \frac{2}{3} \times \frac{7}{5} \\ &= \frac{2 \times 7}{3 \times 5} \\ &= \frac{14}{15}\end{aligned}$$

Multiply by the reciprocal of $\frac{5}{7}$.

Multiply the numerators.

Multiply the denominators.

The quotient is $\frac{14}{15}$.

2 Divide $\frac{3}{4}$ by $\frac{9}{10}$.

$$\begin{aligned}\frac{3}{4} \div \frac{9}{10} &= \frac{3}{4} \times \frac{10}{9} \\ &= \frac{3 \times 10}{4 \times 9} \\ &= \frac{30}{36} \text{ or } \frac{5}{6}\end{aligned}$$

Multiply by the reciprocal of $\frac{9}{10}$.

Multiply the numerators.

Multiply the denominators.

Simplify.

The quotient is $\frac{5}{6}$.

Divide.

1. $\frac{3}{4} \div \frac{1}{2}$

2. $\frac{4}{5} \div \frac{1}{3}$

3. $\frac{1}{5} \div \frac{1}{4}$

4. $\frac{4}{7} \div \frac{8}{9}$

5. $\frac{3}{8} \div \frac{3}{4}$

6. $\frac{9}{7} \div \frac{3}{14}$

7. $\frac{4}{5} \div \frac{2}{5}$

8. $\frac{7}{8} \div \frac{1}{4}$

9. $\frac{2}{5} \div \frac{5}{8}$

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Dividing Fractions *(continued)*

Divide.

10. $\frac{1}{3} \div \frac{1}{6}$

11. $\frac{5}{8} \div \frac{5}{12}$

12. $\frac{4}{5} \div \frac{2}{7}$

13. $\frac{2}{5} \div \frac{3}{10}$

14. $\frac{5}{7} \div \frac{3}{4}$

15. $\frac{2}{3} \div \frac{4}{9}$

16. $\frac{4}{7} \div \frac{4}{5}$

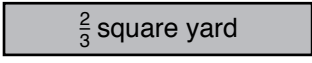
17. $\frac{5}{6} \div \frac{1}{9}$

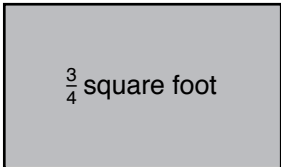
18. $\frac{4}{5} \div \frac{2}{3}$

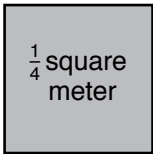
19. About $\frac{1}{20}$ of the population of the world lives in South America. If about $\frac{1}{35}$ of the population of the world lives in Brazil, what fraction of the population of South America lives in Brazil?

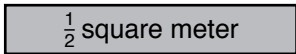
20. Three fourths of a pizza is left. If the pizza was originally cut in $\frac{1}{8}$ pieces, how many pieces are left?

The area of each rectangle is given. Find the missing length for each rectangle.

21.  $\frac{2}{3}$ square yard $\frac{1}{3}$ yard
?

22.  $\frac{3}{4}$ square foot $\frac{2}{3}$ foot
?

23.  $\frac{1}{4}$ square meter
 $\frac{1}{2}$ meter ?

24.  $\frac{1}{2}$ square meter $\frac{1}{4}$ meter
?

Dividing Fractions and Mixed Numbers

To divide fractions and mixed numbers:

1. Write any mixed numbers as improper fractions.
2. Find the reciprocal of the divisor.
3. Multiply the dividend by the reciprocal of the divisor.

Examples 1 $\frac{5}{8} \div \frac{5}{12}$ *The reciprocal of $\frac{5}{12}$ is $\frac{12}{5}$.*

$$\frac{5}{8} \div \frac{5}{12} = \frac{5}{8} \times \frac{12}{5}$$

$$= \frac{60}{40} \text{ or } 1\frac{1}{2}$$

2 $7 \div 3\frac{1}{2} \longrightarrow \frac{7}{1} \div \frac{7}{2}$ *The reciprocal of $\frac{7}{2}$ is $\frac{2}{7}$.*

$$7 \div 3\frac{1}{2} = \frac{7}{1} \times \frac{2}{7}$$

$$= \frac{14}{7} \text{ or } 2$$

Name the reciprocal of each number.

1. $\frac{6}{11}$

2. $\frac{14}{5}$

3. 8

4. $\frac{1}{5}$

Divide. Write each quotient in simplest form.

5. $\frac{7}{8} \div \frac{1}{4}$

6. $\frac{2}{5} \div \frac{5}{8}$

7. $\frac{1}{3} \div \frac{1}{6}$

8. $8 \div \frac{1}{3}$

9. $\frac{5}{9} \div 5$

10. $\frac{2}{4} \div 1\frac{1}{2}$

11. $2\frac{1}{2} \div 5$

12. $3\frac{1}{3} \div \frac{2}{9}$

13. $\frac{5}{8} \div 2\frac{1}{2}$

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Dividing Fractions and Mixed Numbers *(continued)*

Divide. Write each quotient in simplest form.

14. $1\frac{1}{3} \div 2\frac{1}{2}$

15. $3\frac{1}{3} \div 1\frac{2}{5}$

16. $\frac{9}{10} \div 5\frac{2}{5}$

17. $\frac{7}{8} \div \frac{2}{3}$

18. $5 \div \frac{3}{5}$

19. $3\frac{1}{4} \div 2\frac{1}{3}$

Solve each equation. Write each answer in simplest form.

20. $s = \frac{3}{4} \div \frac{1}{2}$

21. $k = \frac{4}{5} \div \frac{1}{3}$

22. $\frac{1}{5} \div \frac{1}{4} = y$

23. $u = 4 \div \frac{1}{3}$

24. $\frac{4}{7} \div \frac{8}{9} = j$

25. $w = \frac{3}{8} \div \frac{3}{4}$

26. $\frac{9}{7} \div 1\frac{3}{4} = h$

27. $\frac{4}{5} \div \frac{2}{5} = p$

28. $5 \div 3\frac{3}{4} = q$

29. $c = \frac{3}{8} \div 2\frac{1}{4}$

30. $t = 7\frac{1}{3} \div 4$

31. $m = 3\frac{1}{4} \div 2\frac{1}{4}$

32. $n = 1\frac{2}{7} \div 1\frac{13}{14}$

33. $1\frac{1}{5} \div \frac{3}{10} = r$

34. $7\frac{1}{2} \div 2\frac{5}{6} = w$

Adding Fractions

To add fractions with like denominators, add the numerators. Write the sum over the common denominator. Simplify the sum if possible.

Example 1 Add: $\frac{7}{8} + \frac{5}{8}$.

$$\begin{array}{r} \frac{7}{8} \\ + \frac{5}{8} \\ \hline \frac{12}{8} = \frac{3}{2} \text{ or } 1\frac{1}{2} \end{array}$$

Simplify the sum.

To add fractions with unlike denominators, rename the fractions with a common denominator. Then add the fractions.

Example 2 Add: $\frac{1}{9} + \frac{5}{6}$.

$$\begin{array}{r} \frac{1}{9} = \frac{2}{18} \\ + \frac{5}{6} = \frac{15}{18} \\ \hline \frac{17}{18} \end{array}$$

Use 18 for the common denominator.

Add.

1. $\begin{array}{r} \frac{4}{7} \\ + \frac{2}{7} \\ \hline \end{array}$

2. $\begin{array}{r} \frac{5}{9} \\ + \frac{4}{9} \\ \hline \end{array}$

3. $\begin{array}{r} \frac{11}{15} \\ + \frac{2}{15} \\ \hline \end{array}$

4. $\begin{array}{r} \frac{11}{15} \\ + \frac{7}{15} \\ \hline \end{array}$

5. $\begin{array}{r} \frac{6}{7} \\ + \frac{6}{7} \\ \hline \end{array}$

6. $\begin{array}{r} \frac{11}{12} \\ + \frac{5}{12} \\ \hline \end{array}$

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Adding Fractions (*continued*)

Add.

$$\begin{array}{r} 7. \quad \frac{3}{8} \\ + \frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad \frac{12}{13} \\ + \frac{14}{13} \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad \frac{1}{2} \\ + \frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad \frac{1}{8} \\ + \frac{1}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad \frac{1}{3} \\ + \frac{1}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad \frac{3}{5} \\ + \frac{2}{7} \\ \hline \end{array}$$

$$13. \quad \frac{7}{16} + \frac{3}{8}$$

$$14. \quad \frac{7}{10} + \frac{2}{5}$$

$$15. \quad \frac{3}{14} + \frac{1}{7}$$

$$16. \quad \frac{5}{12} + \frac{1}{3}$$

$$17. \quad \frac{1}{6} + \frac{1}{8}$$

$$18. \quad \frac{1}{6} + \frac{4}{9}$$

$$19. \quad \frac{3}{8} + \frac{5}{8} + \frac{1}{8}$$

$$20. \quad \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$$

$$21. \quad \frac{2}{3} + \frac{3}{4} + \frac{1}{6}$$

22. After running $\frac{7}{8}$ mile in a horse race, a horse ran an additional $\frac{3}{8}$ mile to cool down. How far did the horse run altogether?

23. In 1991, about $\frac{1}{5}$ of the crude oil produced was from North America, and about $\frac{2}{7}$ of the crude oil produced was from the Middle East.
What fraction of the crude oil produced was from North America or the Middle East?

24. In 1991, about $\frac{3}{10}$ of the petroleum consumed was in North America, and about $\frac{1}{5}$ of the petroleum consumed was in Western Europe. What fraction of the petroleum consumed was in North America or Western Europe?

Adding Fractions and Mixed Numbers

To add fractions and mixed numbers, first rename each fraction as necessary. Then add the fractions. Next, add the whole numbers. Rename and simplify if necessary.

Example 1 Add: $4\frac{5}{6} + 5\frac{1}{4}$.

Step 1	Step 2	Step 3
<p>Rename each fraction by finding the LCD if necessary.</p> $\begin{array}{r} 4\frac{5}{6} \longrightarrow 4\frac{10}{12} \\ + 5\frac{1}{4} \longrightarrow + 5\frac{3}{12} \\ \hline \end{array}$	<p>Add the fractions. Then add the whole numbers.</p> $\begin{array}{r} 4\frac{10}{12} \\ + 5\frac{3}{12} \\ \hline 9\frac{13}{12} \end{array}$	<p>Rename and simplify if necessary.</p> $9\frac{13}{12} = 10\frac{1}{12}$

Example 2 Add: $14\frac{5}{9} + 7$.

$$\begin{array}{r} 14\frac{5}{9} \\ + 7 \\ \hline 21\frac{5}{9} \end{array}$$

Add. Write each sum in simplest form.

1. $\begin{array}{r} 13 \\ + 9\frac{7}{8} \\ \hline \end{array}$

2. $\begin{array}{r} 6\frac{1}{4} \\ + 8\frac{3}{4} \\ \hline \end{array}$

3. $\begin{array}{r} 5\frac{1}{6} \\ + 7\frac{1}{3} \\ \hline \end{array}$

4. $\begin{array}{r} 11\frac{3}{4} \\ + 8\frac{2}{3} \\ \hline \end{array}$

5. $\begin{array}{r} 16\frac{1}{2} \\ + 14\frac{5}{7} \\ \hline \end{array}$

6. $\begin{array}{r} 15\frac{1}{2} \\ + 9\frac{4}{5} \\ \hline \end{array}$

7. $\begin{array}{r} 18\frac{7}{8} \\ + 15\frac{5}{8} \\ \hline \end{array}$

8. $\begin{array}{r} 12\frac{1}{10} \\ + 7\frac{5}{6} \\ \hline \end{array}$

Adding Fractions and Mixed Numbers *(continued)*

Add. Write each sum in simplest form.

$$\begin{array}{r} 9. \quad 18\frac{7}{8} \\ + 13 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 11 \\ + 3\frac{5}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 9\frac{7}{9} \\ + 3\frac{4}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 8\frac{2}{5} \\ + 4\frac{4}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 12\frac{1}{2} \\ + 8\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 14\frac{5}{8} \\ + 6\frac{5}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 16\frac{2}{5} \\ + 13\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 13\frac{4}{15} \\ + 12\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 16\frac{2}{5} \\ + 8\frac{1}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 12\frac{3}{8} \\ + 10\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 4\frac{4}{9} \\ + 5\frac{5}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 18\frac{2}{3} \\ + 12\frac{8}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 10\frac{6}{7} \\ + 5\frac{2}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad 15\frac{3}{4} \\ + 8\frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 23. \quad 24\frac{1}{2} \\ + 12\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 24. \quad 20\frac{2}{9} \\ + 8\frac{1}{12} \\ \hline \end{array}$$

$$25. \quad 8\frac{2}{11} + 6\frac{1}{2} =$$

$$26. \quad 9\frac{5}{9} + 10\frac{5}{12} =$$

$$27. \quad 6\frac{4}{9} + 8\frac{7}{15} =$$

$$28. \quad 12\frac{4}{15} + 5\frac{7}{12} =$$

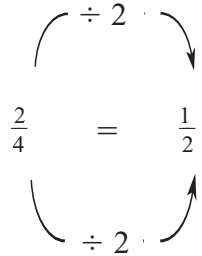
$$29. \quad 14\frac{4}{9} + 10\frac{2}{3} =$$

$$30. \quad 19\frac{2}{7} + 12\frac{5}{21} =$$

Subtracting Fractions

To subtract fractions with like denominators, subtract the numerators. Write the difference over the common denominator. Simplify the difference if possible.

Example 1 Subtract: $\frac{3}{4} - \frac{1}{4}$.

Step 1	Step 2
<p>Subtract the numerators. Write the difference over the like denominator.</p> $\frac{3}{4} - \frac{1}{4} = \frac{3-1}{4} \text{ or } \frac{2}{4}$	<p>Simplify the difference.</p>  <p><i>The GCF of 2 and 4 is 2.</i></p>

To subtract fractions with unlike denominators, rename the fractions with a common denominator. Then subtract the fractions.

Example 2 Subtract: $\frac{7}{10} - \frac{2}{5}$.

$$\begin{array}{r} \frac{7}{10} = \frac{7}{10} \\ - \frac{2}{5} = \frac{4}{10} \\ \hline \frac{3}{10} \end{array}$$

Use 10 for the common denominator.

Subtract. Write each difference in simplest form.

1. $\frac{5}{6} - \frac{4}{6}$

2. $\frac{9}{10} - \frac{3}{10}$

3. $\frac{9}{16} - \frac{3}{16}$

4. $\frac{11}{12} - \frac{3}{12}$



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Subtracting Fractions *(continued)*

Subtract. Write each difference in simplest form.

5. $\frac{11}{14} - \frac{5}{14}$

6. $\frac{8}{9} - \frac{2}{9}$

7. $\frac{5}{6} - \frac{1}{3}$

8. $\frac{11}{12} - \frac{3}{4}$

9. $\frac{9}{10} - \frac{2}{5}$

10. $\frac{5}{7} - \frac{3}{14}$

11. $\frac{20}{21} - \frac{5}{14}$

12. $\frac{9}{14} - \frac{1}{2}$

13. $\frac{11}{15} - \frac{3}{10}$

14. $\frac{5}{6} - \frac{1}{12}$

15. $\frac{7}{18} - \frac{1}{6}$

16. $\frac{9}{20} - \frac{1}{8}$

17. $\frac{7}{12} - \frac{2}{9}$

18. $\frac{13}{18} - \frac{5}{12}$

19. $\frac{9}{16} - \frac{1}{6}$

20. $\frac{17}{24} - \frac{3}{10}$

Subtracting Fractions and Mixed Numbers

To subtract fractions and mixed numbers, first rename each fraction by finding the LCD if necessary. Then rename, if necessary, to subtract. Next subtract the fractions and then the whole numbers. Rename and simplify if necessary.

Example 1 Find $4\frac{2}{5} - 1\frac{9}{10}$.

Step 1	Step 2	Step 3
Rename each fraction finding the LCD if necessary. $\begin{array}{r} 4\frac{2}{5} \rightarrow 4\frac{4}{10} \\ - 1\frac{9}{10} \rightarrow - 1\frac{9}{10} \\ \hline \end{array}$	Rename if necessary to subtract. $4\frac{4}{10} = 3 + \frac{10}{10} + \frac{4}{10} = 3\frac{14}{10}$ $\begin{array}{r} 4\frac{4}{10} \rightarrow 3\frac{14}{10} \\ - 1\frac{9}{10} \rightarrow - 1\frac{9}{10} \\ \hline \end{array}$	Subtract and simplify if necessary. $\begin{array}{r} 3\frac{14}{10} \\ - 1\frac{9}{10} \\ \hline 2\frac{5}{10} \text{ or } 2\frac{1}{2} \end{array}$

Example 2 Find $6 - 3\frac{1}{6}$.

$$\begin{array}{r} 6 \rightarrow 5\frac{6}{6} \\ - 3\frac{1}{6} \rightarrow - 3\frac{1}{6} \\ \hline 2\frac{5}{6} \end{array}$$

Subtract. Write each difference in simplest form.

1.
$$\begin{array}{r} 14\frac{2}{3} \\ - 12 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 10 \\ - 4\frac{3}{4} \\ \hline \end{array}$$

3.
$$\begin{array}{r} 7\frac{7}{9} \\ - 3\frac{4}{9} \\ \hline \end{array}$$

4.
$$\begin{array}{r} 8\frac{1}{3} \\ - 4\frac{2}{3} \\ \hline \end{array}$$

5.
$$\begin{array}{r} 15\frac{1}{4} \\ - 5\frac{1}{2} \\ \hline \end{array}$$

6.
$$\begin{array}{r} 16\frac{3}{8} \\ - 2\frac{5}{6} \\ \hline \end{array}$$

7.
$$\begin{array}{r} 14\frac{3}{7} \\ - 10\frac{1}{2} \\ \hline \end{array}$$

8.
$$\begin{array}{r} 18\frac{3}{10} \\ - 7\frac{4}{5} \\ \hline \end{array}$$



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Subtracting Fractions and Mixed Numbers *(continued)*

Subtract. Write each difference in simplest form.

$$\begin{array}{r} 9. \quad 8\frac{1}{5} \\ - 2\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 6 \\ - 3\frac{2}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 9\frac{5}{12} \\ - 3\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 16\frac{2}{9} \\ - 2\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 23\frac{1}{2} \\ - 15\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 13\frac{2}{15} \\ - 8\frac{1}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 16\frac{3}{8} \\ - 14\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 19\frac{1}{6} \\ - 4\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 9\frac{2}{9} \\ - 1\frac{1}{18} \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 7 \\ - 2\frac{4}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 16\frac{3}{4} \\ - 5\frac{11}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 12\frac{1}{3} \\ - 10\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 26\frac{1}{4} \\ - 15\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad 14\frac{1}{9} \\ - 8\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 23. \quad 15\frac{1}{8} \\ - 6\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 24. \quad 18\frac{1}{2} \\ - 9\frac{7}{8} \\ \hline \end{array}$$

$$25. \quad 6\frac{3}{11} - 5\frac{1}{3}$$

$$26. \quad 12\frac{5}{7} - 6\frac{1}{2}$$

$$27. \quad 8\frac{2}{9} - 1\frac{7}{12}$$

$$28. \quad 14\frac{3}{10} - 6\frac{4}{5}$$

$$29. \quad 12\frac{5}{6} - 10\frac{2}{3}$$

$$30. \quad 21\frac{2}{5} - 18\frac{7}{15}$$

Changing Fractions to Decimals

A fraction is another way of writing a division problem. To change a fraction to a decimal, divide the numerator by the denominator.

Examples 1 About $\frac{1}{20}$ of the heat in a house is lost through the doors. Write this fraction as a decimal.

$\frac{1}{20}$ means $1 \div 20$ or $20 \overline{)1}$.

$$\begin{array}{r} 0.05 \\ 20 \overline{)1.00} \end{array}$$

So, $\frac{1}{20} = 0.05$.

2 Express $\frac{1}{3}$ as a decimal.

$$\begin{array}{r} 0.33... \\ 3 \overline{)1.00} \end{array}$$

$\frac{1}{3} = 0.33... \text{ or } 0.\overline{3}$ The bar status shows that 3 repeats.

Express each fraction as a decimal. Use bar notation if necessary.

1. $\frac{4}{25}$

2. $\frac{3}{5}$

3. $\frac{7}{20}$

4. $\frac{3}{50}$

5. $\frac{9}{10}$

6. $\frac{7}{8}$

7. $\frac{1}{3}$

8. $\frac{14}{16}$

9. $\frac{20}{30}$

10. $\frac{5}{9}$

11. $\frac{19}{20}$

12. $\frac{5}{200}$



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Changing Fractions to Decimals *(continued)*

Express each fraction as a decimal. Use bar notation if necessary.

13. $\frac{10}{50}$

14. $\frac{13}{20}$

15. $\frac{5}{6}$

16. $\frac{4}{5}$

17. $\frac{7}{10}$

18. $\frac{13}{40}$

19. $\frac{39}{50}$

20. $\frac{2}{25}$

21. $\frac{7}{16}$

22. $\frac{34}{125}$

23. $\frac{16}{25}$

24. $\frac{99}{100}$

25. $\frac{17}{20}$

26. $\frac{3}{150}$

27. $\frac{3}{8}$

28. $\frac{2}{3}$

A mill is a unit of money that is used in assessing taxes.

One mill is equal to $\frac{1}{10}$ of a cent or $\frac{1}{1000}$ of a dollar.

29. Money is usually written using decimals. Express each fraction above as a decimal using the correct money symbol.

30. Find the number of cents and the number of dollars equal to 375 mills.

31. Find the number of cents and the number of dollars equal to 775 mills.

32. Find the number of cents and the number of dollars equal to 1,000 mills.

Writing Decimals as Fractions

To write a terminating decimal as a fraction, write the digits to the right of the decimal point over a power of ten. The power of ten is determined by the place-value position of the last digit in the decimal. For example, if the last digit is in the hundredths place, use 100. If the last digit is in the thousandths place, use 1000.

Example 1 Write 0.375 as a fraction.

Since the last digit, 5, is in the thousandths place, write

375 over 1000. Then simplify.

$$0.375 = \frac{375}{1000} \text{ or } \frac{3}{8}$$

Repeating decimals can also be written as fractions using the method shown below.

Example 2 Write 0.555... as a fraction.

Let $N = 0.555\dots$. Then $10N = 5.555\dots$

Subtract N from $10N$ to eliminate the repeating part.

$$10N = 5.555\dots$$

$$- N = 0.555\dots$$

$$9N = 5$$

$$N = \frac{5}{9}$$

$$\text{So, } 0.555\dots = \frac{5}{9}.$$

Write each decimal as a fraction.

1. 0.525

2. 0.45

3. 0.333...

4. 0.43

5. 0.8

6. 0.1212...

7. 0.345

8. 0.1862

9. 0.4555...



Name _____ Date _____ Period _____

Writing Decimals as Fractions *(continued)*

Write each decimal as a fraction.

10. 0.456

11. 0.32

12. 0.222...

13. 0.35

14. 0.48

15. 0.955

16. 0.8222...

17. 0.4545...

18. 0.444...

19. 0.565

20. 0.435

21. 0.552

22. 0.855

23. 0.842

24. 0.944

25. 0.732

26. 0.245

27. 0.485

28. 0.666...

29. 0.8585...

30. 0.9655

Writing Decimals as Percents

To express a decimal as a percent, first express the decimal as a fraction with a denominator of 100. Then express the fraction as a percent.

Examples Express each decimal as a percent.

$$\begin{aligned} 1 \quad 0.09 &= \frac{9}{100} \\ &= 9\% \end{aligned}$$

$$\begin{aligned} 2 \quad 0.005 &= \frac{5}{1000} \\ &= \frac{0.5}{100} \\ &= 0.5\% \end{aligned}$$

$$\begin{aligned} 3 \quad 1.8 &= \frac{18}{10} \\ &= \frac{180}{100} \\ &= 180\% \end{aligned}$$

A shortcut to writing a decimal as a percent is to move the decimal point two places to the right and add a percent sign (%).

Examples Express each decimal as a percent.

$$\begin{aligned} 4 \quad 0.25 \\ 0.25 &= 0.25\% \\ &= 25\% \end{aligned}$$

$$\begin{aligned} 5 \quad 0.9 \\ 0.9 &= 0.90\% \\ &= 90\% \end{aligned}$$

Express each decimal as a percent.

1. 0.66

2. 0.08

3. 0.75

4. 0.001

5. 1.19

6. 0.72

7. 0.136

8. 4.02

9. 0.18

8. 0.36

11. 0.09

12. 0.2

13. 0.625

14. 0.007

15. 1.4

16. 0.093



Name _____ Date _____ Period _____

Writing Decimals as Percents *(continued)*

Express each decimal as a percent.

17. 0.8

18. 0.54

19. 3.75

20. 0.02

21. 0.258

22. 0.016

23. 0.49

24. 0.003

25. 0.96

26. 0.52

27. 0.15

28. 0.008

29. 3.62

30. 0.623

31. 0.035

32. 7.08

33. 0.5

34. 0.97

35. 0.6

36. 0.425

37. 0.08

38. 2.5

39. 0.001

40. 0.074

41. 0.345

42. 0.19

43. 0.062

44. 0.19

45. 0.005

46. 0.37

47. 0.8

48. 0.04

Writing Percents as Decimals

To express a percent as a decimal, divide by 100 and write as a decimal.

Examples Express each percent as a decimal.

1 56%

$$56\% = \frac{56}{100}$$

$$= 0.56$$

2 3.4%

$$3.4\% = \frac{3.4}{100}$$

$$= \frac{34}{1000}$$

$$= 0.034$$

A shortcut to writing a percent as a decimal is to move the decimal point two places to the left and drop the percent sign.

Examples Express each percent as a decimal.

3 18%

$$18\% = \underbrace{18.}_{\text{move decimal 2 places left}}$$

$$= 0.18$$

4 0.5%

$$0.5\% = \underbrace{000.5}_{\text{move decimal 2 places left}}$$

$$= 0.005$$

Express each percent as a decimal.

1. 45%

2. 91%

3. 24.5%

4. 8.37%

5. 13%

6. 6%

7. 76.5%

8. 1.22%

9. 14.5%

10. 26%

11. 1.8%

12. 80%



Name _____ Date _____ Period _____

Writing Percents as Decimals *(continued)*

Express each percent as a decimal.

13. 8%

14. 32%

15. 15%

16. 15.7%

17. 16.23%

18. 2.01%

19. 3.2%

20. 80%

21. 1.32%

22. 21%

23. 25%

24. 13%

25. 4%

26. 40%

27. 62.5%

28. 30%

29. 60.3%

30. 12.3%

31. 10.25%

31. 8.6%

33. 12.15%

34. 102%

35. 450.5%

36. 175%

37. 0.05%

38. 0.25%

39. 0.105%

40. 14.36%

41. 2.18%

42. 38.65%

Writing Fractions as Percents

To express a fraction as a percent, first set up a proportion. Then solve the proportion using cross products.

Example Express $\frac{13}{20}$ as a percent.

$$\frac{13}{20} = \frac{k}{100}$$

Set up a proportion.

$$13 \times 100 = 20 \times k$$

Find the cross products.

$$1300 = 20k$$

$$1300 \div 20 = 20k \div 20$$

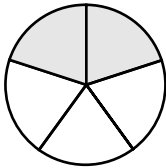
Divide each side by 20.

$$65 = k$$

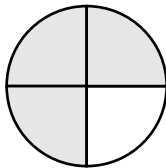
$$\frac{13}{20} = \frac{65}{100} \text{ or } 65\%$$

Express each shaded section as a fraction and as a percent.

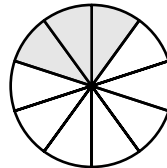
1.



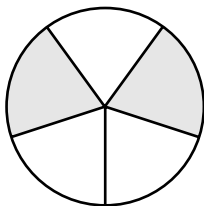
2.



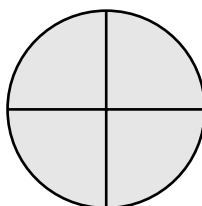
3.



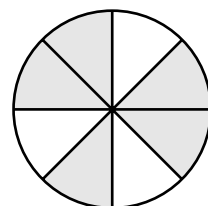
4.



5.



6.



Express each fraction as a percent.

7. $\frac{17}{100}$

8. $\frac{4}{5}$

9. $\frac{1}{4}$

10. $\frac{8}{20}$

11. $\frac{1}{50}$

12. $\frac{7}{10}$

13. $\frac{6}{25}$

14. $\frac{1}{10}$

15. $\frac{1}{25}$

16. $\frac{1}{5}$

17. $\frac{6}{50}$

18. $\frac{8}{10}$

19. $\frac{12}{5}$

20. $\frac{15}{20}$

21. $\frac{150}{50}$

22. $\frac{19}{20}$

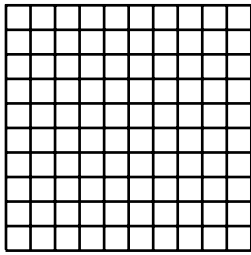
SKILL 36

Name _____ Date _____ Period _____

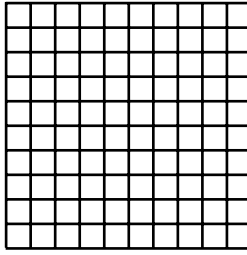
Writing Fractions as Percents *(continued)*

Use a 10×10 grid to shade the amount stated in each fraction. Then express each fraction as a percent.

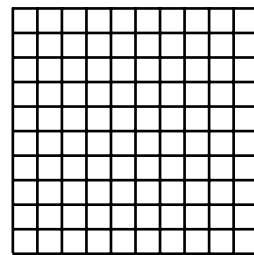
23. $\frac{1}{10}$



24. $\frac{1}{20}$



25. $\frac{1}{50}$



Express each fraction as a percent.

26. $\frac{47}{100}$

27. $\frac{8}{25}$

28. $\frac{9}{12}$

29. $\frac{13}{50}$

30. $\frac{11}{20}$

31. $\frac{7}{5}$

32. $\frac{3}{100}$

33. $\frac{21}{25}$

34. $\frac{3}{10}$

35. $\frac{3}{20}$

36. $\frac{31}{50}$

37. $\frac{5}{4}$

38. $\frac{6}{10}$

39. $\frac{15}{5}$

40. $\frac{12}{50}$

41. $\frac{1}{20}$

42. $\frac{17}{20}$

43. $\frac{152}{50}$

44. $\frac{400}{100}$

45. $\frac{30}{25}$

46. $\frac{9}{10}$

47. $\frac{49}{50}$

48. $\frac{24}{25}$

49. $\frac{40}{20}$

50. $\frac{5}{15}$

51. $\frac{12}{20}$

52. $\frac{18}{10}$

53. $\frac{1000}{100}$

54. $\frac{13}{20}$

55. $\frac{215}{50}$

56. $\frac{25}{20}$

57. $\frac{8}{5}$

58. $\frac{16}{10}$

59. $\frac{43}{50}$

60. $\frac{75}{25}$

61. $\frac{22}{20}$



Name _____ Date _____ Period _____

Writing Percents as Fractions

To express a percent as a fraction, divide by 100 and simplify.

Examples Express each percent as a fraction.

1 65%

$$\begin{aligned} 65\% &= \frac{65}{100} \\ &= \frac{13}{20} \end{aligned}$$

2 2.5%

$$\begin{aligned} 2.5\% &= \frac{2.5}{100} \\ &= \frac{25}{1000} \\ &= \frac{1}{40} \end{aligned}$$

Express each percent as a fraction.

1. 45%

2. 91%

3. 24.5%

4. 8%

5. 32%

6. 15%

7. 15.7%

8. 16.23%

9. 2.01%

10. 3.2%

11. 80%

12. 1.32%

13. 21%

14. 25%

15. 13%



Name _____ Date _____ Period _____

Writing Percents as Fractions *(continued)*

Express each percent as a fraction.

16. 4%

17. 40%

18. 62.5%

19. 30%

20. 60.3%

21. 12.3%

22. 15%

23. 32%

24. 67%

25. 62.8%

26. 18%

27. 23%

28. 70%

29. 1.5%

30. 3.2%

31. 1.82%

32. 14.8%

33. 16%

34. 120%

35. 18.5%

36. 255%

37. 100.5%

38. 1.255%

39. 6.8%

40. 0.09%

41. 45.45%

42. 50.15%

Comparing and Ordering Rational Numbers

To compare fractions, write each fraction as a decimal.
Then compare the decimals.

Example 1 Compare $\frac{2}{3}$ and $\frac{3}{5}$.

$$\frac{2}{3} = 0.6666666667$$

$$\frac{3}{5} = 0.6$$

$$\text{Since } 0.6666666667 > 0.6, \frac{2}{3} > \frac{3}{5}.$$

To compare percents, compare the numbers without the percent sign.

Example 2 Compare 15% and 17.5%.

$$\text{Since } 15 < 17.5, 15\% < 17.5\%.$$

Fill in each \bigcirc with $<$, $>$, or $=$ to make a true sentence.

1. $\frac{2}{7} \bigcirc \frac{3}{8}$

2. $\frac{3}{11} \bigcirc \frac{1}{5}$

3. $\frac{11}{21} \bigcirc \frac{9}{16}$

4. $\frac{14}{21} \bigcirc \frac{10}{15}$

5. $\frac{25}{27} \bigcirc \frac{17}{19}$

6. $\frac{3}{10} \bigcirc \frac{4}{9}$

7. $1\frac{7}{8} \bigcirc 2\frac{4}{5}$

8. $3\frac{7}{9} \bigcirc 3\frac{6}{7}$

9. $5\frac{10}{19} \bigcirc 5\frac{15}{24}$

10. 14% \bigcirc 12.5%

11. 5% \bigcirc 8%

12. 0.04% \bigcirc 0.25%

13. 250% \bigcirc 126%

14. 16.6% \bigcirc 10%

15. 75.8% \bigcirc 75.9%



Comparing and Ordering Rational Numbers *(continued)*

Write each set of fractions in order from least to greatest.

16. $\frac{3}{5}, \frac{7}{9}, \frac{4}{5}, \frac{1}{2}$

17. $\frac{3}{8}, \frac{2}{7}, \frac{8}{11}, \frac{5}{16}$

18. $\frac{9}{14}, \frac{6}{7}, \frac{3}{4}, \frac{12}{19}$

19. $\frac{11}{23}, \frac{19}{27}, \frac{7}{10}, \frac{15}{17}$

The Pittsburgh Pirates have won 14 out of 21 games, and the New York Mets have won 15 out of 23 games. Use this information to answer Exercises 20–23.

20. Which team has the better record?

21. Suppose the Pirates win 2 of their next three games and the Mets win all of their next 3 games. Which team has the better record?

22. Suppose the Pirates went on to win 21 games after playing 30 games. Is their record better now than it was before? Explain.

23. Suppose the Mets went on to win 16 games after playing 30 games. Is their record better now than it was before? Explain.

24. Larry has $\frac{5}{6}$ yard of material. Does he have enough to make a vest that requires $\frac{3}{4}$ yard of material? Explain.

Length in the Customary System

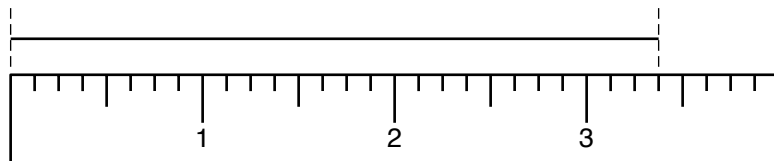
Length
1 foot (ft) = 12 inches (in.)
1 yard (yd) = 3 feet or 36 inches
1 mile (mi) = 5280 feet or 1760 yards

Example 1 Draw a line segment measuring $3\frac{3}{8}$ inches.

Use a ruler divided in eighths.

Find $3\frac{3}{8}$ on the ruler.

Draw the line segment from 0 to $3\frac{3}{8}$.



To change from a smaller unit to a larger unit, divide.

To change from a larger unit to a smaller unit, multiply.

Examples 2 3 ft = _____ in. 1 ft = 12 in., so multiply by 12.

$$3 \times 12 = 36$$

$$3 \text{ ft} = 36 \text{ in.}$$

3 9 ft = _____ yd 1 yd = 3 ft, so divide by 3.

$$9 \div 3 = 3$$

$$9 \text{ ft} = 3 \text{ yd}$$

Draw a line segment of each length.

1. $1\frac{1}{2}$ inches

2. $1\frac{1}{8}$ inches

3. $1\frac{1}{4}$ inches

4. $\frac{3}{4}$ inch

5. $1\frac{3}{8}$ inches

6. $1\frac{5}{8}$ inches

7. $3\frac{1}{2}$ inches

8. $\frac{3}{8}$ inch

9. $1\frac{3}{4}$ inches

10. $2\frac{1}{4}$ inches

11. $2\frac{5}{8}$ inches

12. $3\frac{1}{8}$ inches



Name _____ Date _____ Period _____

Length in the Customary System *(continued)*

Complete.

13. 5 ft = _____ in.

14. 2 mi = _____ ft

15. 12 yd = _____ ft

16. 24 in. = _____ yd

17. 48 in. = _____ ft

18. 3520 yd = _____ mi

19. 72 in. = _____ yd

20. 30 in. = _____ ft

21. 4 mi = _____ ft

22. 90 in. = _____ yd

23. 60 in. = _____ yd

24. 6 mi = _____ yd

25. 6.5 ft = _____ in.

26. 15 ft = _____ yd

27. 9 yd = _____ in.

28. 12 ft = _____ in.

29. 7920 ft = _____ mi

30. 16 ft = _____ in.

Capacity in the Customary System

Capacity
1 cup (c) = 8 fluid ounces (fl oz)
1 pint (pt) = 2 cups
1 quart (qt) = 2 pints
1 gallon (gal) = 4 quarts

To change from one customary unit of capacity to another, you either multiply or divide.

When changing from a smaller unit to a larger unit, divide.

When changing from a larger unit to a smaller unit, multiply.

Examples **1** **12 qt = _____ pt**

You are changing from a larger unit (qt) to a smaller unit (pt), so multiply.

$$12 \times 2 = 24$$

Since 1 qt = 2 pt, multiply by 2.

$$12 \text{ qt} = 24 \text{ pt}$$

2 **8 pt = _____ gal**

You are changing from a smaller unit (pt) to a larger unit (gal), so divide.

$$8 \div 2 = 4$$

Divide by 2 to change pints to quarts.

$$4 \div 4 = 1$$

Divide by 4 to change quarts to gallons.

$$8 \text{ pt} = 1 \text{ gal}$$

Complete.

1. 8 c = _____ fl oz

2. 8 qt = _____ gal

3. 16 pt = _____ qt

4. 5 c = _____ pt

5. 16 qt = _____ pt

6. 18 c = _____ qt

7. 8 gal = _____ qt

8. 16 gal = _____ qt



Name _____ Date _____ Period _____

Capacity in the Customary System *(continued)*

Complete.

- | | |
|---|---|
| 9. 16 fl oz = _____ c | 10. 16 pt = _____ c |
| 11. 3 qt = _____ pt | 12. 5 gal = _____ qt |
| 13. 15 pt = _____ qt | 14. 12pt = _____ c |
| 15. 16 c = _____ fl oz | 16. 10 pt = _____ qt |
| 17. 3 qt = _____ c | 18. 12 c = _____ fl oz |
| 19. 64 pt = _____ gal | 20. 4 gal = _____ c |
| 21. 1 qt = _____ fl oz | 22. 5 c = _____ fl oz |
| 23. 17 c = _____ pt | 24. 6 qt = _____ gal |
| 25. 2.5 gal = _____ qt | 26. $3\frac{1}{2}$ gal = _____ qt |
| 27. 16 qt = _____ gal | 28. 80 fl oz = _____ pt |
| 29. 16 qt = _____ c | 30. 8 c = _____ qt |
| 31. A recipe calls for 3 cups of milk.
How many fluid ounces of milk are
need for the recipe? | 32. Jenna bought 64 fl oz of juice.
How many quarts of juice did
she buy? |

Weight in the Customary System

Weight
1 pound (lb) = 16 ounces (oz)
1 ton (T) = 2000 pounds

To change from one customary unit of weight to another, you either multiply or divide.

When changing from a smaller unit to a larger unit, divide.

When changing from a larger unit to a smaller unit, multiply.

Examples 1 $10\frac{1}{2}$ lb = _____ oz

You are changing from a larger unit (lb) to a smaller unit (oz), so multiply.

$$10\frac{1}{2} \times 16 = \frac{21}{2} \times \frac{16^8}{1} = \frac{168}{1} \text{ or } 168$$

Since 1 pound = 16 ounces, multiply by 16.

$$10\frac{1}{2} \text{ lb} = 168 \text{ oz}$$

2 32 oz = _____ lb

You are changing from a smaller unit (oz) to a larger unit (lb), so divide.

$$32 \div 16 = 2$$

Divide by 16 to change ounces to pounds.

$$32 \text{ oz} = 2 \text{ lb}$$

Complete.

1. 2 T = _____ lb

2. 8500 lb = _____ T

3. 24 oz = _____ lb

4. 4 lb = _____ oz

5. $3\frac{1}{2}$ lb = _____ oz

6. 2500 lb = _____ T

7. 10 lb = _____ oz

8. 1 T = _____ oz



Name _____ Date _____ Period _____

Weight in the Customary System *(continued)*

Complete.

- | | |
|---|--|
| 9. 256 oz = _____ lb | 10. 16 lb = _____ oz |
| 11. 3 T = _____ lb | 12. 7 T = _____ lb |
| 13. 12,000 lb = _____ T | 14. 12 oz = _____ lb |
| 15. 16 T = _____ lb | 16. 10 T = _____ oz |
| 17. 3 lb = _____ oz | 18. 12 oz = _____ lb |
| 19. 64 oz = _____ lb | 20. 4 oz = _____ lb |
| 21. 2.5 T = _____ lb | 22. 5 lb = _____ oz |
| 23. 17 oz = _____ lb | 24. 6 oz = _____ lb |
| 25. $\frac{1}{5}$ T = _____ lb | 26. $3\frac{1}{2}$ T = _____ oz |
| 27. 6.5 T = _____ lb | 28. 500 lb = _____ T |
| 29. 20 lb = _____ oz | 30. 2.25 T = _____ lb |
| 31. A recipe calls for 3 ounces of butter.
How many pounds of butter are
needed for the recipe? | 32. Jenna bought 64 ounces of bananas.
How many pounds of bananas did
she buy? |

Length in the Metric System

Length
1 centimeter (cm) = 10 millimeters (mm)
1 meter (m) = 100 centimeters
1 meter = 1000 millimeters
1 kilometer (km) = 1000 meters

To change from one metric unit of length to another, you either multiply or divide.

When changing from a smaller unit to a larger unit, divide.

When changing from a larger unit to a smaller unit, multiply.

Examples 1 3 m = _____ mm

You are changing from a larger unit (m) to a smaller unit (mm), so multiply.

$$3 \times 1000 = 3000$$

Since 1 m = 1000 mm, multiply by 1000. Move the decimal point 3 places to the right.

$$3 \text{ m} = 3000 \text{ mm}$$

2 5000 m = _____ km

You are changing from a smaller unit (m) to a larger unit (km), so divide.

$$5000 \div 1000 = 5.000$$

Since 1000 meters = 1 kilometer, divide by 1000. Move the decimal point 3 places to the left.

$$5000 \text{ m} = 5 \text{ km}$$

Complete.

1. 300 mm = _____ cm

2. 2000 m = _____ km

3. 60 cm = _____ m

4. 1500 m = _____ km

5. 6 km = _____ m

6. 8 km = _____ cm

7. 80 mm = _____ cm

8. 160 cm = _____ m



Name _____ Date _____ Period _____

Length In the Metric System *(continued)*

Complete.

9. 2000 mm = _____ cm

10. 2 m = _____ cm

11. 300 mm = _____ cm

12. 7 cm = _____ mm

13. 160 cm = _____ mm

14. 20 km = _____ m

15. 3000 cm = _____ m

16. 24,000 mm = _____ m

17. 2000 km = _____ m

18. 42 cm = _____ mm

19. 4100 cm = _____ m

20. 8700 cm = _____ m

21. 42,000 m = _____ km

22. 4 km = _____ m

23. 8 m = _____ cm

24. 50 cm = _____ mm

25. 16.3 mm = _____ cm

26. 4.1 km = _____ m

27. 15.5 cm = _____ mm

28. 160 km = _____ m

29. A napkin is 37 centimeters long.
How many millimeters is this?

30. A race is 80,000 meters long. How
long is the race in kilometers?

Capacity in the Metric System

Capacity
1 liter (L) = 1000 milliliters (mL)
1 kiloliter (kL) = 1000 liters

To change from one metric unit of capacity to another, you either multiply or divide.

When changing from a smaller unit to a larger unit, divide.

When changing from a larger unit to a smaller unit, multiply.

Examples 1 1325 mL = _____ L

You are changing from a smaller unit (mL) to a larger unit (L), so divide.

$$1325 \div 1000 = 1.\overline{325}$$

*Since 1 mL = 1000 L, divide by 1000.
Move the decimal point 3 places to the left.*

$$1325 \text{ mL} = 1.325 \text{ L}$$

2 2 kL = _____ L

You are changing from a larger unit (kL) to a smaller unit (L), so multiply.

$$2 \times 1000 = 2000$$

*Since 1 kL = 1000 L, multiply by 1000.
Move the decimal point 3 places to the right.*

$$2 \text{ kL} = 2000 \text{ L}$$

Complete.

1. 76 mL = _____ L

2. 1800 L = _____ kL

3. 140 L = _____ mL

4. 7500 L = _____ mL

5. 8.2 kL = _____ L

6. 140 L = _____ kL

7. 6000 mL = _____ L

8. 400 kL = _____ L

Capacity in the Metric System *(continued)*

Complete.

9. 5 kL = _____ L
10. 2000 L = _____ kL
11. 4 L = _____ mL
12. 1400 L = _____ kL
13. 3250 mL = _____ L
14. 3.4 kL = _____ L
15. 750 L = _____ kL
16. 940 mL = _____ L
17. 12 L = _____ mL
18. 3400 mL = _____ L
19. 86 kL = _____ L
20. 8 L = _____ mL
21. 36 kL = _____ L
22. 850 L = _____ kL
23. 2.4 L = _____ mL
24. 3.8 kL = _____ L
25. 5.35 L = _____ mL
26. 10.6 kL = _____ L
27. 180 L = _____ kL
28. 1400 mL = _____ L
29. Karen uses 2 L of liquid in her punch recipe. How many mL does she use?
30. José brought home a soft drink bottle that contained 2000 milliliters of liquid. What is the capacity in liters?

Mass in the Metric System

Mass
1 gram (g) = 1000 milligrams (mg)
1 kilogerams (kg) = 1000 grams

To change from one metric unit of mass to another, you either multiply or divide.

When changing from a smaller unit to a larger unit, divide.

When changing from a larger unit to a smaller unit, multiply.

Examples 1 1325 mg = _____ g

You are changing from a smaller unit (mg) to a larger unit (g), so divide.

$$1325 \div 1000 = 1.\overline{325}$$

Since 1 mg = 1000 g, divide by 1000. Move the decimal point 3 places to the left.

$$1325 \text{ mg} = 1.325 \text{ g}$$

2 76 kg = _____ g

You are changing from a larger unit (kg) to a smaller unit (g), so multiply.

$$76 \times 1000 = 76,000$$

Since 1 kg = 1000 g, multiply by 1000. Move the decimal point 3 places to the right.

$$76 \text{ kg} = 76,000 \text{ g}$$

Complete.

1. 180 mg = _____ g

2. 1600 g = _____ kg

3. 1500 kg = _____ g

4. 700 mg = _____ g

5. 8000 g = _____ mg

6. 450 kg = _____ g

7. 820 g = _____ kg

8. 4630 mg = _____ g



Name _____ Date _____ Period _____

Mass in the Metric System *(continued)*

Complete.

- | | |
|--|---|
| 9. 5 kg = _____ g | 10. 2000 g = _____ kg |
| 11. 4 g = _____ mg | 12. 1400 g = _____ kg |
| 13. 3250 mg = _____ g | 14. 3.4 kg = _____ g |
| 15. 750 g = _____ kg | 16. 940 mg = _____ g |
| 17. 12 g = _____ mg | 18. 3400 mg = _____ g |
| 19. 86 kg = _____ g | 20. 8 g = _____ mg |
| 21. 36 kg = _____ g | 22. 850 g = _____ kg |
| 23. 2.4 g = _____ mg | 24. 3.8 kg = _____ g |
| 25. 5.35 g = _____ mg | 26. 10.6 kg = _____ g |
| 27. 86 mg = _____ g | 28. 140 kg = _____ g |
| 29. Mr. Chang's truck can carry a payload of 11 kilograms. What is the payload in grams? | 30. Jana weighed her dog at 20 kg. What is the weight of her dog in mg? |

Converting Customary Units to Metric Units

You can use the following chart to convert customary units to metric units.

Customary Unit / Metric Unit
1 in. = 2.54 cm
1 ft = 30.48 cm or 0.3048 m
1 yd \approx 0.914 m
1 mi \approx 1.609 km
1 oz = 28.350 g
1 lb \approx 454 g or 0.454 kg
1 fl oz = 29.574 mL
1 qt = 0.946 L
1 gal = 3.785 L

Examples 1 5 ft = _____ cm

$$5 \times 30.48 = 152.4$$

1 ft = 30.48 cm, so multiply by 30.48.

$$5 \text{ ft} = 152.4 \text{ cm}$$

2 $2\frac{1}{2}$ gal = _____ L

$$2\frac{1}{2} \times 3.785 = 2.5 \times 3.785 = 9.4625 \quad 1 \text{ gal} = 3.785 \text{ L, so multiply by 3.785.}$$

$$2\frac{1}{2} \text{ gal} = 9.4625 \text{ L}$$

3 3.5 lb = _____ kg

$$3.5 \times 0.454 = 1.589$$

1 lb \approx 0.454 kg, so multiply by 0.454.

$$3.5 \text{ lb} = 1.589 \text{ kg}$$

Complete.

1. 4 in. = _____ cm

2. 7 oz = _____ g

3. 2 qt = _____ L

4. 6 mi = _____ km

5. 3 gal = _____ L

6. 16 oz = _____ g



Name _____ Date _____ Period _____

Converting Customary Units to Metric Units *(continued)*

Complete.

7. 12 fl oz = _____ mL 8. 5 lb = _____ g 9. 3 yd = _____ m

10. 1.5 in. = _____ cm 11. 4 ft = _____ m 12. 5 qt = _____ L

13. 12 oz = _____ g 14. 10 lb = _____ kg 15. 6 in. = _____ cm

16. 5.5 ft = _____ m 17. 2.5 gal = _____ L 18. $2\frac{1}{4}$ mi = _____ km

19. 6.25 yd = _____ m 20. 18 lb = _____ kg 21. 15 fl oz = _____ L

22. $3\frac{1}{8}$ mi = _____ km 23. $1\frac{3}{4}$ ft = _____ cm 24. 2.5 qt = _____ L

25. 10 fl oz = _____ mL 26. 15 qt = _____ L 27. 220 mi = _____ km

28. 20 yd = _____ m 29. 20.35 lb = _____ kg 30. 20 qt = _____ L

31. 350.5 mi = _____ km 32. 25 fl oz = _____ mL 33. 4.5 lb = _____ kg

Converting Metric Units to Customary Units

You can use the following chart to convert customary units to metric units.

Customary Unit / Metric Unit
1 cm = 0.394 in.
1 m = 3.281 ft or 1.093 yd
1 km \approx 0.621 mi
1 g \approx 0.035 oz
1 kg = 2.205 lb
1 mL \approx 0.034 fl oz
1 L = 1.057 qt or 0.264 gal

Examples 1 3 cm = _____ in.

$$3 \times 0.394 = 1.182 \quad 1 \text{ cm} \approx 0.394 \text{ in.}, \text{ so multiply by } 0.394.$$

$$3 \text{ cm} = 1.182 \text{ in.}$$

2 250 g = _____ oz

$$250 \times 0.035 = 8.75 \quad 1 \text{ g} \approx 0.035 \text{ oz}, \text{ so multiply by } 0.035.$$

$$250 \text{ g} = 8.75 \text{ oz}$$

3 1.5 L = _____ qt

$$1.5 \times 1.057 = 1.5855 \quad 1 \text{ L} \approx 1.057 \text{ qt}, \text{ so multiply by } 1.057.$$

$$1.5 \text{ L} = 1.5855 \text{ qt}$$

Complete.

1. 5 cm = _____ in.

2. 787 g = _____ oz

3. 4 L = _____ qt

4. 8 km = _____ mi

5. 2 L = _____ gal

6. 300 g = _____ oz

7. 155 mL = _____ fl oz

8. 9 km = _____ mi

9. 4 m = _____ yd



Name _____ Date _____ Period _____

Converting Metric Units to Customary Units *(continued)*

Complete.

10. 3.5 km = _____ mi 11. 10 mL = _____ fl oz 12. 4.5 L = _____ gal

13. 7.5 m = _____ ft 14. 2.3 m = _____ yd 15. 3.5 L = _____ qt

16. 260 mL = _____ fl oz 17. 14 kg = _____ lb 18. 3.25 m = _____ ft

19. 24.5 km = _____ mi 20. 22 L = _____ gal 21. 45 g = _____ oz

22. 1.25 m = _____ ft 23. 12 kg = _____ lb 24. 14 L = _____ gal

25. 4.65 km = _____ mi 26. 4.8 cm = _____ in. 27. 8.5 L = _____ qt

28. 40 mL = _____ fl oz 29. 10.9 L = _____ gal 30. 280 km = _____ mi

31. 8 m = _____ yd 32. 15.35 kg = _____ lb 33. 10.5 L = _____ qt

34. 6 cm = _____ in. 35. 15.5 m = _____ yd 36. 14 g = _____ oz

37. 3.25 L = _____ qt 38. 50 kg = _____ lb 39. 2.8 m = _____ ft



Adding and Converting Units of Time

Time
1 hour (hr) = 60 minutes (min)
1 minute (min) = 60 seconds

To add measures of time, add the seconds, add the minutes, and add the hours. Rename if necessary.

Example Add 4 hours 25 minutes 40 seconds and 5 hours 30 minutes 25 seconds.

$$\begin{array}{r} 4 \text{ h } 25 \text{ min } 40 \text{ s} \\ + 5 \text{ h } 30 \text{ min } 25 \text{ s} \\ \hline 9 \text{ h } 55 \text{ min } 65 \text{ s} = 9 \text{ h } 56 \text{ min } 5 \text{ s} \end{array} \quad \text{Rename } 65 \text{ s as } 1 \text{ min } 5 \text{ s}.$$

Rename each of the following.

- 14 min 85 s = _____ min 25 s
- 8 h 65 min = 9 h _____ min
- 3 h 19 min 67 s = 3 h _____ min 7 s
- 6 h 68 min 25 s = _____ h _____ min 25 s
- 7 h 105 min 15 s = _____ h _____ min 15 s
- 4 h 99 min 80 s = _____ h _____ min _____ s
- 1 h 76 min 91 s = _____ h _____ min _____ s
- 7 h 88 min 60 s = _____ h _____ min _____ s



Adding and Converting Units of Time *(continued)*

Add. Rename if necessary.

9.
$$\begin{array}{r} 35 \text{ min } 45 \text{ s} \\ + 12 \text{ min } 12 \text{ s} \\ \hline \end{array}$$

10.
$$\begin{array}{r} 6 \text{ h } 50 \text{ min} \\ + 3 \text{ h } 17 \text{ min} \\ \hline \end{array}$$

11.
$$\begin{array}{r} 9 \text{ h } 45 \text{ min } 10 \text{ s} \\ + 3 \text{ h } 30 \text{ min } 50 \text{ s} \\ \hline \end{array}$$

12.
$$\begin{array}{r} 1 \text{ h } 55 \text{ min } 12 \text{ s} \\ + 3 \text{ h } 25 \text{ min } 34 \text{ s} \\ \hline \end{array}$$

13.
$$\begin{array}{r} 11 \text{ h } 33 \text{ min } 6 \text{ s} \\ + 5 \text{ h } 36 \text{ min } 29 \text{ s} \\ \hline \end{array}$$

14.
$$\begin{array}{r} 6 \text{ h } 10 \text{ min } 47 \text{ s} \\ + 2 \text{ h } 51 \text{ min } 28 \text{ s} \\ \hline \end{array}$$

15.
$$\begin{array}{r} 7 \text{ h } 30 \text{ min } 52 \text{ s} \\ + 3 \text{ h } 45 \text{ min } 40 \text{ s} \\ \hline \end{array}$$

16.
$$\begin{array}{r} 9 \text{ h } 10 \text{ min } 45 \text{ s} \\ + 3 \text{ h } 55 \text{ min } 30 \text{ s} \\ \hline \end{array}$$

**An atlas gives average travel times.
Use this information to answer
Exercises 17-19.**

Average Travel Times	
Baton Rouge to Mobile	4 h 40 min
Mobile to Tallahassee	5 h 50 min
Tallahassee to Jacksonville	3 h 35 min

17. What is the average travel time from Baton Rouge to Tallahassee going through Mobile?

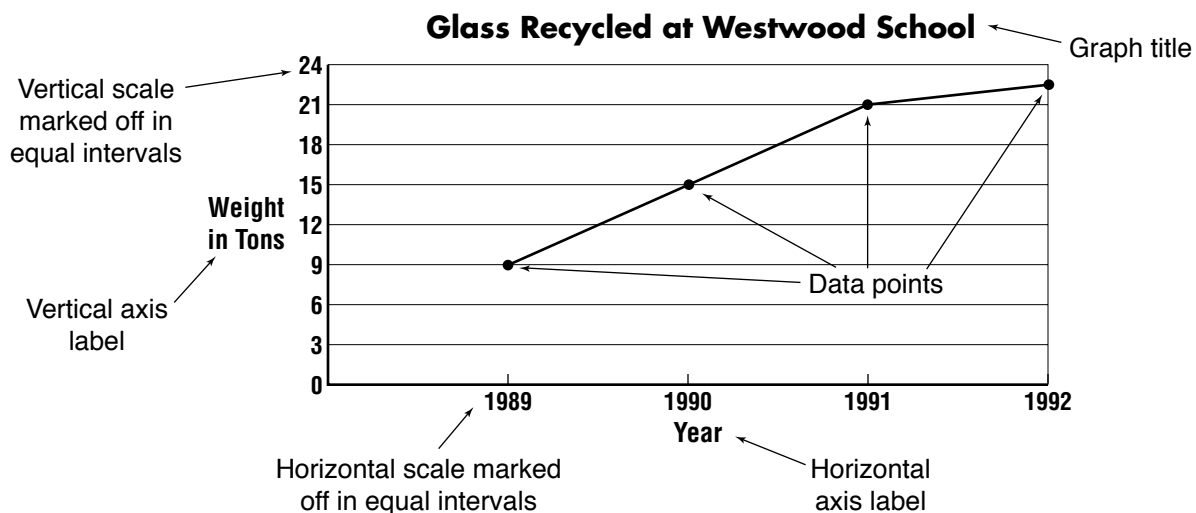
18. What is the average travel time from Mobile to Jacksonville going through Tallahassee?

19. What is the average travel time from Baton Rouge to Jacksonville going through Mobile and Tallahassee?

20. Wesley Paul set an age group record in the 1977 New York Marathon. He ran the race in 3 hours 31 seconds. He was 8 years old at the time. If he ran 2 hours 58 minutes 48 seconds in practice the day before the race, for how long did Wesley run on both days?

Line Graphs

The diagram shows the parts of a graph.



Solve.

1. Make a line graph for this set of data.

Number of Votes Expected	
Date	Number of Votes
3/15	18
3/30	11
4/15	15
4/30	9

2. Make a line graph for this set of data.

Evans Family Electric Bill	
Month	Amount
March	\$129.90
April	\$112.20
May	\$105.00
June	\$88.50

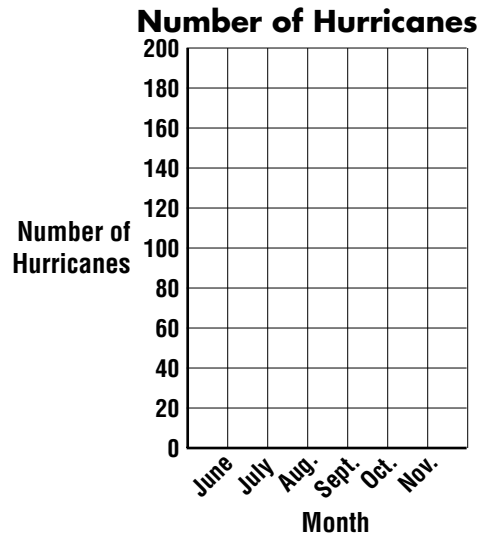


Line Graphs *(continued)*

Refer to the following table for Exercises 1-2.

Recorded Number of Hurricanes by Month

Month	No. of Hurricanes
June	23
July	36
Aug.	149
Sept.	188
Oct.	95
Nov.	21

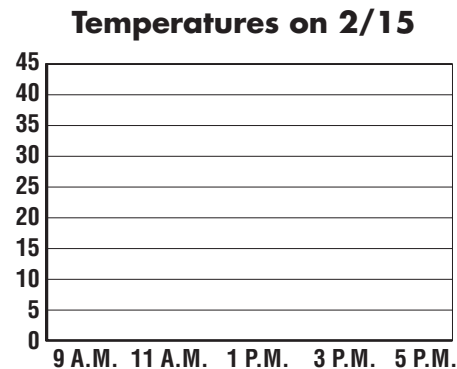


- Complete the line graph for the data in the table.
- After which month does the number of hurricanes start to decrease?

Use the data in the table to complete the line graph.

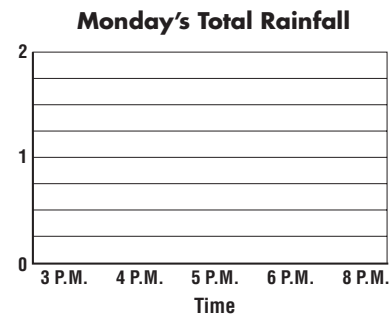
5. **Temperatures on 2/15**

Time	Temperature
9:00 A.M.	32° F
11:00 A.M.	35° F
1:00 P.M.	38° F
3:00 P.M.	42° F
5:00 P.M.	39° F



Solve. Use the line graph.

- During which hour did the most rainfall occur?
- How many inches of rain fell between 4 P.M. and 6 P.M.?
- How many inches of rain fell between 3 P.M. and 8 P.M.?

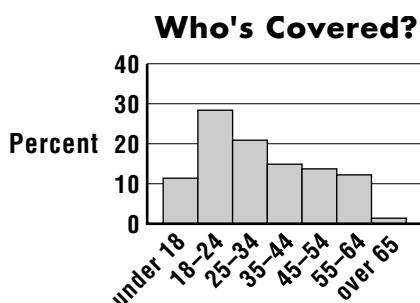


Histograms

A **histogram** uses bars to display numerical data that have been organized into equal intervals.

Example

The table shows the percent of people in several age groups who are not covered by health insurance. Make a histogram of the data.

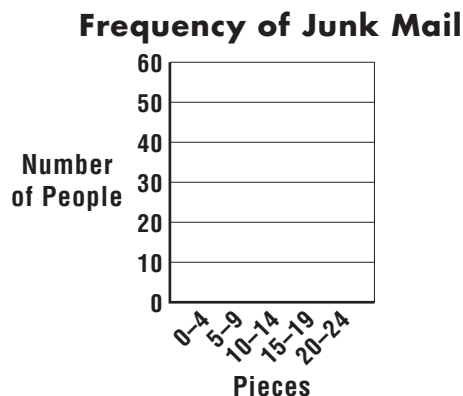


Age	Percent
under 18	12.4%
18-24	28.9%
25-34	20.9%
35-44	15.5%
45-54	14.0%
55-64	12.9%
over 65	1.2%

Make a histogram of the data below.

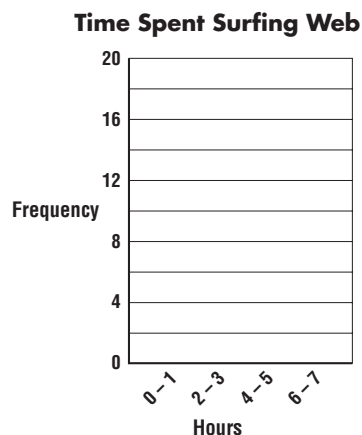
1.

Pieces of Junk Mail	Frequency
0-4	25
5-9	35
10-14	50
15-19	40
20-24	15



2.

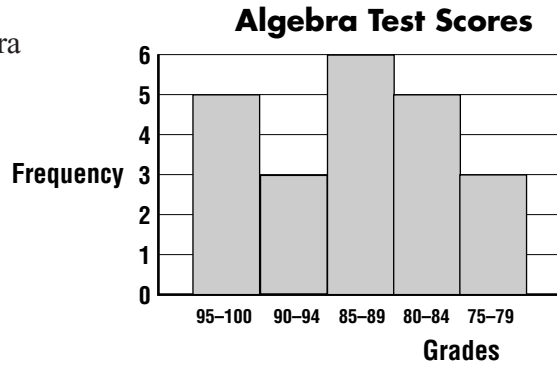
Time Spent Surfing the Web (in hours per day)	Frequency
0-1	20
2-3	18
4-5	2
6-7	1



Histograms *(continued)*

Use the histogram at the right to answer each question.

3. How many students took the algebra test?
4. Which grade has the most test scores?
5. Which grades have the same number of test scores?
6. How many more students earned 85–89 than earned 80–84?
7. Make a frequency table of the algebra scores.



A survey was taken that asked people their height in inches. The data are shown below.

68	69	72	64	74	56	62	58
69	65	70	59	71	67	66	64
73	78	70	52	61	68	67	66

8. Make a frequency table and histogram of the data. Use the intervals 51–55, 56–60, 61–65, 66–70, 71–75, and 76–80.
9. How many heights are in the 66–70 interval?
10. How many people in the survey are taller than 5 feet?
11. How many people in the survey are shorter than 5 feet?
12. What interval has the greatest number of heights?
13. How many people were surveyed?

Probability

The **probability** of an event is the ratio of the number of ways an event can occur to the number of possible outcomes.

$$\text{probability of an event} = \frac{\text{number of ways the event can occur}}{\text{number of possible outcomes}}$$

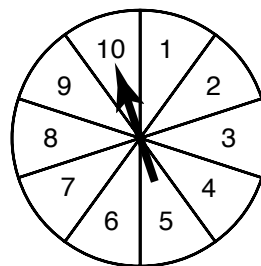
Example

On the spinner below, there are ten equally likely outcomes.
Find the probability of spinning a number less than 5.

Numbers less than 5 are 1, 2, 3, and 4.
There are 10 possible outcomes.

$$\text{Probability of number less than 5} = \frac{4}{10} \text{ or } \frac{2}{5}.$$

The probability of spinning a number less than 5 is $\frac{2}{5}$.



A box of crayons contains 3 shades of red, 5 shades of blue, and 2 shades of green. If a child chooses a crayon at random, find the probability of choosing each of the following.

1. a green crayon

2. a red crayon

3. a blue crayon

4. a crayon that is *not* red

5. a red or blue crayon

6. a red or green crayon



Probability *(continued)*

A card is chosen at random from a deck of 52 cards. Find the probability of choosing each of the following.

- 7. a red card
- 8. the jack of diamonds
- 9. an ace
- 10. a black 10
- 11. a heart
- 12. *not* a club

A cooler contains 2 cans of grape juice, 3 cans of grapefruit juice, and 7 cans of orange juice. If a person chooses a can of juice at random, find the probability of choosing each of the following.

- 13. grapefruit juice
- 14. orange juice
- 15. grape juice
- 16. orange or grape juice
- 17. *not* orange juice
- 18. *not* grape juice

Businesses use statistical surveys to predict customers' future buying habits.

A department store surveyed 200 customers on a Saturday in December to find out how much each customer spent on their visit to the store. Use the results at the right to answer Exercises 19–21.

Amount Spent	Number of Customers
Less than \$2	14
\$2–\$4.99	36
\$5–\$9.99	42
\$10–\$19.99	32
\$20–\$49.99	32
\$50–\$99.99	22
\$100 or more	22

- 19. What is the probability that a customer will spend less than \$2.00?
- 20. What is the probability that a customer will spend less than \$10.00?
- 21. What is the probability that a customer will spend between \$20.00 and \$100.00?



6. How many more students earned 85–89 than earned 80–84?
7. Make a frequency table of the algebra scores.
6. How many more students earned 85–89 than earned 80–84?
7. Make a frequency table of the algebra scores.

34. $\frac{3}{4}, \frac{2}{5}, \frac{5}{8}, \frac{1}{2}$

36. $\frac{1}{3}, \frac{2}{7}, \frac{3}{14}, \frac{1}{6}$

38. $\frac{11}{12}, \frac{5}{6}, \frac{3}{4}, \frac{9}{16}$

40. $\frac{7}{8}, \frac{4}{5}, \frac{3}{4}, \frac{9}{10}$

42. $\frac{1}{2}, \frac{3}{5}, \frac{2}{7}, \frac{5}{9}$

35. $\frac{2}{3}, \frac{4}{9}, \frac{5}{6}, \frac{7}{12}$

37. $\frac{7}{15}, \frac{3}{5}, \frac{5}{12}, \frac{1}{2}$

39. $\frac{4}{5}, \frac{2}{3}, \frac{11}{35}, \frac{7}{9}$

41. $\frac{1}{3}, \frac{2}{5}, \frac{3}{12}, \frac{3}{10}$

43. $\frac{1}{10}, \frac{2}{3}, \frac{1}{12}, \frac{5}{6}$

1. 0.525

2. 0.45

3. 0.333...

4. 0.43

5. 0.8

6. 0.1212...

7. 0.345

8. 0.1862

9. 0.4555...

7. 0.345

8. 0.1862

9. 0.4555...

11. 0.345

11. 0.1862

12. 0.4555...

1. 0.66

2. 0.08

3. 0.75

4. 0.001

5. 1.19

6. 0.72

7. 0.136

8. 4.02

9. 0.18

8. 0.36

11. 0.09

12. 0.2

13. 0.625

14. 0.007

15. 1.4

16. 0.093