Middle School

Summer Math Packet

Includes practice for:

Place Value
Addition
Subtraction
Multiplication
Division
Decimals
Fractions
Rations
Proportions
Statistics/Probability
Geometry
Integers
Summer Money Problems

Place Value

Place value is the value, of a digit in a number.

Consider the number 135,779,268.

billions	hundred millions	ten millions	million	hundred	ten	thousands	hundred	ten	one

What is the place value of the 9? _____

What is the value of the 9? _____ (_____)

Write the place value of the underlined digit.

1. 9,8<u>4</u>6,508 _____
2. 678,<u>9</u>05,786,211 _____
3. <u>7</u>,345,678,902 _____
4. 7,896,<u>0</u>15,812 _____

Write the value of the underlined digit.

5. 87,345,67<u>8</u>,902 _____
6. 8,<u>9</u>05,786,211 _____
7. <u>4</u>,876,508 _____
8. 7,896,015,8<u>1</u>2 _____

The same number can be written in different ways.

standard form: 26,534,978,218
short word form: 26 billion, 534 million, 978 thousand, 218
expanded form: 20,000,000,000 + 6,000,000,000 + 500,000,000 + 30,000,000 + 4,000,000 + 900,000 + 70,000 + 8,000 + 200 + 10 + 8

Write each number in standard form.

9. 4 million, 17 thousand, 11 _____
10. 78,000,000,000 + 400,000,000 + 9,000 _____

Compare and Order Numbers

When comparing numbers, start by looking at the largest place value. Continue comparing until you get to digits that differ. Compare those digits.

EXAMPLE Compare 543,**7**65 and 543,**6**75.

Starting from the left, the first digit that differs is in the hundreds place.
7 hundreds is greater than **6 hundreds.** You can write this as follows:

26,543,765 > 26,543,675
or
26,543,675 < 26,543,765

REMEMBER
< stands for "**is less than**"
> stands for "**is greater than**"

Compare the numbers. Write >, <, or =.

1. 832,876 < 832,976
2. 7,452,311 ___ 7,425,917
3. 7,856 ___ 7,865
4. 24,500,000 ___ 24,005,000
5. 87,604,002 ___ 87,602,004
6. 97,017,987 ___ 97,071, 987
7. 900 billion 700 thousand ___ 900 billion 700 million
8. 60,000,000 + 9,000,000 + 40,000 ___ 60,000,000,000 + 9,000,000 + 40,000

Order each set of numbers from least to greatest.

9. 76,802 74,975 76,820

_____

10. 546,716 564,718 546,671

_____

11. 258,058 285,508 258,085 285,580

_____

Addition

Estimate the sum before adding to see if your actual sum makes sense.
If your actual sum is far off from your estimate, check your addition again.

Round to nearest hundreds.

6,789 → 6,800
+168 → +200
7,000

HINT **To estimate, round each number to the nearest place value.**

Note both numbers should be rounded to the same place value.

6,789
+ 168
6,957

Add. Regroup as needed.

6,957 is close to my estimate of 7,000.
My sum is reasonable.

Estimate each sum. Then add, regrouping as needed.
If your answer is not reasonable, do the addition again.

1. 7,865 + 987 Estimate: _____

2. 6,534 + 8,797 Estimate: _____

3. 3,482 + 6,534 Estimate: _____

4. 25,578 + 66,574 Estimate: _____

5. 96,546 + 6,859 + 73,268 Estimate: _____

6. 7,843 + 85,017 + 76,958 Estimate: _____

Subtraction

Just like you can estimate sums, you can estimate differences of numbers. Estimate the difference before subtracting to see if your actual difference makes sense. If your actual difference is far off from your estimate, check your subtraction again.

Round to nearest ten.

$$\begin{array}{rcr} 734 & \longrightarrow & 730 \\ -\ 59 & \longrightarrow & -\ 60 \\ \hline & & 670 \end{array}$$

HINT **To estimate, round each number to the nearest place value.**

Note both numbers should be rounded to the same place value.

$$\begin{array}{r} 734 \\ -\ 59 \\ \hline 675 \end{array}$$

Subtract, starting from the ones. Regroup as needed.

675 is close to my estimate 670.
My difference is reasonable.

Estimate each difference. Then subtract, regrouping as needed. If your answer is not reasonable, do the subtraction again.

1 $\begin{array}{r} 5{,}463 \\ -\ 987 \end{array}$ Estimate: _____

2 $\begin{array}{r} 7{,}604 \\ -\ 4{,}296 \end{array}$ Estimate: _____

3 $\begin{array}{r} 23{,}482 \\ -\ 6{,}908 \end{array}$ Estimate: _____

4 $\begin{array}{r} 48{,}382 \\ -\ 11{,}873 \end{array}$ Estimate: _____

You can check subtraction by adding the difference to the subtrahend to see if you arrive at the minuend.

5 $\begin{array}{r} 22{,}403 \\ -\ 8{,}675 \end{array}$ Check:

6 $\begin{array}{r} 257{,}602 \\ -\ 169{,}839 \end{array}$ Check:

Multiplication

Consider the product of 589 × 29. Estimate the product.
600 × 30 = 18,000. My product should be close.

```
  584
× 29
5,256
```
Then multiply.
Multiply the ones.

```
  584
× 29
5,256
11,680
```
Multiply the tens.

```
  584
× 29
5,256
+ 11,680
16,936
```
Add the two products.

16,936 is close to my estimate of 18,000.
My product is reasonable.

Estimate each product. Then multiply. If your product is not reasonable, do the multiplication again.

1 674 × 89 Estimate: _____

2 543 × 76 Estimate: _____

3 4,108 × 73 Estimate: _____

4 5,645 × 94 Estimate: _____

5 609 × 28 Estimate: _____

6 4,175 × 39 Estimate: _____

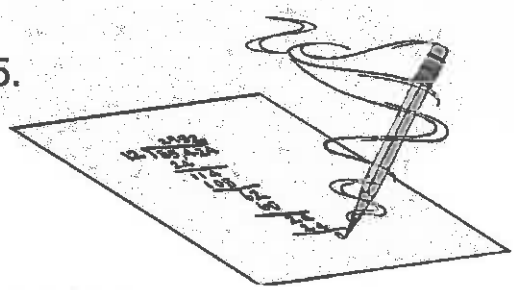
Division

REMEMBER quotient ÷ divisor = dividend

$36\overline{)1{,}658}$ Find the first digit of the quotient and where it goes.

$$\begin{array}{r} 4 \\ 36\overline{)1{,}658} \\ -\ 144 \\ \hline 218 \end{array}$$

$36 \times 4 = 144$. Place 4 above the 5.
Subtract 144 from 165.



$$\begin{array}{r} 46\text{R2} \\ 36\overline{)1{,}658} \\ -\ 144 \\ \hline 218 \\ 216 \\ \hline 2 \end{array}$$

Repeat the steps until division is complete.

To CHECK: Multiply the quotient by the divisor and add the remainder. If you arrive at the dividend, you are correct!

$$\begin{array}{rl} 46 & \text{quotient} \\ \times\ 36 & \text{divisor} \\ \hline 276 & \\ 1{,}380 & \\ \hline 1{,}656 & \text{dividend} \\ +\ 2 & \text{remainder} \\ \hline 1{,}658 & \end{array}$$

Divide. Use the area at the bottom of the page to check with multiplication.

1. $4\overline{)385}$
2. $58\overline{)3{,}612}$
3. $19\overline{)2{,}266}$
4. $23\overline{)4{,}989}$

CHECK:

Add and Subtract Decimals

When adding or subtracting decimals, be sure to **line up** the decimal points.

EXAMPLE

$$\begin{array}{r} 6.7 \\ -\ 2.9 \\ \hline 3.8 \end{array}$$

If you are setting up a problem vertically, you should use zeros as place holders.

EXAMPLE 4.5 + 7.786 can be written as:

$$\begin{array}{r} 4.500 \\ +\ 7.786 \\ \hline 12.286 \end{array}$$

Write the problems vertically, then add or subtract.

1 18.04 − 7.3

$$\begin{array}{r} 18.04 \\ -7.30 \\ \hline 10.74 \end{array}$$

2 246 + 2.46

3 7.6 − 7.06

4 3.21 − 1.9

5 65 − 23.76

6 34.5 + 3.45

7 76 + 5.08

8 5.9 − 2

9 43.3 + 0. 096

Multiply Decimals

You multiply decimals the same way you multiply whole numbers.

Once you get the product, you will need to decide where to place the decimal point.

To do this, count the number of places to the right of the decimal point in each factor and total them. Look at your product, start from the right, and count back that many places. Place your decimal point there.

EXAMPLE

4.5	There is one place after the decimal point.
× 3.4	There is one place after the decimal point.
180	
+ 1350	
15.30	Starting from the right count back two places. Put the decimal point there. The product is 15.3.

Find the products.

1. 3.8 × 0.2

2. 4.76 × 4.9

3. 76.4 × 23

4. 78.4 × 46

5. 1.2 × 0.7

6. 326 × 4.9

7. 5.076 × 8

8. 0.65 × 27

Write the problems vertically before solving.

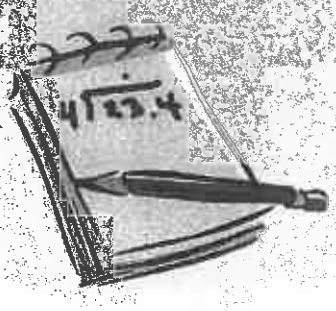
9. 4.5 × 8.7

10. 65 × 9.3

Divide a Decimal by a Whole Number

When dividing a decimal by a whole number bring up the decimal point in the quotient before you begin to divide.

Divide as you would a whole number. However, there are **no remainders.** If you get a remainder, **attach a zero to the dividend,** bring it down and continue to divide.



STEP 1:

$$4\overline{)23.4}$$

STEP 2:

$$\begin{array}{r} 5.8 \\ 4\overline{)23.4} \\ -20 \\ \hline 34 \\ 32 \\ \hline 2 \end{array}$$

STEP 3:

$$\begin{array}{r} 5.85 \\ 4\overline{)23.40} \\ -20 \\ \hline 34 \\ 32 \\ \hline 20 \\ -\ 20 \\ \hline 0 \end{array}$$

Divide.

1. $3\overline{)57.3}$
2. $2\overline{)6.9}$
3. $6\overline{)48.6}$
4. $2\overline{)4.3}$
5. $5\overline{)5.44}$
6. $8\overline{)18.6}$
7. $8\overline{)56.3}$
8. $17\overline{)10.54}$

Fractions in Simplest Form

A fraction is in its simplest form when both the numerator and denominator can only be divided evenly by 1.

EXAMPLES $\frac{3}{6}$ is not in simplest form because both the numerator and the denominator can be divided evenly by 3.

$\frac{4}{5}$ is in simplest form because the only number that the numerator and the denominator can be divided evenly by is 1.

Determine if each fraction is in simplest form. Write "yes" or "no."

1. $\frac{4}{8}$ _____
2. $\frac{3}{12}$ _____
3. $\frac{5}{7}$ _____
4. $\frac{6}{11}$ _____
5. $\frac{5}{20}$ _____
6. $\frac{22}{32}$ _____

To simplify a fraction, find a **common factor** (a number that can be divided by **both** the numerator and the denominator). Divide both the numerator and the denominator by that factor until the only number they can both be divided by is 1.

EXAMPLE

To simplify $\frac{18}{24}$ divide both the numerator and the denominator by **6.**

$$\frac{18}{24} \begin{matrix} \div 6 \\ \div 6 \end{matrix} = \frac{3}{4}$$

7. $\frac{20}{24} = $ _____
8. $\frac{9}{12} = $ _____
9. $\frac{8}{16} = $ _____
10. $\frac{22}{44} = $ _____

11. $\frac{15}{50} = $ _____
12. $\frac{5}{20} = $ _____
13. $\frac{14}{21} = $ _____
14. $\frac{36}{63} = $ _____

Fractions: Adding with Like Denominators

Remember! When the **DENOMINATORS** (number at bottom) are the same, just add the **NUMERATORS** (number at top). Don't change the Denominator!

Name _____

Date _____

Time: _____

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

Fractions: Subtracting with Like Denominators

Remember! When the **DENOMINATORS** (number at bottom) are the same, just add the **NUMERATORS** (number at top). Don't change the Denominator!

Name _____

Date _____

Time: _____

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

Fractions: Adding with Unlike Denominators

Remember! When the **DENOMINATORS** (number at bottom) are different, you must use multiplication to change them into the same denominators by finding common multiples. Then multiply the **NUMERATOR** (number at top) by the same number. Then just add the numerators. Simplify with division if necessary. **Remember!** Whatever you do to the top, do to the bottom.

Name _____

Date _____

Time: _____

Example 1

1. $\frac{3}{5} \times 3 = \frac{9}{15}$

$3 + 3 = 3 + 3$

$15 = 15$

$12 \div 3 = 4$

$15 \div 3 = 5$

Example 2

2. $\frac{1}{4} \times 3 = \frac{3}{12}$

$1 \times 2 = 2$

$6 \times 2 = 12$

$\frac{5}{12}$

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

4. $\frac{2}{9} + \frac{1}{3}$

5. $\frac{3}{10} + \frac{1}{5}$

6. $\frac{2}{5} + \frac{1}{3}$

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

8. $\frac{2}{8} + \frac{1}{4}$

9. $\frac{2}{5} + \frac{2}{4}$

10. $\frac{3}{6} + \frac{1}{4}$

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

12. $\frac{1}{2} + \frac{1}{6}$

13. $\frac{1}{3} + \frac{4}{12}$

14. $\frac{3}{9} + \frac{1}{3}$

15. $\frac{2}{6} + \frac{2}{5}$

16. $\frac{4}{8} + \frac{2}{4}$

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

18. $\frac{2}{7} + \frac{5}{14}$

Fractions: Subtracting with Unlike Denominators

Remember! When the **DENOMINATORS** (number at bottom) are different, you must use multiplication to change them into the same denominators by finding common multiples. Then multiply the **NUMERATOR** (number at top) by the same number. Then just subtract the numerators. Simplify with division if necessary.
Remember! Whatever you do to the top, do to the bottom.

Name _____

Date _____

Time: _____

Example 1 *Example 2*

1. $\frac{3 \times 2 = 6}{5 \times 2 = 10} - \frac{2 = 2}{10 = 10}$ = $\frac{4 \div 2 = 2}{10 \div 2 = 5}$

2. $\frac{3 \times 3 = 9}{4 \times 3 = 12} - \frac{2 \times 4 = 8}{3 \times 4 = 12}$ = $\frac{1}{12}$

3. $\frac{5}{6} - \frac{2}{3}$ =

4. $\frac{2}{6} - \frac{1}{3}$ =

5. $\frac{3}{10} - \frac{1}{5}$ =

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

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

8. $\frac{7}{8} - \frac{3}{4}$ =

9. $\frac{4}{5} - \frac{2}{4}$ =

10. $\frac{3}{6} - \frac{1}{4}$ =

11. $\frac{4}{6} - \frac{1}{3}$ =

12. $\frac{1}{2} - \frac{2}{6}$ =

13. $\frac{2}{3} - \frac{2}{12}$ =

14. $\frac{7}{9} - \frac{1}{3}$ =

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

16. $\frac{5}{8} - \frac{2}{4}$ =

17. $\frac{2}{3} - \frac{1}{9}$ =

18. $\frac{5}{7} - \frac{2}{14}$ =

Multiply Fractions

When multiplying fractions, multiply the numerators and denominators. Then express your product in simplest form.

EXAMPLE $\frac{5}{9} \times \frac{6}{8} = \frac{30 \div 6}{72 \div 6} = \frac{5}{12}$

Another way to multiply is to divide common factors of the numerator and denominator. Multiply the new numerators and denominators and express your answer in simplest form.

$\frac{5}{\cancel{9}_{3}} \times \frac{\cancel{6}^{2}}{8} = \frac{10 \div 2}{24 \div 2} = \frac{5}{12}$

3 is a factor of both 6 and 9. Divide each by 3 to get a new numerator and denominator.

Multiply using either method. Express each product in simplest form.

1. $\frac{8}{9} \times \frac{2}{5} =$
2. $\frac{1}{2} \times \frac{14}{15} =$
3. $\frac{6}{9} \times \frac{2}{3} =$
4. $\frac{4}{6} \times \frac{1}{6} =$
5. $\frac{2}{3} \times \frac{15}{20} =$
6. $\frac{4}{8} \times \frac{16}{20} =$
7. $\frac{3}{8} \times \frac{4}{7} =$
8. $\frac{5}{9} \times \frac{18}{22} =$
9. $\frac{4}{7} \times \frac{1}{4} =$
10. $\frac{2}{9} \times \frac{9}{16} =$
11. $\frac{3}{10} \times \frac{2}{5} =$
12. $\frac{1}{5} \times \frac{7}{9} =$
13. $\frac{3}{4} \times \frac{5}{6} =$
14. $\frac{3}{4} \times \frac{2}{3} =$
15. $\frac{3}{8} \times \frac{8}{11} =$

Divide Fractions

The reciprocal of a number is it's **inverse**. To find the reciprocal of a fraction, switch the numerator and the denominator.

REMEMBER

$\frac{3}{4}$ and $\frac{4}{3}$ are inverses of one another

EXAMPLE The reciprocal of $\frac{3}{4}$ is $\frac{4}{3}$.

Write the inverse of each fraction.

1. $\frac{2}{3}$ ____

2. $\frac{6}{5}$ ____

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

When dividing fractions, multiply the first fraction by the inverse of the second fraction. Then write the quotient in simplest form.

EXAMPLE

$$\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \times \frac{2}{1}$$

To divide, multiply by inverse of $\frac{1}{2}$.

$$= \frac{3}{\cancel{4}_{2}} \times \frac{\cancel{2}^{1}}{1}$$

Divide common factors.

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

Divide. Express each quotient in simplest form.

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

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

6. $\frac{1}{3} \div \frac{3}{4} =$

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

8. $\frac{7}{6} \div \frac{2}{5} =$

9. $\frac{2}{3} \div \frac{6}{7} =$

Name _____ Date _____

12.1 What Is a Ratio? Exercise 112

A ratio compares two quantities. The order of numbers in a ratio is important.

Write the ratio of squares to total shapes.

There are 4 squares and 6 shapes. $\frac{4}{6}$ or 4:6 or 4 to 6

Ratios are written in lowest terms. $\frac{2}{3}$ or 2:3 or 2 to 3

Write each ratio with a ratio sign and as a fraction in lowest terms. Use the picture to find the ratios in Questions 1 and 2.

1. total shapes to circles

2. triangles to total shapes

3. vowels to number of letters in the word MONUMENT

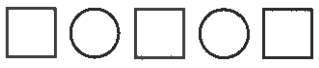
4. total number of letters to vowels in the word ABSENT

5. number of I's to total number of letters in the word MISSISSIPPI

6. total number of letters to number of S's in the word MISSISSIPPI

CRITICAL THINKING

A math teacher lost her quiz about ratios. All she found were the shapes on the right and the ratios below. Which shapes could each ratio compare?



1. 2:3 **2.** 3:2 **3.** $\frac{2}{5}$ **4.** $\frac{5}{3}$

Ratios

A ratio is a comparison between two amounts. Ratios can be written in three different ways.

EXAMPLE Suppose there are 14 girls and 13 boys in a fifth grade class. Write the ratio in three equivalent forms.

Ratio of **girls to boys**:

14 to 13
14:13
$\frac{14}{13}$

Ratio of **girls to students**:

14 to 27
14:27
$\frac{14}{27}$

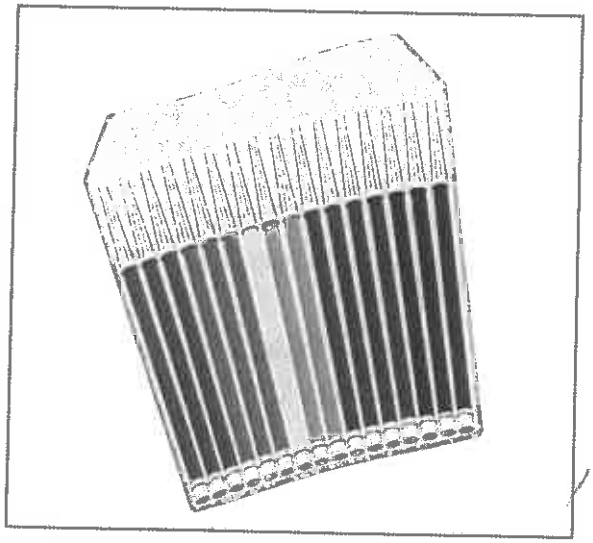
Ratio of **boys to girls**:

13 to 14
13:14
$\frac{13}{14}$

Ratio of **boys to students**:

13 to 27
13:27
$\frac{13}{27}$

Use the information in the picture to complete the ratios.



1. Orange to Yellow _____
2. Black to Blue _____
3. Green to Yellow _____
4. Yellow to Green _____
5. Black to Red _____
6. Orange to all markers _____

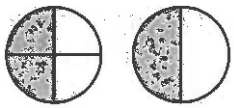
7. Write the ratio of Blue to Green in 3 different ways: _____ _____ _____
8. Write the ratio of Yellow to Red as a fraction in simplest form: _____
9. Write the ratio of Red to Green as a fraction in simplest form: _____
10. Write the ratio of Yellow to Green in 3 different ways: _____ _____ _____

Name _____ Date _____

12.2 What Is a Proportion? Exercise 113

Two ratios form a proportion when the cross products are equal.

Write a ratio of the shaded parts to all parts for each circle. Do the ratios form a proportion?



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

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

$2 \times 2 = 4 \quad 4 \times 1 = 4$

$4 = 4$ ✓ Yes

Decide if each pair of ratios forms a proportion. Write *Yes* or *No*.

1. $\frac{3}{4}$ $\frac{4}{6}$ Yes

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

3. $\frac{2}{3}$ $\frac{8}{12}$ _____

4. $\frac{4}{5}$ $\frac{8}{10}$ _____

5. $\frac{6}{8}$ $\frac{3}{4}$ _____

6. $\frac{2}{5}$ $\frac{3}{6}$ _____

7. $\frac{9}{12}$ $\frac{2}{3}$ _____

8. $\frac{1}{4}$ $\frac{3}{12}$ _____

9. $\frac{7}{10}$ $\frac{3}{4}$ _____

10. $\frac{16}{48}$ $\frac{1}{4}$ _____

11. $\frac{1}{5}$ $\frac{6}{30}$ _____

12. $\frac{9}{11}$ $\frac{8}{10}$ _____

13. $\frac{6}{9}$ $\frac{10}{15}$ _____

14. $\frac{1}{2}$ $\frac{12}{24}$ _____

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

CRITICAL THINKING

Match each ratio in Column A with the ratio in Column B that will make a proportion.

Column A	Column B
1. $\frac{3}{4}$	**a.** $\frac{4}{5}$
2. $\frac{20}{25}$	**b.** $\frac{10}{12}$
3. $\frac{5}{6}$	**c.** $\frac{12}{16}$

Name _____ Date _____

12.3 Solving Proportions — Exercise 114

Use the cross product to find the missing number in a proportion.

Find the missing number in the proportion. $\frac{4}{5} = \frac{12}{?}$

Find a cross product.	$5 \times 12 = 60$
Divide by the other number.	$60 \div 4 = 15$
Check.	$5 \times 12 = 4 \times 15$
	$60 = 60$ ✓

The missing number in the proportion is 15.

Find the missing number in each proportion. Check your work.

1. $\frac{3}{4} = \frac{?}{20}$ **2.** $\frac{?}{5} = \frac{9}{15}$ **3.** $\frac{9}{?} = \frac{11}{11}$

4. $\frac{8}{12} = \frac{?}{3}$ **5.** $\frac{5}{7} = \frac{?}{35}$ **6.** $\frac{1}{6} = \frac{4}{?}$

7. $\frac{?}{40} = \frac{5}{8}$ **8.** $\frac{2}{?} = \frac{4}{6}$ **9.** $\frac{2}{3} = \frac{20}{?}$

10. $\frac{2}{5} = \frac{?}{50}$ **11.** $\frac{75}{100} = \frac{?}{4}$ **12.** $\frac{12}{12} = \frac{17}{?}$

13. $\frac{4}{5} = \frac{?}{100}$ **14.** $\frac{?}{3} = \frac{5}{15}$ **15.** $\frac{3}{?} = \frac{1}{6}$

CRITICAL THINKING

Complete each proportion using two of the numbers from the choices below.

3 4 5 6 9 8

1. $\frac{?}{6} = \frac{6}{?}$ **2.** $\frac{?}{10} = \frac{3}{?}$ **3.** $\frac{1}{?} = \frac{?}{24}$

Name _____ Date _____

13.9 Median and Mode — Exercise 126

The **median** is the middle number when a set of numbers is in order from least to greatest. If there is an even number of numbers, the median is the average of the two middle numbers.

Find the median. 15 18 17 19 10 12

Place the numbers in order. 10 12 15 17 18 19

Find the average of the two middle numbers: $\frac{15+17}{2} = \frac{32}{2} = 16$

The median is 16.

The **mode** is the number that occurs most often.

Find the mode. **5** 8 6 **5** 4 **5**

The mode is 5.

Find the median of each set of numbers.

1. 85, 48, 75, 36, 55

2. 147, 84, 211, 254, 159, 198

3. 25, 56, 84, 54

4. 357, 254, 541, 472, 105

5. 24, 28, 31, 25, 35, 39, 27

6. 2.5, 3.8, 4.8, 2.9, 3.1

Find the mode of each set of numbers.

7. 12, 54, 34, 18, 42, 34

8. 24, 65, 23, 58, 58, 23, 54

9. 508, 457, 685, 305

10. 5.5, 5.8, 5.4, 5.7, 5.8, 5.1

CRITICAL THINKING

Write a set of numbers where the mean, median, and mode are the same number.

Name _____ Date _____

13.11 Probability — Exercise 128

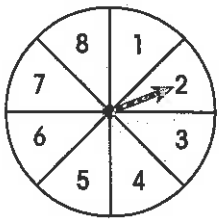
Probability is the chance that something will happen.

$$\text{Probability} = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$$

A bag has 2 blue, 3 red, 1 yellow, and 4 green marbles.
What is the probability of picking a green marble?

Number of favorable outcomes	4 green marbles
Total number of outcomes	10 marbles altogether
Write the probability as a fraction.	$\frac{4}{10} = \frac{2}{5}$

Find the probability of each outcome. Use the spinner pictured below.



1. the probability of picking 1

2. the probability of picking 6

3. the probability of picking a multiple of 4

4. the probability of picking an odd number

5. the probability of picking a prime number

The letters of the word PRECIPITATION are put in a box. Find the probability

6. of picking an R.

7. of picking an A.

8. of picking a P.

9. of picking a T.

10. of picking an I.

11. of picking a vowel.

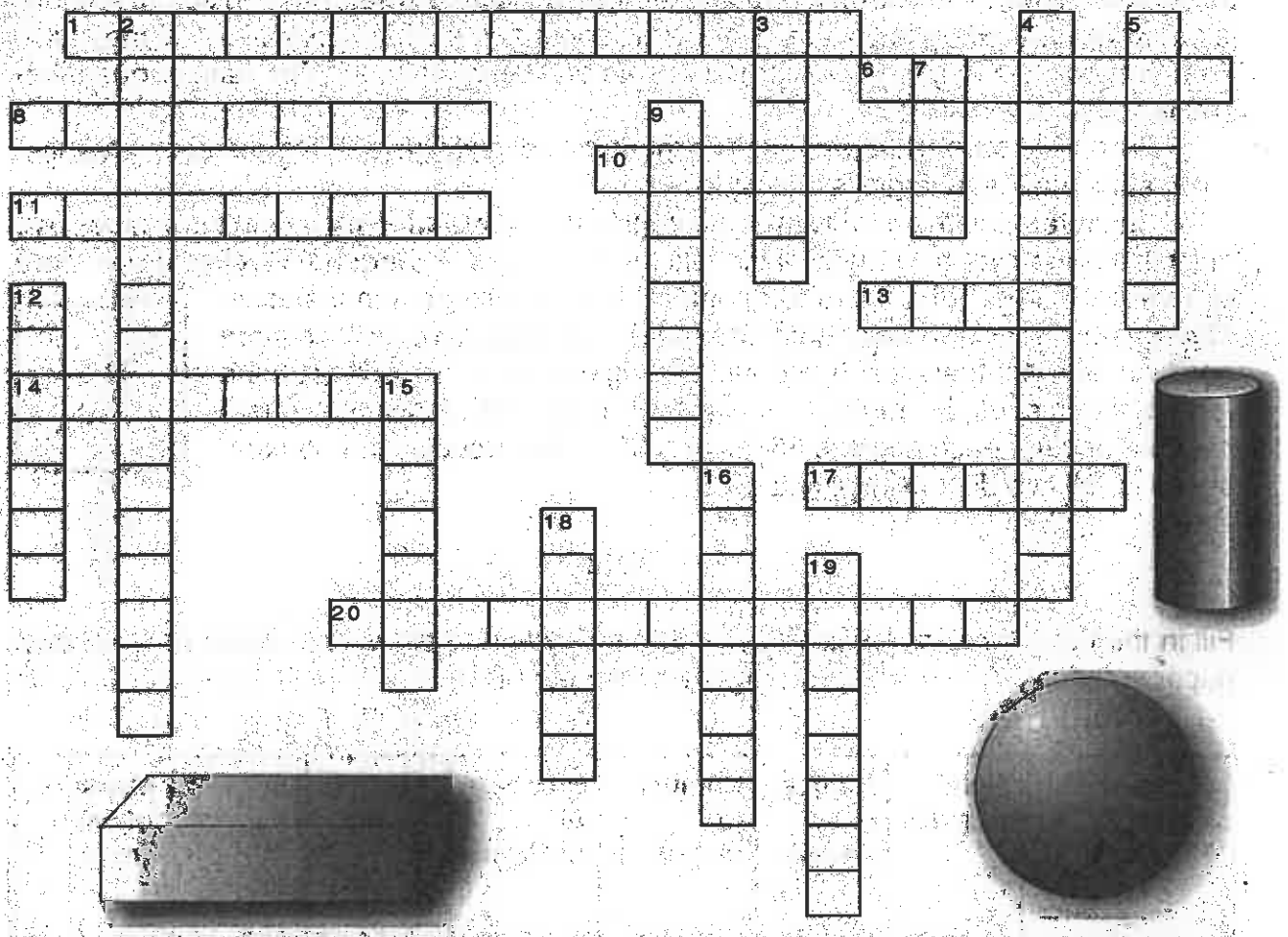
CRITICAL THINKING

You are taking a multiple-choice test. Each item has 4 choices.
What is the probability that you will guess the correct choice?

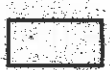
Name _____ Date _____

Geometric Figures Crossword Puzzle

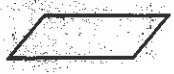
Complete the crossword puzzle using the clues given below. The clues show two- and three-dimensional geometric figures. Fill in their names in the appropriate places. You may need to use a math textbook, dictionary, or other source to find the correct names.



ACROSS

1. 
6. 
8. 
10. 
11. 
13. 
14. 
17. 
20. 

DOWN

2. 
3. 
4. 
5. 
7. 
9. 
12. 
15. 
16. 
18. 
19. 

Geometric Figures Crossword Puzzle Word Bank

CircleCone Cube Cylinder Decagon Hexagon

Octagon Parallelogram Pentagon Pentagon Polygon

Quadrilateral Rectangle Rectangular Prism Rhombus

Septagon Sphere Square Trapezoid

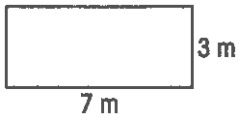
Triangle Triangular Prism

Name _____ Date _____

16.6 Perimeter — Exercise 147

The **perimeter** is the total distance around a figure.

Find the perimeter of this rectangle.

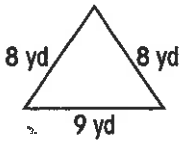


Add the lengths of all the sides.

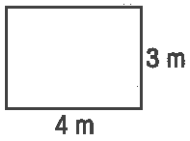
7m + 7m + 3m + 3m = 20 meters

Find the perimeter of each figure.

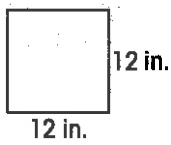
1.



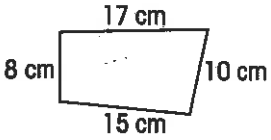
2.



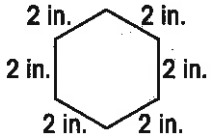
3.



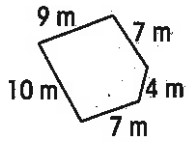
4.



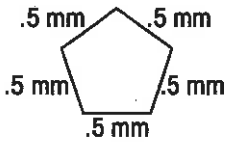
5.



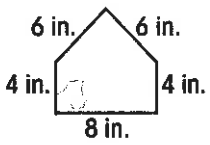
6.



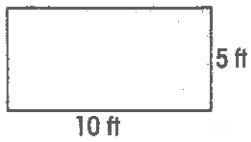
7.



8.



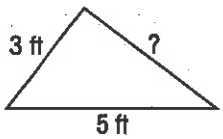
9.



CRITICAL THINKING

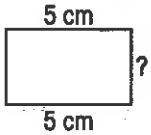
Use the perimeter and picture to find the missing side of each figure.

1.



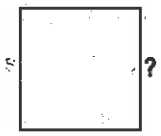
Triangle
perimeter = 12 ft

2.



Rectangle
perimeter = 16 cm

3.



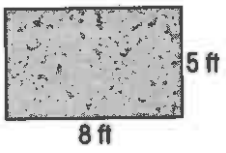
Square
perimeter = 20 in.

Name _____ Date _____

16.7 Area of Squares and Rectangles — Exercise 148

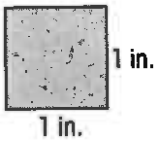
To find the area of a rectangle, use this formula: Area = length × width.

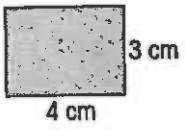
Find the area of this rectangle.

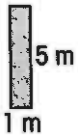


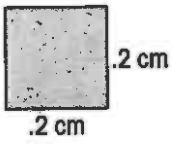
Area = length × width
Area = 8 ft × 5 ft
Area = 40 sq ft

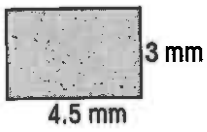
Find the area of each figure.

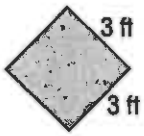
1. 

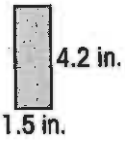
2. 

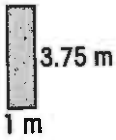
3. 

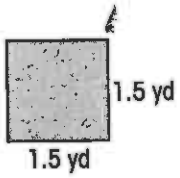
4. 

5. 

6. 

7. 

8. 

9. 

CRITICAL THINKING

Decide whether you would use perimeter or area to find the following.

1. the amount of fabric to cover a wall

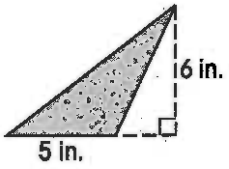
2. the amount of chalk striping needed to outline a soccer field

Name _____ Date _____

16.9 Area of Triangles — Exercise 150

To find the area of a triangle, use this formula: Area $= \frac{1}{2} \times$ base $\times$ height

Find the area of this triangle.



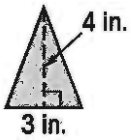
Area $= \frac{1}{2} \times$ base $\times$ height

Area $= \frac{1}{2} \times 5$ in. $\times 6$ in.

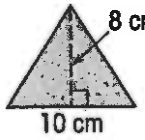
Area = 15 sq in.

Find the area of each triangle.

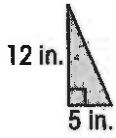
1.



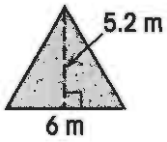
2.



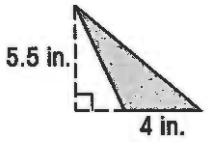
3.



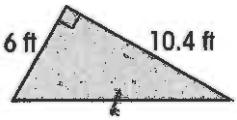
4.



5.



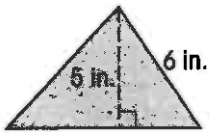
6.



CRITICAL THINKING

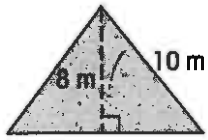
The given area for each triangle is incorrect. Find the correct area. Explain how the mistake was made.

1.



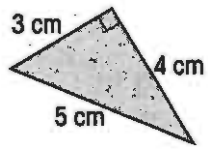
area = 24 sq in.

2.



area = 96 sq m

3.

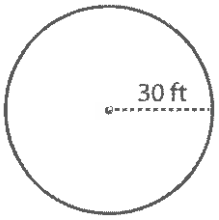


area = 10 sq cm

Name : _____ Score : _____

Circle - Area

Example :



Area of a circle = πr^2

Radius (r) = 30 ft

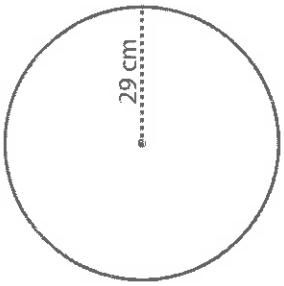
Area = πr^2

= 3.14 x 30 x 30

Area = **2826 ft²**

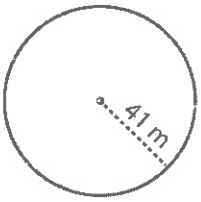
Find the area of each circle. Round the answer to tenth decimal place. (use $\pi = 3.14$)

1)



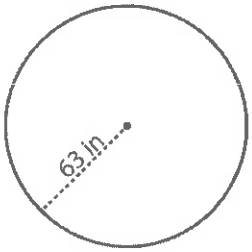
Area = _____

2)



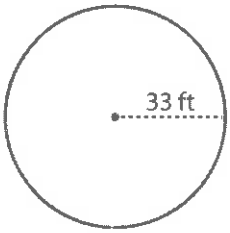
Area = _____

3)



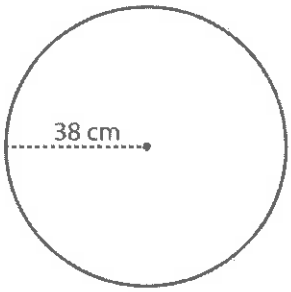
Area = _____

4)



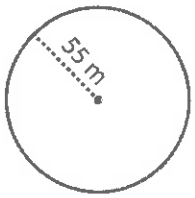
Area = _____

5)



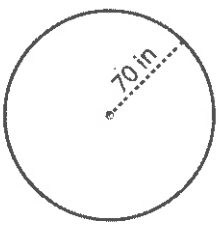
Area = _____

6)



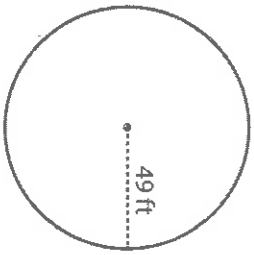
Area = _____

7)



Area = _____

8)



Area = _____

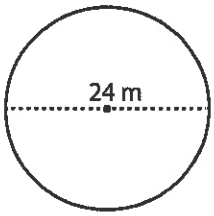
9)

Area = _____

Name : _____ Score : _____

Circle - Circumference

Example :



Circumference of a circle = 2πr or **πd**

Diameter (d) = 24 m

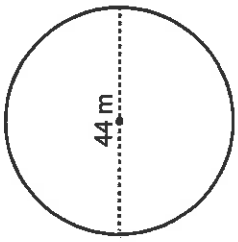
Circumference = πd

= 3.14 x 24

Circumference = **75.4 m**

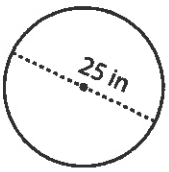
Find the circumference of each circle. Round the answer to tenth decimal place. (use π=3.14)

1)



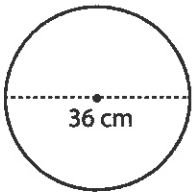
Circumference = _____

2)



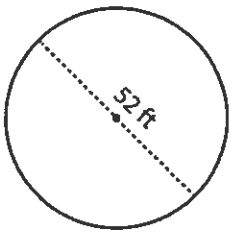
Circumference = _____

3)



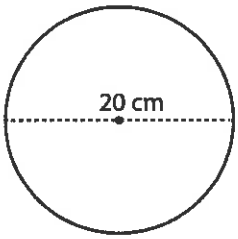
Circumference = _____

4)



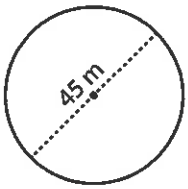
Circumference = _____

5)



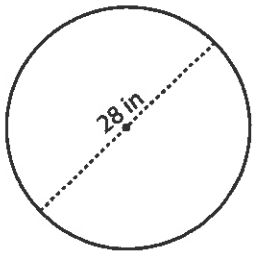
Circumference = _____

6)



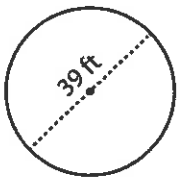
Circumference = _____

7)



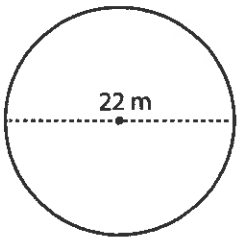
Circumference = _____

8)



Circumference = _____

9)



Circumference = _____

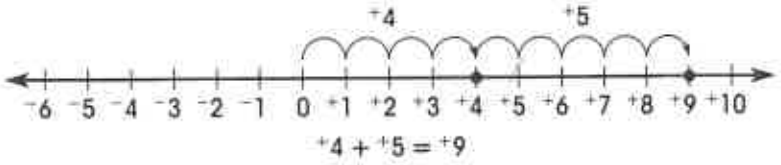
Name _____ Date _____

17.2 Adding Integers with Like Signs — Exercise 157

You can use number lines to add integers. Make the number line any size you need.

Start at zero. Move to the right to add positive integers.

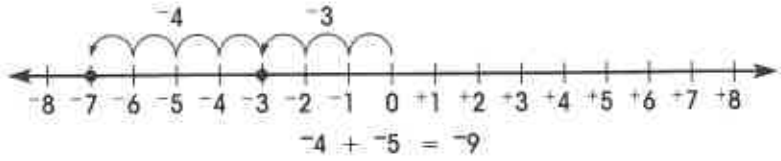
Add. $^{+}4 + {}^{+}5$



$^{+}4 + {}^{+}5 = {}^{+}9$

Start at zero. Move to the left to add negative integers.

Add. $^{-}3 + {}^{-}4$



$^{-}4 + {}^{-}5 = {}^{-}9$

Add.

1. $^{-}3 + {}^{-}5 =$ **2.** $^{+}5 + {}^{+}6 =$ **3.** $^{+}8 + {}^{+}6 =$ **4.** $^{-}5 + {}^{-}9 =$

5. $^{+}3 + {}^{+}7 =$ **6.** $^{+}7 + {}^{+}5 =$ **7.** $^{-}7 + {}^{-}9 =$ **8.** $^{-}2 + {}^{-}5 =$

9. $^{-}7 + {}^{-}8 =$ **10.** $^{-}1 + {}^{-}6 =$ **11.** $^{+}9 + {}^{+}8 =$ **12.** $^{-}7 + {}^{-}4 =$

13. $^{+}9 + {}^{+}12 =$ **14.** $^{-}5 + {}^{-}8 =$ **15.** $^{+}11 + {}^{+}5 =$ **16.** $^{+}13 + {}^{+}7 =$

17. $^{-}12 + {}^{-}5 =$ **18.** $^{+}5 + {}^{+}9 =$ **19.** $^{-}6 + {}^{-}8 =$ **20.** $^{+}5 + {}^{+}8 =$

CRITICAL THINKING

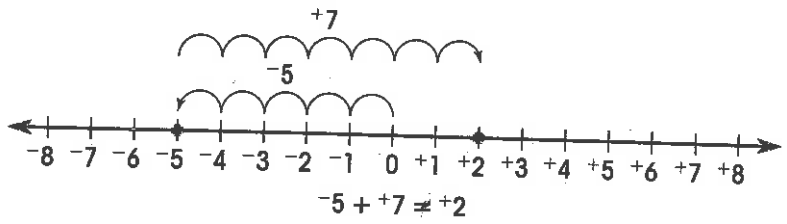
The lowest temperature in Minnesota is $^{-}39°F$. The lowest temperature in Montana is 3°F lower than $^{-}39°F$. What is the lowest temperature in Montana?

Name _____ Date _____

17.3 Adding Integers with Unlike Signs — Exercise 158

You can add integers with unlike signs on a number line.

Add. $^{-}5 + {}^{+}7$



Add.

1. $^{+}5 + {}^{-}8 =$ **2.** $^{-}8 + {}^{+}10 =$ **3.** $^{-}8 + {}^{+}3 =$ **4.** $^{-}6 + {}^{+}4 =$

5. $^{-}7 + {}^{+}3 =$ **6.** $^{+}9 + {}^{-}7 =$ **7.** $^{+}2 + {}^{-}9 =$ **8.** $^{+}6 + {}^{-}12 =$

9. $^{-}4 + {}^{+}2 =$ **10.** $^{-}3 + {}^{+}10 =$ **11.** $^{+}9 + {}^{-}5 =$ **12.** $^{+}7 + {}^{-}8 =$

13. $^{+}4 + {}^{-}6 =$ **14.** $^{-}6 + {}^{+}13 =$ **15.** $^{-}10 + {}^{+}12 =$ **16.** $^{+}7 + {}^{-}4 =$

17. $^{-}5 + {}^{+}14 =$ **18.** $^{+}2 + {}^{-}5 =$ **19.** $^{+}16 + {}^{-}13 =$ **20.** $^{-}13 + {}^{+}4 =$

CRITICAL THINKING

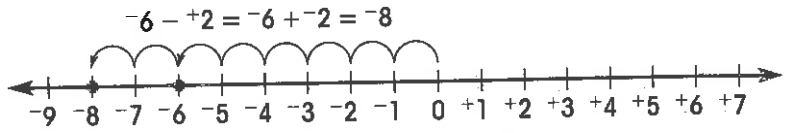
Laura made $15 baby-sitting. She then spent $5 at school. John gave Laura the $2 he owed her. Laura then spent $3 on a new notebook. How much money does Laura have left?

Name _____ Date _____

17.4 Subtracting Integers — Exercise 159

To subtract an integer, add its opposite.

Subtract. $^{-}6 - {}^{+}2$



Rewrite each subtraction problem as an addition problem. Do not solve.

1. $^{+}5 - {}^{+}3$ **2.** $^{-}4 - {}^{+}6$ **3.** $^{+}2 - {}^{+}8$ **4.** $^{-}9 - {}^{+}5$

5. $^{-}7 - {}^{+}16$ **6.** $^{+}8 - {}^{+}12$ **7.** $^{-}13 - {}^{+}8$ **8.** $^{-}8 - {}^{+}3$

Subtract. Remember to rewrite each problem as an addition problem.

9. $^{+}2 - {}^{+}6 =$ **10.** $^{+}5 - {}^{+}9 =$ **11.** $^{+}12 - {}^{-}18 =$ **12.** $^{-}5 - {}^{+}14 =$

13. $^{-}2 - {}^{-}10 =$ **14.** $^{-}14 - {}^{-}3 =$ **15.** $^{+}12 - {}^{+}17 =$ **16.** $^{-}4 - {}^{+}12 =$

17. $^{-}8 - {}^{-}2 =$ **18.** $^{+}18 - {}^{+}23 =$ **19.** $^{-}9 - {}^{-}8 =$ **20.** $^{-}12 - {}^{+}10 =$

CRITICAL THINKING

The highest temperature in Anchorage, Alaska for January is 20°F.
The highest temperature in Barrow, Alaska for January is $^{-}9$°F.

1. Which city has the colder temperature in January?

2. What is the difference between these temperatures?

Name _____ Date _____

17.5 Multiplying Integers — Exercise 160

When you multiply integers, you must decide if the answer is positive or negative.

If the signs of the integers are the **same**, the product is **positive**.

$^{+}5 \times {}^{+}4 = {}^{+}20$
$^{-}5 \times {}^{-}4 = {}^{+}20$

If the signs of the integers are **different**, the product is **negative**.

$^{+}5 \times {}^{-}4 = {}^{-}20$
$^{-}5 \times {}^{+}4 = {}^{-}20$

Multiply. Decide if the product is positive or negative.

1. $^{-}8 \times {}^{+}7 =$ **2.** $^{-}3 \times {}^{+}12 =$ **3.** $^{+}6 \times {}^{-}5 =$ **4.** $^{+}3 \times {}^{-}10 =$

5. $^{+}4 \times {}^{-}9 =$ **6.** $^{+}10 \times {}^{-}5 =$ **7.** $^{-}8 \times {}^{+}6 =$ **8.** $^{+}7 \times {}^{-}5 =$

9. $^{-}9 \times {}^{-}6 =$ **10.** $^{-}8 \times {}^{-}9 =$ **11.** $^{+}3 \times {}^{+}6 =$ **12.** $^{+}5 \times {}^{+}8 =$

13. $^{-}4 \times {}^{-}8 =$ **14.** $^{+}7 \times {}^{+}3 =$ **15.** $^{-}6 \times {}^{-}2 =$ **16.** $^{-}8 \times {}^{-}2 =$

17. $^{-}2 \times {}^{+}5 =$ **18.** $^{+}7 \times {}^{-}5 =$ **19.** $^{-}3 \times {}^{+}4 =$ **20.** $^{+}6 \times {}^{-}4 =$

CRITICAL THINKING

1. Every day Jon saves $4 by bringing lunch to school. How much does Jon save after five days of school? Is this a positive or a negative number? Why?

2. Every day Aaron buys a school lunch that costs $4.50. How much does he spend altogether for five days of lunches? Is this a negative or a positive number? Why?

Name _____ Date _____

17.6 Dividing Integers — Exercise 161

The rules for dividing integers are the same as the rules for multiplying integers.

If the signs of the integers are the **same**, the quotient is **positive**.	$^{-}36 \div {}^{-}9 = {}^{+}4$ $^{+}36 \div {}^{+}9 = {}^{+}4$
If the signs of the integers are **different**, the quotient is **negative**.	$^{-}36 \div {}^{+}9 = {}^{-}4$ $^{+}36 \div {}^{-}9 = {}^{-}4$

Divide. Decide if the sign of the quotient is positive or negative.

1. $^{-}8 \div {}^{+}4 =$ **2.** $^{+}5 \div {}^{-}5 =$ **3.** $^{+}16 \div {}^{-}8 =$ **4.** $^{+}24 \div {}^{-}4 =$

5. $^{-}56 \div {}^{+}7 =$ **6.** $^{+}18 \div {}^{-}6 =$ **7.** $^{-}15 \div {}^{+}5 =$ **8.** $^{-}10 \div {}^{+}2 =$

9. $^{-}9 \div {}^{-}3 =$ **10.** $^{+}21 \div {}^{+}7 =$ **11.** $^{+}28 \div {}^{+}4 =$ **12.** $^{-}24 \div {}^{-}6 =$

13. $^{-}32 \div {}^{-}4 =$ **14.** $^{+}48 \div {}^{+}6 =$ **15.** $^{-}45 \div {}^{-}9 =$ **16.** $^{-}54 \div {}^{-}9 =$

17. $^{+}12 \div {}^{-}6 =$ **18.** $^{+}56 \div {}^{-}8 =$ **19.** $^{-}63 \div {}^{+}9 =$ **20.** $^{-}72 \div {}^{+}8 =$

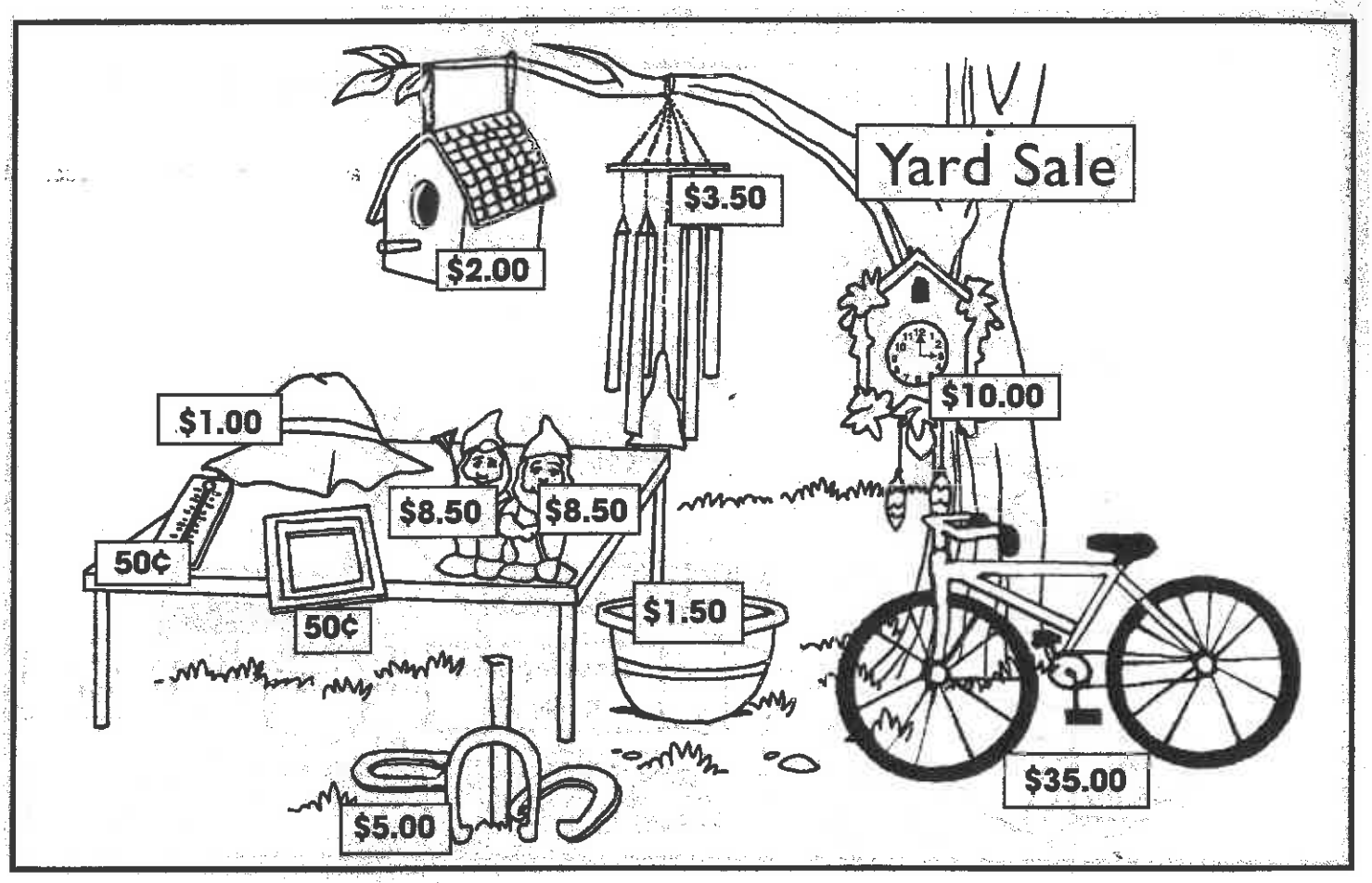
21. $^{+}18 \div {}^{+}9 =$ **22.** $^{-}15 \div {}^{-}5 =$ **23.** $^{-}21 \div {}^{+}3 =$ **24.** $^{+}27 \div {}^{+}9 =$

CRITICAL THINKING

Find the missing integer for each problem.

1. $^{+}18 \div$ ____ $= {}^{-}9$ **2.** ____ $\div {}^{-}5 = {}^{+}6$ **3.** $^{-}24 \div$ ____ $= {}^{+}2$ **4.** $^{+}18 \div$ ____ $= {}^{+}3$

Name_____



1. Mrs. Grady had put out 30 items for her yard sale. How many things has she sold so far?

   _____

2. A man bought the cuckoo clock and thermometer. How much did he spend?

   _____ He paid with a $10 bill and a $5 bill. How much change did he receive? _____

3. A lady bought the bowl, wind chimes, bird house, and hat. How much did she pay Mrs. Grady? _____

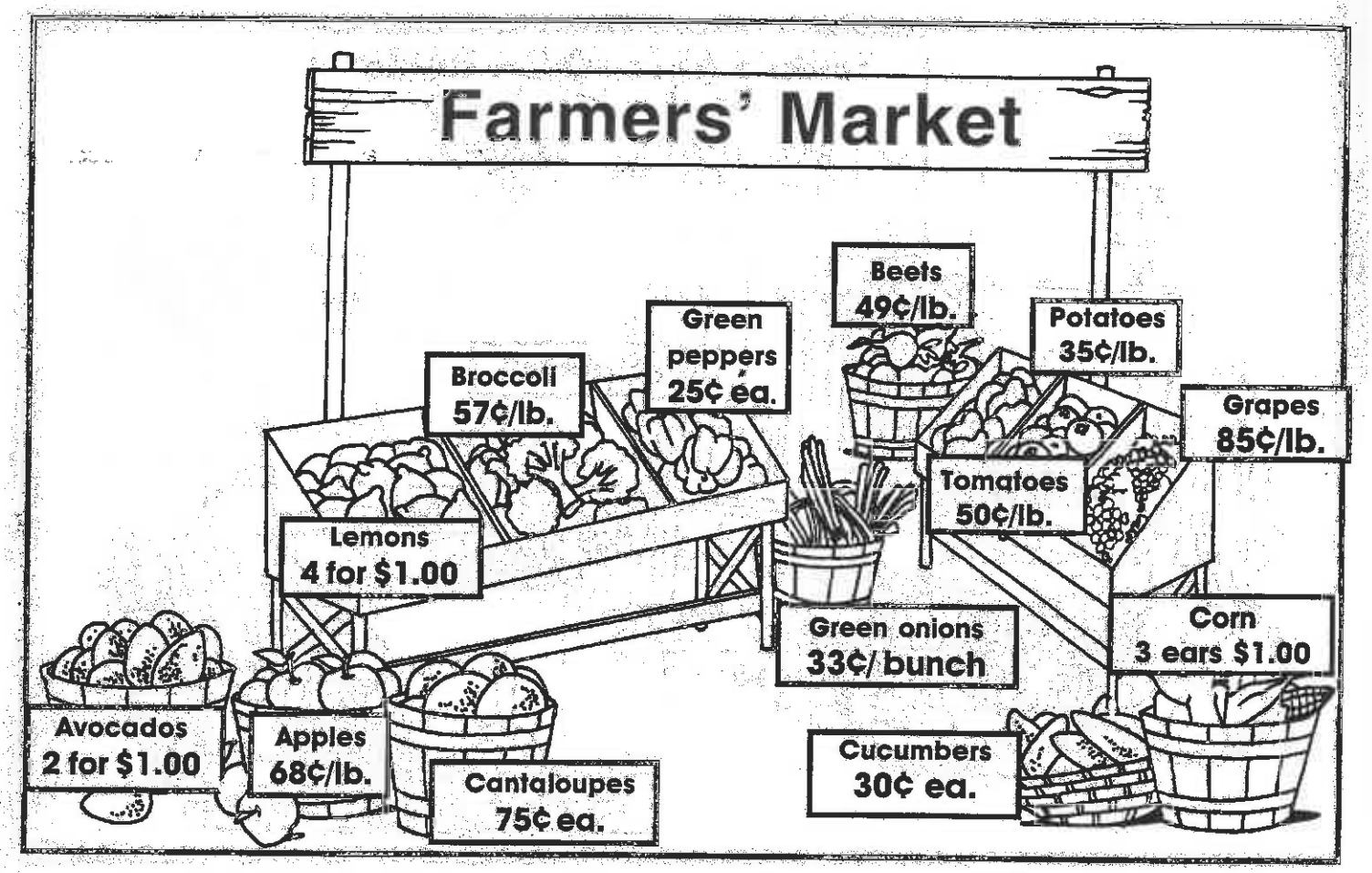
4. A boy told his mother he would pay her back with his allowance if she would buy him the bike. He gets $5.00 a week. How many weeks will it take him to pay back his mother?

   _____

5. A man wanted to buy a gnome. Mrs. Grady said she would sell the pair for $15.00. How much less did she make by selling the gnomes together? _____

BONUS: Cross out all the items that were sold. What things did Mrs. Grady not sell?

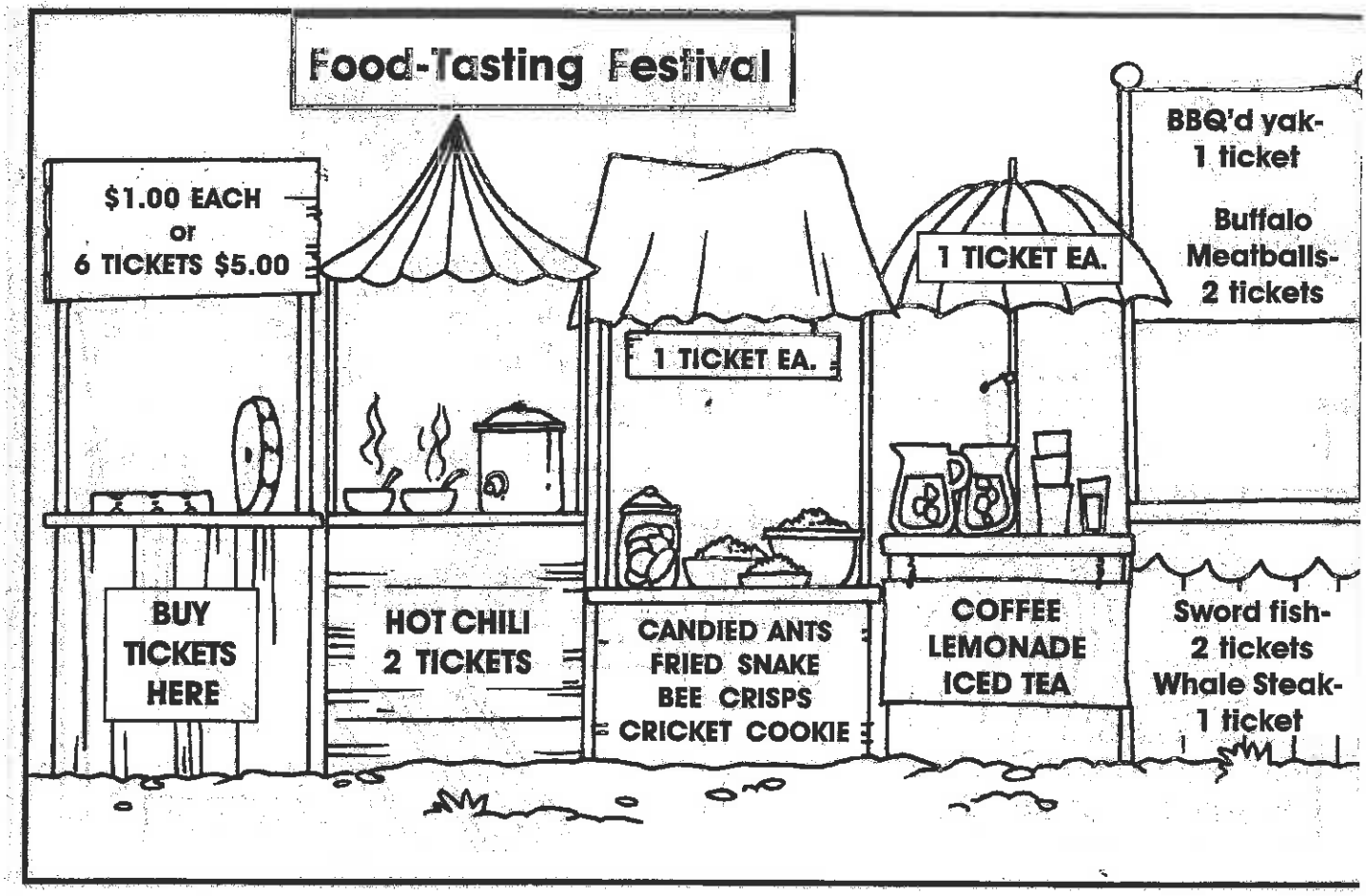
Name_____



1. Mr. Foster bought a cantaloupe, six ears of corn, two cucumbers, and two pounds of tomatoes. How much did he pay for the produce? _____
2. How much would one lemon cost? _____
3. Sara is going to make two apple pies. She needs six apples for each pie. Four apples weigh one pound. How many pounds of apples will she need? _____
   What will she pay for them? _____
4. Four avocados, four green peppers, and four pounds of broccoli would cost how much?
   _____
5. Tim's mom asked him to get 10 pounds of potatoes, one pound of beets, and a bunch of green onions. Tim also bought three pounds of grapes. How much did Tim spend?
   _____

BONUS: Look it up. Find *tomato* in a dictionary. Is it a fruit or a vegetable?

Name_____



1. Toby bought $25.00 worth of tickets. He shared them equally among six people. How many tickets did each person get? _____

2. Gretchen sampled the buffalo meatballs, the fried snake, and the hot chili. Then she got a cup of lemonade. How many tickets did she use? _____

3. Each roll has 150 tickets. So far, 9½ rolls have been sold. How many tickets is that?

   _____

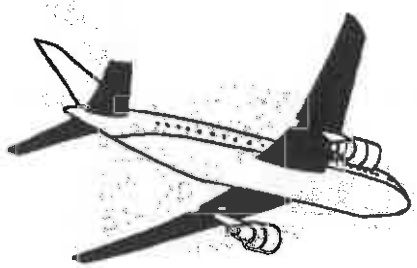
4. Fran, Frank, and Fred each selected bee crisps, sword fish, and barbecued yak. Altogether, how many tickets were spent? _____

5. Jane decided to spend her last three tickets on a cup of coffee and two different sweet treats. What did she have? _____

BONUS: You have $5.00 worth of tickets. What would you buy at the food festival?

Name: _____

Travel Time



America West Airlines

Summer Sale Fares

from Phoenix, Arizona

EACH WAY, BASED ON ROUND-TRIP PURCHASE

(Even lower fares available)

Atlanta	$159
Boston	$164
Baltimore	$159
Chicago	$139
Columbus, OH	$139
Dallas/Ft. Worth	$114
Newark	$164
Houston	$114
Wichita	$124
Indianapolis	$129
Orlando	$164
Kansas City	$114
Mazatlan	$114
Mexico City	$145
Milwaukee	$139
Minneapolis/St. Paul	$139
Philadelphia	$174
Los Cabos	$109
St. Louis	$119
Tampa/St. Petersburg	$164
Washington, D.C.	$164

1. The Sanchez family lives in Phoenix. Every summer, they visit relatives in Mexico City. How much will four round-trip tickets cost? _____
2. Paul will be flying from Phoenix to Chicago in June. His wife will spend a week in Philadelphia. How much less is Paul's round-trip fare than his wife's?

   _____
3. It is 1400 miles from Phoenix to Chicago. The flight time is four hours. What is the average speed of the airplane? _____
4. Risa is going to Washington, D.C. How much will her round-trip ticket cost?

   _____
5. Risa leaves Phoenix at 8:00 a.m. Because of the time difference, it is already 11:00 a.m. in Washington, D.C. The flight is 5½ hours. What time will it be in Washington when Risa arrives? _____

BONUS: Altitude quiz. An airplane is flying 31,680 feet above the ground. How many miles high is it? _____ Look up *mile* in a dictionary if you need help.