

Math 6

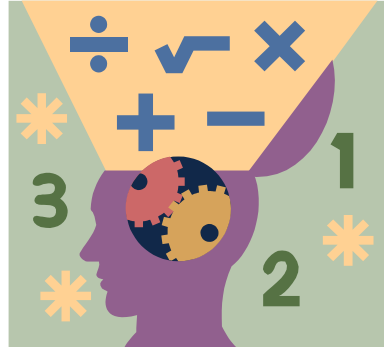


Colonial School District

Summer Math Packet

Answer Key

June 2019



Dear Parents/Guardians,

First, we would like to thank you for all of the additional support you offer at home. Education is a true partnership between school and family that is essential to a child's success.

As this school year comes to a close, we wanted to again encourage you to continue to reinforce and foster the mathematical skills and practices that have been developed this year by scheduling time for your child to work through this summer math packet. The activities were selected by our grade level experts with the key mathematical concepts of the school year in mind. The ultimate goal is to reinforce and strengthen the skills that will serve as building blocks for future learning.

Wishing you a relaxing, yet exciting, math-filled summer!

Sincerely,

The Curriculum Department

Integers

Adding

RULE	EXAMPLES
<p data-bbox="456 457 630 489">SAME SIGNS</p> <p data-bbox="493 506 592 537">1. Add.</p> <p data-bbox="293 564 792 632">2. Sum is positive if both are positive; negative if both are negative.</p>	<p data-bbox="997 474 1177 506">$5 + 8 = 13$</p> <p data-bbox="959 541 1211 573">$-5 + (-8) = -13$</p>
<p data-bbox="423 699 662 730">DIFFERENT SIGNS</p> <p data-bbox="337 747 748 779">1. Subtract the absolute values.</p> <p data-bbox="337 806 748 873">2. Answer is sign of the integer with the greater absolute value.</p>	<p data-bbox="980 716 1195 747">$5 + (-8) = -3$</p> <p data-bbox="997 783 1177 814">$-5 + 8 = 3$</p>

Find each sum.

1. $-4 + (-8)$

-12

2. $14 + 16$

30

3. $-43 + (-12)$

-55

4. $-16 + 11$

-5

5. $28 + (-42)$

-14

6. $75 + (-5)$

70

7. $-49 + (-32)$

-81

$$\begin{array}{r} -49 \\ -81 \\ \hline -130 \end{array}$$

8. $23 + (-23)$

0

9. $86 + (-18)$

68

$$\begin{array}{r} 86 \\ 68 \\ \hline 68 \end{array}$$

Integers

Multiplying & Dividing

RULE	EXAMPLES	
1. Multiply or divide. 2. The answer is positive if the signs are the same (both positive or both negative); negative if the signs are different (one positive and one negative).	$-5 \times (-8) = 40$ $40 \div 4 = 10$	$16 \times (-3) = -48$ $-20 \div 10 = -2$

Find each product or quotient.

1. $-3 \times (-8)$

24

2. $-5 \times (-5)$

25

3. -15×3

-45

4. $0 \times (-121)$

0

5. $-35 \div (-7)$

5

6. $-65 \div 5$

-13

7. $240 \div (-4)$

-60

8. $36 \div 12$

3

9. $(-49 \div 7) \times 8$

-7×8
-56

Integers

Subtracting

RULE	EXAMPLES	
1. Change the minus sign to a plus.	$5 - 8$	$-9 - (-12)$
2. Find the opposite of the 2 nd number.	$= 5 + -8$	$= -9 + 12$
3. Add; using your rules for adding integers.	$= -3$	$= 3$

Find each difference.

1. $4 - 7$

$= 4 + -7$

-3

2. $-5 - 3$

$= -5 + -3$

-8

3. $-8 - 2$

$= -8 + -2$

-10

4. $-3 - 24$

$= -3 + -24$

-27

5. $10 - 17$

$= 10 + -17$

-7

6. $13 - 9$

$= 13 + (-9)$

4

7. $-41 - 37$

$= -41 + (-37)$

$$\begin{array}{r} -41 \\ -37 \\ \hline -78 \end{array}$$

8. $62 - (-29)$

$= 62 + +29$

$$\begin{array}{r} 62 \\ 29 \\ \hline 91 \end{array}$$

9. $-6 - (-6)$

$= -6 + +6$

0

Integers

Problem Solving

RULE

4-Step Plan for Problem Solving

1. **Explore.** You need to read the problem and know what information you have and need and what is asked.
2. **Plan.** Develop a plan to solve the problem. Choose a strategy. Often it is helpful to make an estimate.
3. **Solve.** Carry out your plan.
4. **Examine.** Be sure to label your answer correctly. Check your answer By comparing to your estimate. If the answer does not make sense, make a new plan and try again.

NOTE:

Remember in most cases there is more than one way to solve the problem!

1. Rita opened a checking account with a balance of \$150. She wrote 2 checks: \$87 and \$68. How much money remained in the account?

$$150 + (-87) + (-68)$$

-\$5 is left: the account
is overdrawn

$$\begin{array}{r} 150 \\ -87 \\ \hline 63 \\ -68 \\ \hline -5 \end{array}$$

2. During a space shuttle launch a maneuver is scheduled to begin at T minus 85 seconds (i.e. 85 seconds before liftoff). If the maneuver lasts 2 minutes, at what time will the maneuver be complete?

$$-85 + 2(60)$$

$$60 \text{ sec} = 1 \text{ min}$$

$$-85 + 120 \longrightarrow \begin{array}{r} 120 \\ -85 \\ \hline \end{array}$$

At T + 35 seconds

3. The water level in a tank decreased 10 centimeters in 5 minutes. If the tank drains at a steady rate, what is the change in the water level each minute?

$$\frac{10}{5} \text{ which is } 2 \text{ cm per min}$$

Fractions

Adding and Subtracting

RULE	EXAMPLE
1. Find the lowest common denominator (LCD). 2. Write equivalent fractions using the LCD. 3. Add or subtract the numerators. Write the sum or difference over the LCD. 4. Reduce if necessary.	$\frac{5}{6} + \frac{3}{8}$ $\text{LCD} = 24$ $\frac{5}{6} = \frac{20}{24}$ $\frac{3}{8} = \frac{9}{24}$ <hr/> $\frac{29}{24} = 1\frac{5}{24}$

Find each sum.

1. $\frac{2}{7} + \frac{3}{8}$

$$\frac{16}{56} + \frac{21}{56} = \frac{37}{56}$$

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

$$\frac{5}{30} + \frac{18}{30} = \frac{23}{30}$$

3. $\frac{5}{16} - \frac{2}{9}$

$$\frac{45}{144} - \frac{32}{144} = \frac{13}{144}$$

4. $\frac{3}{4} - \frac{5}{12}$

$$\frac{9}{12} - \frac{5}{12} = \frac{4}{12} = \frac{1}{3}$$

5. $3\frac{6}{7} + 4\frac{1}{8}$

$$3\frac{48}{56} + 4\frac{7}{56} = 7\frac{55}{56}$$

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

$$4\frac{9}{15} - 2\frac{10}{15} =$$

$$3\frac{24}{15} - 2\frac{10}{15} = 1\frac{14}{15}$$

Fractions

Multiplying

RULE	EXAMPLES	
1. Write any mixed numbers as improper fractions. 2. Multiply the numerators. 3. Multiply the denominators. 4. Reduce if necessary.	$\frac{3}{10} \times \frac{2}{3}$ $\frac{6}{30}$ $= \frac{1}{5}$	$3\frac{5}{8} \times \frac{3}{7}$ $\frac{29}{8} \times \frac{3}{7}$ $= \frac{87}{56}$ $= 1\frac{31}{56}$

Find each product.

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

$$\frac{1}{9}$$

2. $\frac{2}{9} \times \frac{3}{8}$

$$\frac{6}{72} = \frac{1}{12}$$

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

$$\frac{6}{30} = \frac{1}{5}$$

4. $1\frac{3}{4} \times 7$

$$\frac{7}{4} \times \frac{7}{1} = \frac{49}{4} = 12\frac{1}{4}$$

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

$$\frac{24}{5} \times \frac{15}{4} = \frac{\cancel{24}^6}{\cancel{5}_1} \times \frac{\cancel{15}_3}{\cancel{4}_1} = \frac{6}{1} \times \frac{3}{1} = 18$$

6. $\frac{4}{5} \times \frac{1}{3} \times \frac{5}{12}$

$$\frac{\cancel{4}_1}{\cancel{5}_3} \times \frac{1}{3} \times \frac{\cancel{5}_1}{\cancel{12}_4} = \frac{1}{9}$$

Fractions

Dividing

RULE	EXAMPLES	
1. Write any mixed numbers as improper fractions.	$\frac{3}{10} \div \frac{2}{3}$	$3\frac{5}{8} \div \frac{3}{7}$
2. Change the 2 nd fraction to its reciprocal. (i.e. flip it over)	$\frac{3}{10} \times \frac{3}{2}$	$\frac{29}{8} \times \frac{7}{3}$
3. Multiply.	$= \frac{9}{20}$	$= \frac{203}{24}$
4. Reduce if necessary.		$= 8\frac{11}{24}$

Find each quotient.

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

$$\frac{1}{3} \times \frac{6}{1} = \frac{6}{3} = 2$$

2. $\frac{5}{8} \div \frac{1}{16}$

$$\frac{5}{8} \times \frac{16}{1} = \frac{5}{\cancel{8}^1} \times \frac{16}{1} = 10$$

3. $\frac{5}{12} \div \frac{3}{16}$

$$\frac{5}{12} \times \frac{16}{3} = \frac{5}{\cancel{12}^3} \times \frac{16}{3} = \frac{20}{9} = 2\frac{2}{9}$$

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

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

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

$$\frac{4}{3} \div \frac{17}{6} = \frac{4}{3} \times \frac{6}{17} = \frac{8}{17}$$

6. $11\frac{3}{4} \div 5\frac{3}{4}$

$$\frac{47}{4} \div \frac{23}{4} = \frac{47}{\cancel{4}^1} \times \frac{4}{23} = \frac{47}{23} = 2\frac{1}{23}$$

Fractions

Problem Solving

RULE

4-Step Plan for Problem Solving

1. **Explore.** You need to read the problem and know what information you have and need and what is asked.
2. **Plan.** Develop a plan to solve the problem. Choose a strategy. Often it is helpful to make an estimate.
3. **Solve.** Carry out your plan.
4. **Examine.** Be sure to label your answer correctly. Check your answer By comparing to your estimate. If the answer does not make sense, make a new plan and try again.

NOTE:

Remember in most cases there is more than one way to solve the problem!

1. The total length of the bicycle race track is $\frac{5}{8}$ miles. The first $\frac{1}{5}$ mile is hilly and the rest is flat. What fraction of the course is flat?

$$\frac{5}{8} - \frac{1}{5} = \frac{25}{40} - \frac{8}{40} = \frac{17}{40}$$

2. The cooking instructions for a turkey recommend roasting the turkey at a low temperature for $\frac{3}{4}$ hours for each pound. How long should you cook a $10\frac{1}{2}$ pound turkey?

$$10\frac{1}{2} \times \frac{3}{4} = \frac{21}{2} \times \frac{3}{4} = \frac{63}{8} = 7\frac{7}{8}$$

3. In one year 120 students enrolled at a community college. This was $\frac{3}{5}$ of the number of students accepted. How many of those accepted did not enroll?

$$120 \div \frac{3}{5} = \frac{40}{1} \times \frac{5}{3} = 200$$

Decimals

Adding and Subtracting

RULE	EXAMPLE
<p>1. Line up the decimal points.</p> <p>2. Add zeros if necessary.</p> <p>3. Add or subtract.</p> <p>NOTE:</p> <p>Remember to bring down your decimal point into your answer!</p>	$33.4 - 3.82$ $\begin{array}{r} 33.40 \\ - 3.82 \\ \hline 29.58 \end{array}$

Find each sum or difference.

1. $3.956 + 2.41$

$$\begin{array}{r} 1 \\ 3.956 \\ + 2.41 \\ \hline 6.366 \end{array}$$

2. $0.0589 + 0.278$

$$\begin{array}{r} 11 \\ .0589 \\ + .278 \\ \hline .3369 \end{array}$$

3. $117 + 105.02$

$$\begin{array}{r} 1 \\ 117. \\ + 105.02 \\ \hline 222.02 \end{array}$$

4. $6.788 - 0.2$

$$\begin{array}{r} 6.788 \\ - 0.2 \\ \hline 6.588 \end{array}$$

5. $3.24 - 0.51$

$$\begin{array}{r} 21 \\ \cancel{3}.24 \\ - 0.51 \\ \hline 2.73 \end{array}$$

6. $117 - 105.0023$

$$\begin{array}{r} 69991 \\ 117.0000 \\ - 105.0023 \\ \hline 11.9977 \end{array}$$

Decimals

Multiplying

RULE	EXAMPLE
<p>1. Multiply as you would whole numbers</p> <p>2. Count the number of digits to the right of the decimal point in each number.</p> <p>3. In you answer, count from the right to the left that number of place and put your decimal point.</p> <p style="text-align: center;">NOTE:</p> <p>Remember, do NOT line up the decimal points when setting up your problem!</p>	<p style="text-align: center;">62.8×0.093</p> $ \begin{array}{r} 62.8 \quad 1 \text{ decimal place} \\ \times .93 \quad 2 \text{ decimal places} \\ \hline 1884 \\ 56520 \\ \hline 58.404 \quad 3 \text{ decimal places} \end{array} $

Find each product.

1. 0.6×0.8

$$\begin{array}{r}
 0.6 \times 0.8 = \underline{.48} = .48 \\
 (1) \quad (2) \quad \leftarrow
 \end{array}$$

2. 0.9×0.27

$$\begin{array}{r}
 0.9 \times 0.27 = .243 \\
 (1) \quad (2 \ 3)
 \end{array}$$

3. 18.3×0.67

$$\begin{array}{r}
 18.3 \quad (1) \\
 \times .67 \quad (2 \ 3) \\
 \hline
 1281 \\
 10980 \\
 \hline
 12.261 \\
 \quad \quad \quad \underbrace{\hspace{1.5cm}} \\
 \quad \quad \quad (1 \ 2 \ 3)
 \end{array}$$

4. 7.2×5.4

$$\begin{array}{r}
 7.2 \quad (1) \\
 \times 5.4 \quad (2) \\
 \hline
 288 \\
 3600 \\
 \hline
 38.88 \\
 \quad \quad \quad \underbrace{\hspace{1.5cm}} \\
 \quad \quad \quad (1 \ 2)
 \end{array}$$

5. 8.4×0.003

$$\begin{array}{r}
 8.4 \quad (1) \\
 .003 \quad (2 \ 3 \ 4) \\
 \hline
 .0252 \\
 \quad \quad \quad \underbrace{\hspace{1.5cm}} \\
 \quad \quad \quad (1 \ 2 \ 3 \ 4)
 \end{array}$$

6. 0.04×0.3

$$\begin{array}{r}
 = .012 \\
 (1 \ 2) \quad (3)
 \end{array}$$

Decimals

Dividing

RULE	EXAMPLE
<p>1. Change the divisor to a whole number by moving the decimal point to the right.</p> <p>2. Move the decimal point in the dividend the same number of places. Add zeros if necessary.</p> <p>3. Divide.</p> <p>NOTE: Remember to bring your decimal point up into your answer!</p>	<p>$3.9 \div 0.13$</p> <p>$0.13 \overline{)3.9}$</p> <p>$\begin{array}{r} 30. \\ 13 \overline{)390} \\ \underline{39} \\ 0 \end{array}$</p>

Find each quotient.

1. $82 \div 0.4$

$$\begin{array}{r} .4 \overline{)82.0} \\ \underline{8} \\ 020 \\ \underline{20} \\ 0 \end{array}$$

2. $2.38 \div 3.5$

$$\begin{array}{r} 3.5 \overline{)2.380} \\ \underline{35} \\ 280 \\ \underline{280} \\ 0 \end{array}$$

3. $121.8 \div 1.4$

$$\frac{121.8}{1.4} \times \frac{10}{10} = \frac{1218}{14} = 87$$

4. $0.0092 \div 8$

$$\frac{.0092}{8} = .00115$$

5. $149.73 \div 0.23$

$$\begin{array}{r} .23 \overline{)149.73} \\ \underline{46} \\ 117 \\ \underline{115} \\ 23 \\ \underline{23} \\ 0 \end{array}$$

6. $2.004 \div 0.2$

$$\frac{2.004}{0.2} \times \frac{10}{10} = \frac{20.04}{2} = 10.02$$

Decimals

Problem Solving

RULE

4-Step Plan for Problem Solving

- Explore.** You need to read the problem and know what information you have and need and what is asked.
- Plan.** Develop a plan to solve the problem. Choose a strategy. Often it is helpful to make an estimate.
- Solve.** Carry out your plan.
- Examine.** Be sure to label your answer correctly. Check your answer By comparing to your estimate. If the answer does not make sense, make a new plan and try again.

NOTE:

Remember in most cases there is more than one way to solve the problem!

- Megan has \$80 to spend on clothes for school. After looking at the ads, she decides to buy two pairs of jeans for \$29.99 each and two tank tops for \$8.18 each. Does she have enough money to buy three new hair clips that are on sale 3 for \$10?

$$\begin{array}{r} \text{No, because } 2 \times \$29.99 = \$59.98 \\ 2 \times \$8.18 = \underline{\$16.36} \\ \$76.34 + \$10 = \$86.34 \end{array}$$

- Paula calls her grandparents long distance in California and talks for 45 minutes. The phone company charges \$0.05 per half-minute. How much does the call cost?

$$\begin{array}{r} 45 \\ \times .05 \\ \hline 2.25 \end{array}$$

- Ms. Francis drove her car 427 miles on 15.8 gallons of gas.
 - To the nearest mile, how many miles per gallon is this?
 - What was the cost of the gasoline she used if the price was \$1.96 per gallon?

a)

$$\begin{array}{r} 27. \\ 15.8 \overline{) 427.0} \\ \underline{316} \\ 1110 \\ \underline{1106} \\ 4 \end{array}$$

She got 27 mpg.

b)

$$\begin{array}{r} 1.96 \\ 27 \\ \hline 1372 \\ 392 \\ \hline 52.92 \end{array}$$

The cost of gasoline was \$52.92

Percent

Conversions

RULE	EXAMPLE
FRACTION TO PERCENT 1. Change the fraction to a decimal. (numerator \div denominator) 2. Change to decimal to a percent. (Multiply by 100) 3. Label with a percent sign.	$\frac{3}{8}$ $3 \div 8 = 0.375$ $0.375 \times 100 = 37.5\%$

Express each fraction as a percent.

1. $\frac{24}{25}$

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

3. $\frac{40}{125}$

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

$24 \div 25 = 0.96$

$2 \div 5 = 0.4$

$40 \div 125 = 0.32$

$2 \div 3 = 0.\overline{66}$

$.096 \times 100 = 9.6\%$

$0.4 \times 100 = 40\%$

$0.32 \times 100 = 32\%$

$0.\overline{66} \times 100 = 66.\overline{6}\%$

RULE	EXAMPLE
PERCENT TO FRACTION 1. Write the number over 100. (no % symbol) 2. Reduce the fraction.	15% $\frac{15}{100}$ $= \frac{3}{20}$

Express each percent as a fraction.

5. 20%

6. 72%

7. 70%

8. 2%

$\frac{20}{100} = \frac{1}{5}$

$\frac{72}{100} = \frac{18}{25}$

$\frac{70}{100} = \frac{7}{10}$

$\frac{2}{100} = \frac{1}{50}$

Percent

Percent of a Number

RULE	EXAMPLE
<p>1. Identify the part, whole, and /or percent.</p> <p>2. Plug in the numbers into the proportion and solve.</p> <p>Percent Proportion</p> $\frac{\text{Part}}{\text{Whole}} = \frac{\%}{100}$	<p>What number is 25% of 520?</p> <p>Percent = 25 Whole = 520 <i>(NOTE: Whole is after "of" in the problem)</i></p> $\frac{\quad}{520} = \frac{25}{100}$ <p>$100 \times _ = 520 \times 25$ $100 \times _ = 13,000$ $100 \times 130 = 13,000$</p> <p>130 is 25% of 520.</p>

Use a proportion to solve each problem (round your answer to the nearest tenth if necessary).

1. What number is 60% of 72?

$$\frac{60}{100} = \frac{\quad}{72}$$

$$100 \times _ = 60 \times 72$$

$$100 \times _ = 4,320$$

$$4,320 \div 100 = 43.2$$

2. Find 92% of 120.

$$\frac{92}{100} = \frac{\quad}{120}$$

$$100 \times _ = 92 \times 120$$

$$100 \times _ = 11,040$$

$$11,040 \div 100 = 110.4$$

3. 25 is what % of 40?

$$\frac{25}{40} = \frac{\quad}{100}$$

$$25 \times 100 = 40 \times _$$

$$2,500 = 40 \times _$$

$$2,500 \div 40 = 62.5\%$$

4. 55 is what % of 60?

$$\frac{55}{60} = \frac{\quad}{100}$$

$$55 \times 100 = 60 \times _$$

$$5,500 = 60 \times _$$

$$5,500 \div 60 = 91.\overline{6}\% = 91.7\%$$

5. 64 is 50% of what number?

$$\frac{64}{\quad} = \frac{50}{100}$$

$$64 \times 100 = 50 \times _$$

$$6,400 = 50 \times _$$

$$6,400 \div 50 = 128$$

6. 2 is 40% of what number?

$$\frac{2}{\quad} = \frac{40}{100}$$

$$2 \times 100 = 40 \times _$$

$$200 = 40 \times _$$

$$200 \div 40 = 5$$

Percent

Percent of Change

RULE	EXAMPLE
<p>1. Find the amount of increase or decrease.</p> <p>2. Fill in numbers in the proportion:</p> $\frac{\text{Increase/Decrease Amount}}{\text{Original}} = \frac{x}{100}$ <p>3. Solve to find the % of change.</p>	<p>Old: 8 New: 15</p> $15 - 8 = 7 \text{ increase}$ $\frac{7}{8} = \frac{x}{100}$ $7 \times 100 \times = 8 \times x$ $700 = 8x$ $700 \div 8$ <p>88% increase</p>

Use a proportion to solve each problem (round to the nearest whole percent if necessary).

1. Old: \$4 New: \$7

$$\$7 - \$4 = \$3 \text{ increase}$$

$$\frac{3}{4} = \frac{x}{100}$$

$$300 \div 4 = 7.5 = 7.5\%$$

2. Old: 36 New: 18

$$36 - 18 = 18 \text{ decrease}$$

$$\frac{18}{36} = \frac{x}{100}$$

$$1,800 \div 36 = 50\%$$

3. Old: \$6.80 New: \$8.20

$$\$8.20 - \$6.80 = \$1.40 \text{ increase}$$

$$\frac{1.4}{6.8} = \frac{x}{100}$$

$$140 \div 6.8 = 20.58 = 21\%$$

4. Old: \$150 New: \$126

$$36 - 18 = 18 \text{ decrease}$$

$$\frac{24}{150} = \frac{x}{100}$$

$$2,400 \div 1500 = 16\%$$

5. A book is on sale for \$14. The original price of the book was \$20. Find the percent of the discount.

$$20 - 14 = 6$$

$$\frac{6}{20} = \frac{x}{100}$$

$$6 \times 100 = 600$$

$$600 \div 20 = 30 = 30\%$$

Percent

Problem Solving

RULE

4-Step Plan for Problem Solving

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2. **Plan.** Develop a plan to solve the problem. Choose a strategy. Often it is helpful to make an estimate.
3. **Solve.** Carry out your plan.
4. **Examine.** Be sure to label your answer correctly. Check your answer By comparing to your estimate.
If the answer does not make sense, make a new plan and try again.

NOTE:

Remember in most cases there is more than one way to solve the problem!

1. Mr. Treed bought his son a new bicycle that cost \$198. The store required a 15% down payment to hold the bike. How much was the down payment?

$$\frac{15}{100} = \frac{x}{198}$$

$$100 \times _ = 15 \times 198 \quad = \quad 100 \times _ = 2,970$$

$$2,970 \div 100 = \$29.70$$

2. Twenty-eight of the 131 students in Ms. Martin's classes received A's on the last test. About what percent of the students earned A's?

$$\frac{x}{100} = \frac{28}{131}$$

$$100 \times 28 = _ \times 131 \quad = \quad 2,800 = _ \times 131$$

$$2,800 \div 131 = 21.37 = 21\%$$

3. Mrs. Miller bought a new suit that cost \$175. She bought it when it was on sale for 40% off. What was the original price of the suit?

$$\frac{40}{100} = \frac{175}{x}$$

$$40 \times _ = 175 \times 100 \quad = \quad 40 \times _ = 17,500$$

$$17,500 \div 40 = \$437.50$$

Write a variable expression to represent the word phrase.

1. Steve had an unknown amount of money in his pocket. He then lost \$23. What is the expression that shows how much money he has now?

$$x - 23$$

2. Adam found a bag of money that he split with 22 friends. What is the expression that shows the amount of money that each person has? (Don't forget to include Adam).

$$\frac{x}{23}$$

3. Rachel found a box with money in it. What is the expression for this money?

$$x$$

4. Steve cashed his paycheck and then found \$23. What is the expression that shows how much money Steve has now?

$$x + 23$$

5. A dog lost 15 pounds. What is the expression that shows the dog's current weight?

$$x - 15$$

6. Ryan weighs 6 times as much as his dog. What is an expression for Ryan's weight if you call his dog's weight n ?

$$6n$$

7. What is an expression for the value of an unknown number of dimes?

$$0.1d$$

8. Jamie is 7 years older than Nancy. What is an expression for Jamie's age if Nancy's is called n ?

$$n + 7$$

9. Fritz is 6 years older than twice his brother's age. What is an expression for Fritz's age if his brother's age is called n ?

$$2n + 6$$

10. What is an expression for the circumference of a circle with a diameter of n inches?

$$\pi$$

11. What is an expression for the value of an unknown number of half-dollars?

$$0.5n$$

12. If there are 4 times as many dimes in a pile of coins as there are nickels, what is the expression for the number of dimes if you call the number of nickels n ?

$$4n$$

Writing Expressions and Equations

The table shows phrases written as mathematical expressions.

Phrase	Expression	Phrase	Expression
8 more than a number the sum of 8 and a number x plus 8 x increased by x	$x + 8$	7 subtracted from a number h minus 7 7 less than a number a number decreased by 7	$h - 7$
Phrase	Expression	Phrase	Expression
3 multiplied by n 3 times a number the product of n and 3	$3n$	a number divided by 5 the quotient of t divided by 5 divide a number by 5	$\frac{t}{5}$

Write each phrase as an algebraic expression. No = here!

- 12 more than a number $x + 12$
- The quotient of a number divided by 9 $\frac{x}{9}$
- 4 times a number $4x$
- 15 less than a number $x - 15$
- 1 less than the product of 3 and m $3m - 1$
- The product of 4 times a number minus 8 $4x - 8$

Write each phrase as an algebraic expression. Use = here!

- A number minus 6 equals 12 $x - 6 = 12$
- A number plus 14 equals 25 $x + 14 = 25$
- 3 more than 5 times the number of dogs is 18 dogs $5x + 3 = 18$
- 4 times the number of cows plus 2 times the number of ducks is 20 $4c + 2d = 20$
- 2 less than the quotient of 12 divided by a number is 2 $\frac{12}{x} - 2 = 2$
- The product of 5 and y added to 3 is 33 $5y + 3 = 33$

P E M or D S or A

Easy Applications

The acronym for this order of operations is **PEMDAS**.

Parentheses

Exponents

Multiplication

Division

Addition

Subtraction

left to right

left to right

A popular expression for remembering this is **Please Excuse My Dear Aunt Sally**

Directions: Find the numerical value of the following expressions using the correct order of operations.

1. $9 \times 5 - 4 + 3 \times 4 =$ 53
 $45 - 4 + 12 =$
 $41 + 12 =$

2. $12 + 8 \times 6 \div 2 \times 8 =$ 204
 $12 + 48 \div 2 \times 8 =$
 $12 + 24 \times 8 = 12 + 192 =$

3. $3 + 6 \times 8 - 5 \times 2 =$ 41
 $3 + 48 - 10 =$
 $51 - 10 =$

4. $7 + 8 \div 4 + 3 - 2 =$ 10
 $7 + 2 + 3 - 2 =$

5. $22 \div 11 + 12 - 3 =$ 11
 $2 + 12 - 3 =$

6. $9 \times 8 - 6 \times 3 + 7 =$ 61
 $72 - 18 + 7 =$

7. $13 + 5 \times 6 \div 2 + 10 =$ 38
 $13 + 30 \div 2 + 10$
 $13 + 15 + 10$

8. $35 \div 7 \times 8 + 2 - 4 \times 2 =$ 34
 $5 \times 8 + 2 - 8$
 $40 + 2 - 8$

9. $100 \div 5 \times 5 + 4 - 9 =$ 95
 $20 \times 5 + 4 - 9 =$
 $100 + 4 - 9 =$

10. $88 \div 11 + 56 \div 8 + 12 - 5 =$ 22
 $8 + 7 + 12 - 5 =$



Remember the following facts:

- The fraction bar ($\frac{\quad}{\quad}$) means division.
- The raised dot (\bullet) means multiplication.
- Numbers written next to parenthesis or parentheses next to each other also require multiplication.

Directions: Find the numerical value of these expressions.

11. $5(8) - \frac{30}{5} + 4 \times 3 =$ 46
A $40 - 6 + 12 =$

12. $(7)(9) + \frac{9}{3} - 20 \times 3 =$ 6
 $63 + 3 - 60 =$

13. $8(9) + 10 \bullet 5 + 8 \bullet 2 =$ 138
 $72 + 50 + 16 =$

14. $3 + 8 \bullet 10 - 13 \times 3 =$ 44
 $3 + 80 - 39 =$

15. $17 + 5 - 6 \bullet 4 + \frac{12}{3} =$ 2
 $17 + 5 - 24 + 4 =$

16. $9 + \frac{44}{4} - 8 \times 2 + 20 - 3 =$ 21
 $9 + 11 - 16 + 20 - 3 =$

Function Table

Complete the table by filling in the missing number. Then, write the equation.

1.

x	y	
1	6	$6 = 1 + 5$
2	7	$7 = 2 + 5$
3	8	$8 = 3 + 5$
4	9	$9 = 4 + 5$
5	10	$10 = 5 + 5$
Equation: $y = x + 5$		

2.

x	y	
11	2	$11 - 9 = 2$
12	3	$12 - 9 = 3$
13	4	$13 - 9 = 4$
14	5	$14 - 9 = 5$
15	6	$15 - 9 = 6$
Equation: $x - 9 = y$		

3.

x	y	
12	2	$2 = 12 \div 6$
18	3	$3 = 18 \div 6$
24	4	$4 = 24 \div 6$
30	5	$5 = 30 \div 6$
36	6	$6 = 36 \div 6$
Equation: $y = \frac{x}{6}$		

4.

x	y	
1	8	$8 \times 1 = 8$
2	16	$8 \times 2 = 16$
3	24	$8 \times 3 = 24$
4	32	$8 \times 4 = 32$
5	40	$8 \times 5 = 40$
Equation: $8x = y$		

5.

x	y	
1	1	$3 \times 1 - 2 = 1$
2	4	$3 \times 2 - 2 = 4$
3	7	$3 \times 3 - 2 = 7$
4	10	$3 \times 4 - 2 = 10$
5	13	$3 \times 5 - 2 = 13$
Equation: $3x - 2 = y$		

6.

x	y	
1	6	$5 \times 1 + 1 = 6$
2	11	$5 \times 2 + 1 = 11$
3	16	$5 \times 3 + 1 = 16$
4	21	$5 \times 4 + 1 = 21$
5	26	$5 \times 5 + 1 = 26$
Equation: $5x + 1 = y$		

Properties of Operations



VOCABULARY TERMS

Addend	A number that is added in an addition expression.
Associative Property of Addition	The grouping of addends does not change the sum: $(a + b) + c = a + (b + c)$.
Associative Property of Multiplication	The grouping of factors does not change the product: $(ab) c = a (bc)$.
Commutative Property of Addition	The order of addends does not change the sum: $a + b = b + a$.
Commutative Property of Multiplication	The order of factors does not change the product: $ab = ba$.
Distributive Property	The product of a factor and a sum is equal to the sum of the products: $a(b + c) = ab + ac$.
Factor	A number that divides into another number with no remainder. When two or more factors are multiplied, they form a product. For example: $2 \times 5 = 10$; 2 and 5 are factors, 10 is the product.
Identity Property Addition	The sum of any number and 0 is that number: $a + 0 = a$.
Identity Property Multiplication	Any number multiplied by one equals that number: $a \times 1 = a$.
Product	The result of multiplication.
Sum	The result of addition.
Zero Product Property	The product of any number and zero is zero: $a \times 0 = 0$.

Properties of Operations



INDEPENDENT PRACTICE

Fill in the missing number below and tell which property the problem demonstrates.

1. $51 \times \underline{1} = 51$

Property used: Identity of multiplication

2. $71 + (\underline{90} + 5) = (71 + 90) + 5$

Property used: Associative

3. $115 \times \underline{23} = 23 \times 115$

Property used: Commutative

4. $0 + 78 = \underline{78}$

Property used: Identity of Addition

5. $17 \times (5 \times 12) = (\underline{17} \times 5) \times 12$

Property used: Associative

6. $54 + 60 = 60 + \underline{54}$

Property used: Commutative

Equations

One-step Equations

RULE	EXAMPLE
<p>1. Look at what has been done to the variable.</p> <p>2. Undo it using the inverse operation on both sides of the equation.</p> <p>3. Check your answer by replacing the variable with the solution.</p>	$ \begin{array}{r} X - 15 = 29 \\ + 15 \quad + 15 \\ \hline X = 44 \end{array} $ <p>✓ $44 - 15 = 29$</p>

Solve.

$$\begin{array}{r|l}
 1. \quad d + 32 & = 70 \\
 - 32 & - 32 \\
 \hline
 d & = 38
 \end{array}$$

✓ $38 + 32 = 70$

$$\begin{array}{r|l}
 2. \quad 708 & = c + 30 \\
 - 32 & - 32 \\
 \hline
 678 & = c
 \end{array}$$

✓ $708 = 678 + 30$

$$\begin{array}{r|l}
 3. \quad x - 89 & = 176 \\
 + 89 & + 89 \\
 \hline
 x & = 265
 \end{array}$$

✓ $265 - 89 = 176$

$$\begin{array}{r|l}
 4. \quad x - 36 & = 12 \\
 + 36 & + 36 \\
 \hline
 x & = 48
 \end{array}$$

✓ $48 - 36 = 12$

$$\begin{array}{r|l}
 5. \quad \frac{5x}{5} & = \frac{225}{5} \\
 x & = 45
 \end{array}$$

✓ $5 \times 45 = 225$

$$\begin{array}{r|l}
 6. \quad \frac{12n}{12} & = \frac{96}{12} \\
 n & = 8
 \end{array}$$

✓ $12 \times 8 = 96$

$$\begin{array}{r|l}
 7. \quad n \div 72 & = 360 \\
 72 \times \frac{n}{72} & = 360 \times 72 \\
 n & = 25,920
 \end{array}$$

✓ $25,920 \div 72 = 360$

$$\begin{array}{r|l}
 8. \quad n \div 12 & = 12 \\
 12 \times \frac{n}{12} & = 12 \times 12 \\
 n & = 144
 \end{array}$$

✓ $144 \div 12 = 12$

Write an equation for each sentence. Solve. Show your work.

1. A number b plus 5 equals 15.

$$\begin{array}{r|l} b + 5 & = 15 \\ - 5 & - 5 \\ \hline b & = 10 \end{array}$$

check: $10 + 5 = 15$

2. A number r minus 2 is 8.

$$\begin{array}{r|l} r - 2 & = 8 \\ + 2 & + 2 \\ \hline r & = 10 \end{array}$$

check: $10 - 2 = 8$

3. A number w added to 7 is 32.

$$\begin{array}{r|l} w + 7 & = 32 \\ - 7 & - 7 \\ \hline w & = 25 \end{array}$$

check: $25 + 7 = 32$

4. If 4 is added to the product of 6 and a number t , the result is 76.

$$\begin{array}{r|l} 6t + 4 & = 76 \\ - 4 & - 4 \\ \hline 6t & = 72 \end{array}$$

$$\frac{6t}{6} = \frac{72}{6}$$

$$t = 12$$

check: $(6 \times 12) + 4 = 76$

$$72 + 4 = 76$$

5. Rebecca completes four addition problems each minute. How many minutes will it take her to complete 12 problems?

$m =$ minutes

$$\frac{4m}{4} = \frac{12}{4}$$

$$m = 3$$

check: $4 \times 3 = 12$ It will take Rebecca 3 minutes to solve 12 problems

6. Melissa spent three hours each day painting her house. She spent a total of 27 hours painting. How many days did she paint?

$d =$ days

$$\frac{4m}{4} = \frac{12}{4}$$

$$m = 3$$

check: $4 \times 3 = 12$ It will take Rebecca 3 minutes to solve 12 problems

Graphing on the Coordinate Plane

Directions:

- Identify the quadrant or axis where the point is located.
- Graph each ordered pair on the coordinate grid.
- Write the letter next to the point.

1. A (-4, -1)

III

2. B (4, 1)

I

3. C (3, 0)

x-axis

4. D (0, 4)

y-axis

5. E (2, 2)

I

6. F (-2, 5)

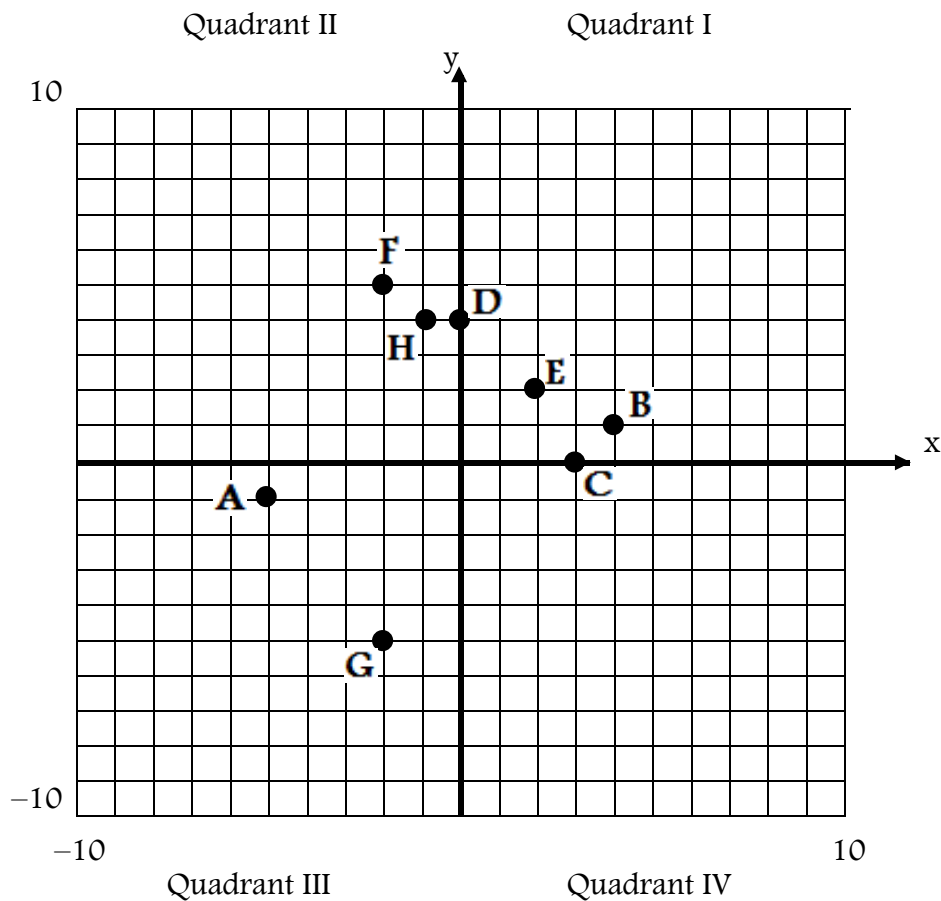
II

7. G (-2, -5)

III

8. H (-1, 4)

II



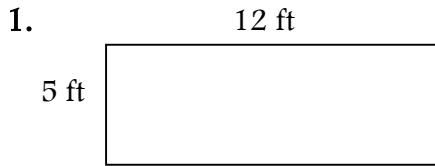
Measures of Center

Complete the problems shown.

<p>I scored these points in 8 basketball games: 20, 20, 16, 21, 15, 20, 14, 10.</p> <p>range = <u>11</u> $21 - 10$</p> <p>mean = <u>17</u> $\frac{136}{8}$</p> <p>median = <u>18</u> $\frac{16 + 20}{2}$</p> <p>mode = <u>20</u></p>	<p>I earned these amounts: \$2.50, \$3.75, \$6.20, \$3.75, \$8.00, \$5.75.</p> <p>How much greater is the mean than the mode?</p> <p>Mode is \$3.75</p> <p>Mean is $\\$29.95 \div 6 = \\4.99</p> <p style="text-align: center;"> $\begin{array}{r} 4.99 \\ - 3.75 \\ \hline \end{array}$ </p> <p style="text-align: center;"><u>\$1.24 greater</u></p>	<p>I worked these hours at my job: $8, 6\frac{1}{2}, 5, 8, 5\frac{1}{2}, 7, 7\frac{1}{2}, 8$.</p> <p>Which is greatest: the mean, the mode, or the median?</p> <p>Mode = 8</p> <p>Median = $\frac{7 + 7.5}{2} = 7.25$ or $7\frac{1}{4}$</p> <p>Mean = $\frac{55.5}{8} = 6.9375$</p>
<p>Five baseball players hit these many home runs in a season: 36, 25, 45, 23, 8. What is the median for these data?</p> <p style="text-align: center;">8, 23, <u>25</u>, 36, 45</p>	<p>What 4 numbers have a range of 4, a median of 22, a mean of 22, and a mode of 22?</p> <p style="text-align: center;">20, 22, 22, 24</p>	<p>Is there a mode in this data: 3, 4, 5, 6, 7, 8?</p> <p style="text-align: center;">No, there is no mode</p>
<p>Students received these test scores: 96%, 88%, 52%, 75%, 82%, 91%, 75%. What is the mean?</p> <p style="text-align: center;"> $\begin{array}{r} 96 + 88 + 52 + 75 + 82 \\ + 91 + 75 = 559 \end{array}$ </p> <p style="text-align: center;">$559 \div 7 = 79.86\%$</p>	<p>These numbers were on a lottery ticket: 18, 33, 42, 17, 26. What is the range?</p> <p style="text-align: center;"> $\begin{array}{r} 42 \\ - 17 \\ \hline 25 \end{array}$ </p>	<p>I have 5 numbers. The mean for these numbers is 12. What is the sum of the numbers?</p> <p style="text-align: center;">$5 \cdot 12 = x$</p> <p style="text-align: center;">$60 = x$</p> <p>The sum is 60</p>

Remember: perimeter refers to the sum (+) of all of the outside edges of a figure.

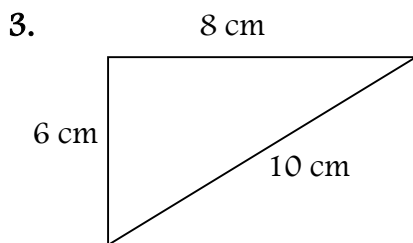
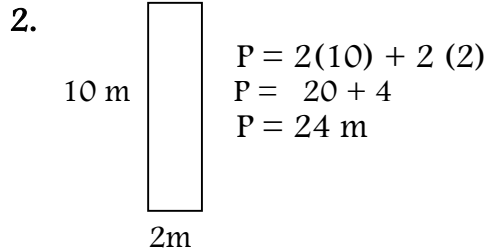
Find the perimeter of each figure shown or described below.



$$P = 2(5) + 2(12)$$

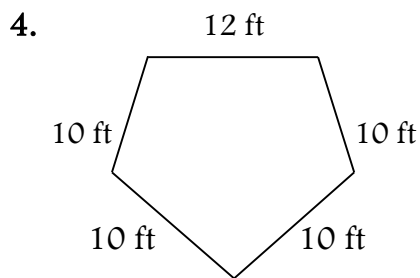
$$P = 10 + 24$$

$$P = 34 \text{ ft}$$



$$P = 6 + 8 + 10$$

$$P = 24 \text{ cm}$$



$$P = 12 + 4(10)$$

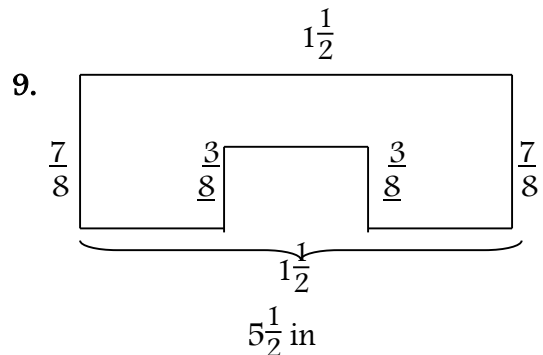
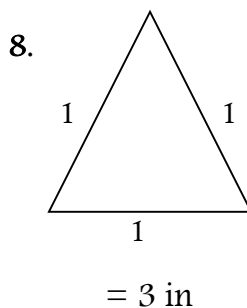
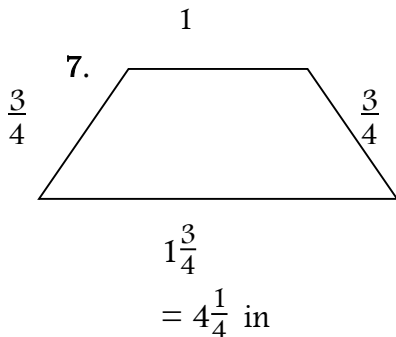
$$P = 12 + 40$$

$$P = 52 \text{ ft}$$

5. rectangle:
 $l = 6 \text{ yards}$ $w = 4 \text{ yards}$

6. rectangle:
 $l = 7\frac{1}{2} \text{ inches}$ $w = 6\frac{3}{8} \text{ inches}$

Find the perimeter of each figure. Measure to the nearest eighth inch. Your answers may vary due to differences in printing and scanning this sheet.



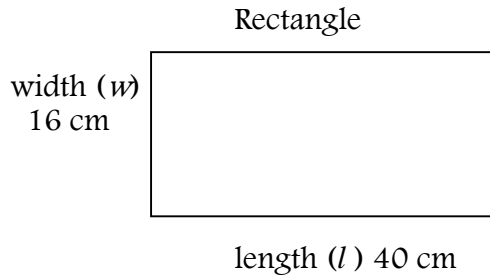
10. Find the perimeter of a square with side $14\frac{1}{2}$ inches.

$$P = 4(14\frac{1}{2}) \quad P = 58 \text{ in}$$

11. Find the perimeter of a triangle with sides 4 inches, $8\frac{1}{2}$ inches, and $9\frac{1}{4}$ inches.

$$P = 4 + 8\frac{1}{2} + 9\frac{1}{4} \quad P = 21\frac{3}{4}$$

Geometry Connection: Area



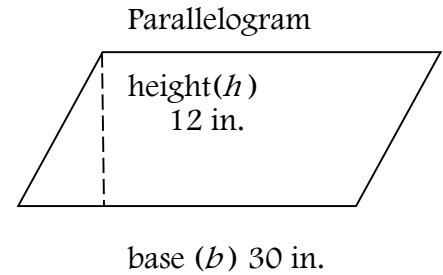
The area of a rectangle equals the product of its length and its width.

$$A = lw$$

$$A = lw$$

$$A = 40 \cdot 16$$

$$A = 640 \text{ cm}^2$$



The area of a parallelogram equals the product of its base and its height.

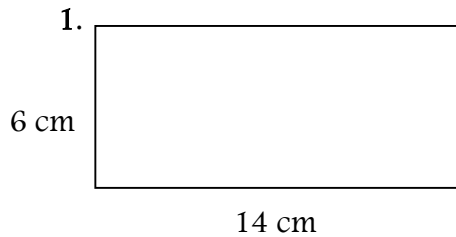
$$A = bh$$

$$A = bh$$

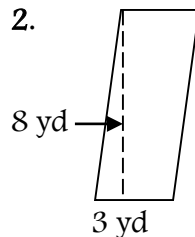
$$A = 30 \cdot 12$$

$$A = 360 \text{ in}^2$$

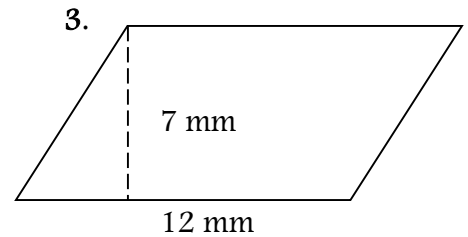
Find the area of each figure shown or described below.



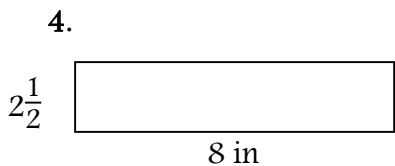
$$A = 6 \cdot 14 \quad A = 84 \text{ cm}^2$$



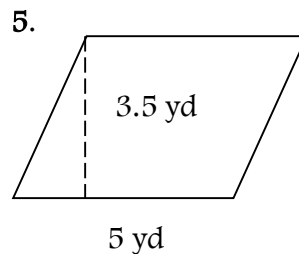
$$A = 3 \cdot 8 \quad A = 24 \text{ yd}^2$$



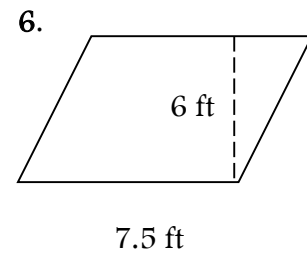
$$A = 12 \cdot 7 \quad A = 84 \text{ mm}^2$$



$$A = 2\frac{1}{2} \cdot 8 = \frac{5}{2} \cdot 8 \quad A = \frac{40}{2} = 20 \text{ in}^2$$



$$A = 5 \cdot 3.5 \quad A = 17.5 \text{ yd}^2$$



$$A = 7.5 \cdot 6 \quad A = 45 \text{ ft}^2$$

7. parallelogram: $b = 15 \text{ ft}$, $h = 21 \text{ ft}$
 $15 \cdot 21 = 315 \text{ ft}^2$

8. rectangle: $l = 7.5 \text{ cm}$, $w = 12 \text{ cm}$
 $7.5 \cdot 12 = 90 \text{ cm}^2$


9. parallelogram: $b = 4.7 \text{ m}$, $h = 2.2 \text{ m}$
 $4.7 \cdot 2.2 = 10.34 \text{ m}^2$

10. rectangle: $l = 1\frac{1}{4} \text{ yd}$, $w = \frac{1}{2} \text{ yd}$
 $1\frac{1}{4} \cdot \frac{1}{2} = \frac{5}{4} \cdot \frac{1}{2} = \frac{5}{8} \text{ yd}^2$

Find the area of each figure.

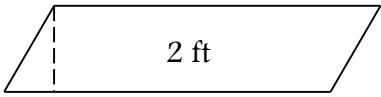
$A = b \cdot h$ or $A = l \cdot w$

1. $13 \cdot 5 = 65 \text{ in}^2$



13 in

2. $2 \cdot 10.5 = 21 \text{ ft}^2$

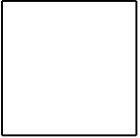


5 in

2 ft

10.5 ft

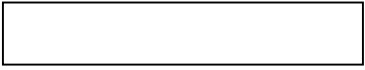
3. $3 \cdot 3 = 9 \text{ ft}^2$



3 ft

3 ft

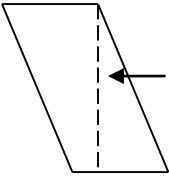
4. $14 \cdot 3 = 42 \text{ mm}^2$



3 mm

14 mm


5. $3.5 \cdot .75 = 2.625 \text{ ft}^2$



3.5 ft

0.75 ft


6. $17 \cdot 8 = 136 \text{ in}^2$



17 in

8 in

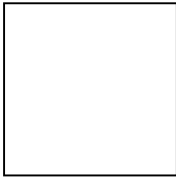
7. $3\frac{1}{2} \cdot 1\frac{1}{4}$
 $3.5 \cdot 1.25$
 4.375 ft^2 or
 $4\frac{3}{8} \text{ ft}^2$



$3\frac{1}{2} \text{ ft}$

$1\frac{1}{4} \text{ ft}$

8. $9.8 \cdot 9.8 = 96.04 \text{ yd}^2$



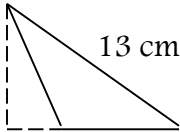
9.8 yd

9.8 yd

Area of Triangles

Find the area of each triangle. $A = (b \cdot h) \div 2$

1. $\frac{1}{2}(7 \cdot 8)$



8 cm

13 cm

7 cm

$56 \div 2 = 28 \text{ cm}^2$

2. base: 12 ft
 height: 7 ft

$12(7) \div 2$
 42 ft^2

$(17 \cdot 6) \div 2$
 51 m^2

3. base: 17 m
 height: 6m

4. base: $3\frac{1}{2}$ in
 height: $1\frac{5}{8}$ in

$(3.5 \cdot 1.625) \div 2$
 2.84 in^2

$(3.9)(7.2) \div 2$
 14.04 mm^2

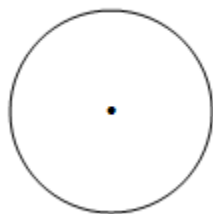
5. base: 3.9 mm
 height: 7.2 mm

6. base: 7 km
 height: 4.2 km

$(7)(4.2) \div 2$
 14.7 km^2

Find the area of each circle shown or described below. Round answers to the nearest hundredth. $A = \pi r^2$ use 3.14 for π

1.
132.25

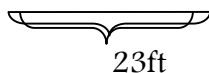
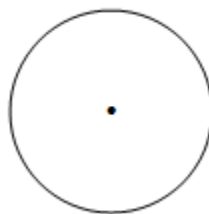


6 m $A = 113.04\text{m}^2$

$$A = 3.14 \cdot 6^2$$

$$A = 3.14 \cdot 36$$

2.

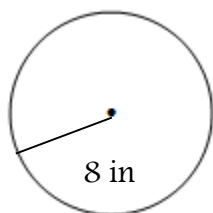


$$A = 3.14 \cdot 11.5^2$$

$$A = 3.14 \cdot$$

$$A = 415.27\text{ft}^2$$

3.

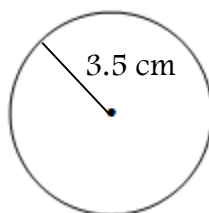


$$A = 3.14 \cdot 8^2$$

$$A = 3.14 \cdot 64$$

$$A = 200.96\text{in}^2$$

4.

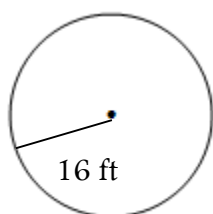


$$A = 3.14 \cdot 3.5^2$$

$$A = 3.14 \cdot 12.25$$

$$A = 38.47\text{cm}^2$$

5.

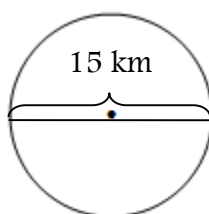


$$A = 3.14 \cdot 16^2$$

$$A = 3.14 \cdot 256$$

$$A = 803.84\text{ft}^2$$

6.



$$A = 3.14 \cdot 7.5^2$$

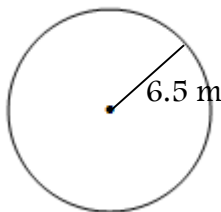
$$A = 3.14 \cdot 56.25$$

$$A = 176.63\text{km}^2$$

Circles and Circumference

Find the circumference of each circle show or described below
 $C = 2\pi r$ or $C = \pi \cdot d$ use 3.14 for π

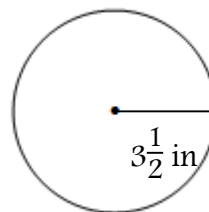
1.



$$C = 2 \cdot 3.14 \cdot 6.5$$

$$C = 40.82\text{m}$$

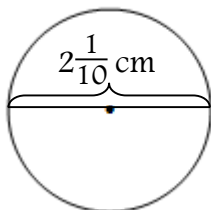
2.



$$C = 2 \cdot 3.14 \cdot 3\frac{1}{2}$$

$$C = 21.98\text{in}$$

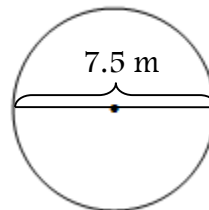
3.



$$C = 3.14 \cdot 2\frac{1}{10}$$

$$C = 6.59\text{cm}$$

4.



$$C = 3.14 \cdot 7.5$$

$$C = 23.55\text{m}$$

5. $d = 8\frac{3}{4}$ in.

$$C = 3.14 \cdot 8\frac{3}{4}$$

$$C = 27.48\text{in}$$

6. $r = 11$ ft

$$C = 2 \cdot 3.14 \cdot 11$$

$$C = 69.08\text{ft}$$

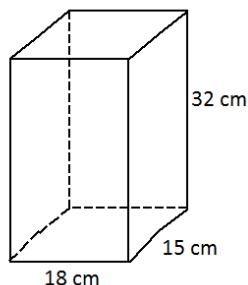
Surface Area of Prisms $SA = 2(l \cdot w) + 2(w \cdot h) + 2(l \cdot h)$

Find the surface area of each rectangular prism. Round decimal answers to the nearest tenth.

Volume of Prisms $V = L \cdot W \cdot H$

Find the volume of each rectangular prism. Round decimal answers to the nearest tenth.

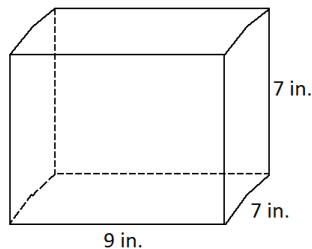
1.



$$SA = 2(18 \cdot 15) + 2(15 \cdot 32) + 2(18 \cdot 32) = 2,652 \text{ cm}^2$$

$$V = 18 \cdot 15 \cdot 32 = 8,640 \text{ cm}^3$$

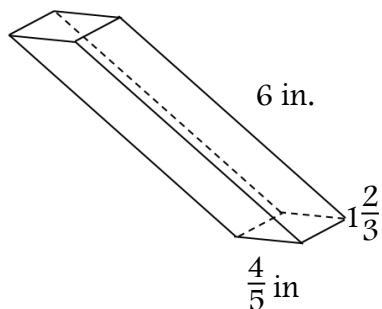
2.



$$SA = 2(8 \cdot 7) + 2(7 \cdot 7) + 2(8 \cdot 7) = 322 \text{ in}^2$$

$$V = 8 \cdot 7 \cdot 7 = 392 \text{ in}^3$$

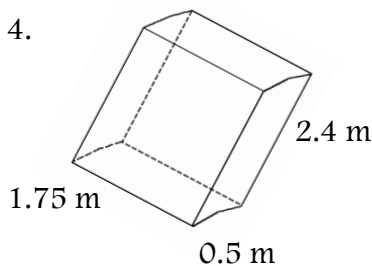
3.



$$SA = 2(6 \cdot 1\frac{2}{3}) + 2(\frac{4}{5} \cdot 1\frac{2}{3}) + 2(6 \cdot \frac{4}{5}) = 32.3 \text{ in}^2$$

$$V = 6 \cdot \frac{4}{5} \cdot 1\frac{2}{3} = 8 \text{ in}^3$$

4.



$$SA = 2(1.75 \cdot 0.5) + 2(0.5 \cdot 2.4) + 2(1.75 \cdot 2.4) = 12.6 \text{ m}^2$$

$$V = 1.75 \cdot 0.5 \cdot 2.4 = 2.1 \text{ m}^3$$

5. length, 8 mm
width, 12 mm
height, 10 mm

$$SA = 2(8 \cdot 12) + 2(12 \cdot 10) + 2(8 \cdot 10) = 592 \text{ mm}^2$$

$$V = 8 \cdot 12 \cdot 10 = 960 \text{ mm}^3$$

6. length, 9 ft
width, 7 ft
height, 12.5 ft

$$SA = 2(9 \cdot 7) + 2(7 \cdot 12.5) + 2(9 \cdot 12.5) = 526 \text{ ft}^2$$

$$V = 9 \cdot 7 \cdot 12.5 = 787.5 \text{ ft}^3$$

7. length, 7.6 in.
width, 8.4 in.
height, 15 in.

$$SA = 2(7.6 \cdot 8.4) + 2(8.4 \cdot 15) + 2(7.6 \cdot 15)$$

$$= 607.7 \text{ in}^2$$

$$V = 6 \cdot 12 \cdot 10 = 960 \text{ mm}^3$$

8. length, 18.3 cm
width, 27 cm
height, 21 cm

$$SA = 2(18.3 \cdot 27) + 2(27 \cdot 21) + 2(18.3 \cdot 21) =$$

$$= 2,890.8 \text{ cm}^2$$

$$V = 9 \cdot 7 \cdot 12.5 = 787.5 \text{ ft}^3$$

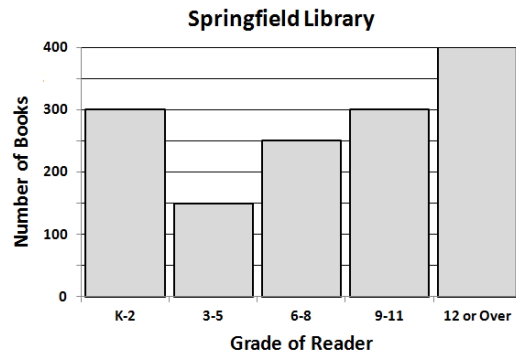
9. A cube has sides that are 9.2 inches long. What is the volume of the cube?

All faces of a cube are congruent $9.2 \cdot 9.2 \cdot 9.2 = 778.7 \text{ in}^3$

Histograms

A histogram is a graph that shows how many items occur between two numbers.

The Springfield Library has books arranged by grade level.



How many books are there for grades 6-11?

Find the number of books for grades 6-8.	250
Find the number of books for grades 9-11.	300
Add to find the books for grades 6-11.	$250 + 300 = 550$

There are 550 books for grades 6-11.

Use the histogram above to answer each question.

1. How many books are there for grades 3-5? 150
2. Which grade levels have the greatest number of books? 12 or over
3. Which grade levels have the fewest number of books? 3-5
4. How many books are there for students in grade 6 and above? $250 + 300 + 400 = 950$
5. How many books are in the Springfield Library? $300 + 150 + 950 = 1,400$

Critical Thinking

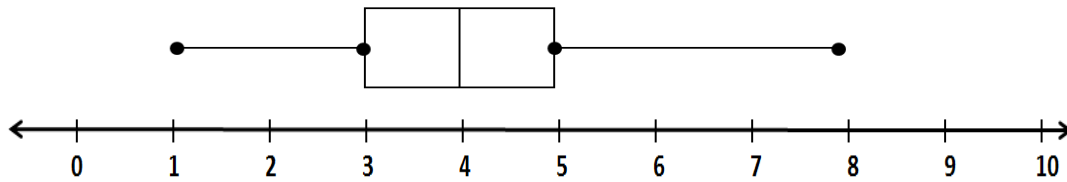
What percent of all of the books in the histogram are for grades 9 and above?

$$\frac{700}{1400} = 50\%$$

Worksheet – BOX-AND-WHISKER PLOTS

A. Use the Box-and-Whisker Plot to Answer Questions 1-5

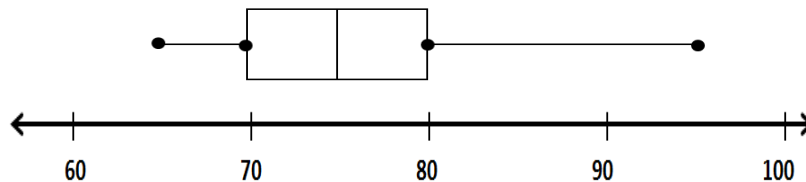
Ages of Dogs in the Dog Show (years)



1. What is the age of the oldest dog(s) in the show? 8 yrs old
2. What is the median age of the dogs? 4 yrs old
3. What number is the lower quartile? 3 yrs old
4. What is the inter-quartile range? $5 - 3 = 2$ yrs
5. About what fraction of the dogs are 5 years old or older? $\frac{1}{4}$

B. Use the Box-and-Whisker Plot to Answer Questions 6-10

Algebra Test Scores



6. What is the median of all scores? 75
7. What number is the lower quartile? 70
8. What percent of the scores are between 70% and 80%? 50%
9. What fraction of the scores fall between 80% and 95%? $\frac{1}{4}$
10. What is the range of the test scores? $95 - 65 = 30$

Equivalent Ratios

1.

7	14	21
5	10	15

2.

8	16	24
7	14	21

3.

2	4	6
5	10	15

4.

3	6	9
5	10	15

5.

7	14	21
12	24	36

6.

7	14	21
4	8	12

Determine whether the ratios are equivalent.

7. $\frac{6}{7}$ and $\frac{18}{21}$ Yes

8. $\frac{12}{11}$ and $\frac{24}{22}$ Yes

9. $\frac{4}{5}$ and $\frac{16}{20}$ Yes

10. $\frac{9}{4}$ and $\frac{11}{5}$ No

11. $\frac{7}{9}$ and $\frac{5}{3}$ No

12. $\frac{5}{7}$ and $\frac{15}{21}$ Yes

Use equivalent ratios to find the unknown value.

13. $\frac{25}{c}$ and $\frac{5}{8}$ $c = \underline{40}$

14. $\frac{50}{c}$ and $\frac{10}{11}$ $c = \underline{55}$

15. $\frac{r}{14}$ and $\frac{2}{7}$ $r = \underline{4}$

16. $\frac{r}{44}$ and $\frac{5}{11}$ $r = \underline{20}$

17. $\frac{7}{6}$ and $\frac{49}{h}$ $h = \underline{42}$

18. $\frac{11}{12}$ and $\frac{a}{84}$ $a = \underline{77}$

Why Did Bonzo Hit His Sister During the Game?

Ⓘ 5 lb of potatoes for \$2.19
 $2.19 \div 5 = \$ \underline{0.44}$ per lb

Ⓐ 60 oz of honey for \$4.89
 $4.89 \div 60 = \$ \underline{0.08}$ per oz

Ⓔ 200 ft of foil for \$6.24
 $6.24 \div 200 = \$ \underline{0.03}$ per ft

Ⓓ 1 dozen roses for \$29.75
 $29.75 \div 12 = \$ \underline{2.48}$ per rose

Ⓐ 36 oz of peanut butter for \$4.39
 $4.39 \div 36 = \$ \underline{0.12}$ per oz

Ⓔ 25 greeting cards for \$7.95
 $7.95 \div 25 = \$ \underline{0.32}$ per card

Ⓕ 18 issues of a magazine for \$28.90
 $28.90 \div 18 = \$ \underline{1.61}$ per issue

Ⓙ 147 oz of detergent for \$9.27
 $9.27 \div 147 = \$ \underline{0.06}$ per oz

Ⓒ 1 dozen doughnuts for \$4.50
 $4.50 \div 12 = \$ \underline{0.38}$ per doughnut

Ⓕ 7 tennis lessons for \$99
 $99 \div 7 = \$ \underline{14.14}$ per lessons

Ⓦ 22 oz of cereal for \$3.67
 $3.67 \div 22 = \$ \underline{0.17}$ per oz

Ⓡ 3.5 lb of cheese for \$8.94
 $8.94 \div 3.5 = \$ \underline{2.55}$ per oz

H	E		H	E	A	R	D		I	T		W	A	S
1.61	0.03	0.41	14.14	0.32	0.08	2.55	2.48	0.19	0.44	0.06	2.67	0.17	0.12	0.38

Ⓔ 14 oz for \$0.99 $.99 \div 14 = \$\underline{0.07}$ per oz Ⓞ 5 pieces for \$4.79 $4.79 \div 5 = \$\underline{0.96}$ per piece

Ⓐ 64 oz for \$3.10 $3.10 \div 64 = \$\underline{0.05}$ per oz Ⓔ 21 pieces for \$18.77 $18.77 \div 21 = \$\underline{0.89}$ per piece

Ⓚ 165 oz for \$0.50 $.50 \div 1.65 = \$\underline{0.30}$ per oz Ⓒ 30 pieces for \$2.59 $2.59 \div 30 = \$\underline{0.09}$ per piece

Ⓐ 8 oz for \$1.95 $1.95 \div 8 = \$\underline{0.24}$ per oz Ⓜ 165 pieces for \$7.28 $7.28 \div 165 = \$\underline{0.04}$ per piece

Ⓕ A monthly magazine charges \$17.40 for a one-year subscription (12 issues). The same magazine sells at the newsstand for \$2.00 a copy. How much do you save on *each issue* by buying a subscription?

$$17.40 \div 12 = \$1.45$$

2.00
<u> 1.45</u>
You save \$ 0.55

Ⓒ A sports store pays \$380 for a case of 144 baseball. The store sells the baseballs for \$4.75 each. How much less is their cost than their selling cost for each ball?

$$380 \div 144 = \$2.64$$

4.75
<u> 2.64</u>
The cost is \$2.11 less

Ⓡ A season ticket to the Olde Theatre costs \$76 and admits you to 6 plays. Single tickets to each play cost \$15. How much do you save on each play by buying a season ticket?

$$76 \div 6 = \$12.67$$

$$15.00 - 12.67 = 2.33$$

You save \$2.33 per play

Ⓒ For film and processing, a 36-exposure roll of film costs \$19.20. A 24-exposure roll costs \$16.40. How much can you save per picture by choosing the better buy?

$$19.20 \div 36 = 0.53$$

$$16.40 \div 24 = 0.68$$

$$0.68 - 0.53 = 0.15$$

You save \$0.15 per picture

A		S	O	C	K		H	E	R		G	A	M	E
0.24	0.02	2.11	0.96	0.15	0.30	2.16	0.55	0.07	2.33	0.46	0.09	0.05	0.04	0.89

Ratio Word Problems

1. An ice cream factory makes 220 quarts of ice cream in 5 hours. How many quarts could be made in 12 hours? What was the rate per day?

44

$$220 \div 5 = 44 \text{ quarts per hour}$$

2. The bakers at Healthy Bakery can make 150 bagels in 2 hours. How many bagels can they bake in 14 hours? What was that rate per hour?

1,050 & 75

$$\frac{2 \text{ hr}}{150 \text{ bagels}} = \frac{14 \text{ hr}}{?} \quad 2 \cdot 7 = 14 \quad \text{so } 150 \cdot 7 = 1,050 \text{ bagels}$$

$$150 \div 2 = 75 \text{ bagels per hour}$$

3. You can buy 3 apples at the Quick Market for \$1.14. You can buy 5 of the same apples at the Stop and Save for \$2.45. Which place is the better buy?

Quick Market

$$\frac{3 \text{ apples}}{\$1.14} \div \frac{3}{3} = \frac{\text{apple}}{\$0.38} \quad \$0.38 \text{ per apple at Quick Market}$$

$$\frac{5 \text{ apples}}{\$2.45} \div \frac{5}{5} = \frac{\text{apple}}{\$0.49} \quad \$0.49 \text{ per apple at Stop and Save}$$

4. A ferris wheel can accommodate 75 people in 30 minutes. How many people could ride the ferris wheel in 6 hours? What was that rate per hour?

900 & 150

$$\frac{75 \text{ people} \cdot 12}{0.5 \cdot 12} = \frac{900 \text{ people}}{6 \text{ hrs}} \quad \frac{75 \text{ people}}{0.5 \text{ hrs}} \cdot \frac{2}{2} = \frac{150 \text{ people}}{1 \text{ hr}}$$

5. A jet travels 470 miles in 5 hours. At this rate, how far could the jet fly in 8 hours? What is the rate of speed of the jet?

852 & 94

$$470 \div 5 = 94 \text{ miles per hour}$$

$$8 \text{ hrs} \cdot 94 = 852 \text{ miles}$$

6. You can buy 5 cans of green beans at the Village Market for \$4.00. You can buy 10 of the same cans of beans at Joe's Market for \$7.10. Which place is the better buy?

Joe's Market

$$\$4.00 \div 5 = \$0.80 \text{ per can at Village Market}$$

$$\$7.10 \div 10 = \$0.70 \text{ per can at Joe's Market}$$

7. Gas mileage is the number of miles you can drive on a gallon of gasoline. A test of a new car results in 590 miles on 20 gallons of gas. How far could you drive on 50 gallons of gas? What is the car's gas mileage?

1,475 & 29.5

$$590 \text{ miles} \div 20 \text{ gallons} = 29.5 \text{ miles per gallon (mpg)}$$

$$29.5 \text{ mpg} \cdot 50 \text{ gallons} = 1,475 \text{ miles}$$