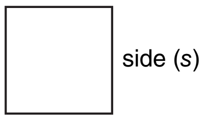
Name ______________________________

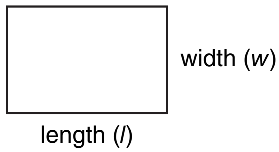
• Geometric Formulas

Shape	Perimeter	Area
Square	$P = 4s$	$A = s^2$
Rectangle	$P = 2l + 2w$	$A = lw$
Parallelogram	$P = 2b + 2s$	$A = bh$
Triangle	$P = s_1 + s_2 + s_3$	$A = \frac{1}{2}bh$

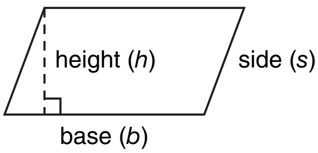
Square



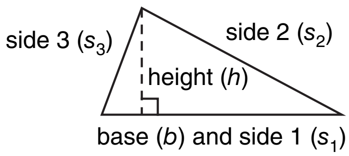
Rectangle



Parallelogram



Triangle



Practice:

1. Write the formula for the perimeter of a square. Then substitute 8 inches for the side. Solve the equation to find the perimeter of the square.

____

2. Write the formula for the area of a rectangle. Then substitute 4 cm for the length and 6 cm for the width. Solve the equation to find the area of the rectangle.

____

3. Write the formula for the perimeter of a parallelogram. Then substitute 3 inches for the base and 5 inches for the side. Solve the equation to find the perimeter of the parallelogram.

____

4. Write the formula for the area of a triangle. Then substitute 5 cm for the base and 8 cm for the height. Solve the equation to find the area of the triangle.

____

• Expanded Notation with Exponents
• Order of Operations with Exponents
• Powers of Fractions

- To write numbers in expanded notation, we may also show whole number place values with powers of 10.

  Notice the exponent and the number of zeros it takes.

  $10^4 = 10{,}000 \quad 10^3 = 1000 \quad 10^2 = 100 \quad 10^1 = 10 \quad 10^0 = 1$

  Example: Show 186,000 in expanded notation using exponents.

  186,000

  $(1 \times 100{,}000) + (8 \times 10{,}000) + (6 \times 1000)$

  $(1 \times 10^5) + (8 \times 10^4) + (6 \times 10^3)$

  The exponent after the 10 is equal to the number of zeros to the right of the number.

- In the order of operations, simplify expressions before multiplying or dividing.
  1. Simplify parentheses.
  2. Simplify exponents (powers) and roots.
  3. Multiply and divide left to right.
  4. Add and subtract left to right.

> Some students remember the order of operations by memorizing this phrase:
> **P**lease—P is for parentheses.
> **E**xcuse—E is for exponents.
> **M**y **D**ear—M is for multiplication;
> D is for division.
> **A**unt **S**ally—A is for addition;
> S is for subtraction.

- Exponents may be used with fractions and with decimals.

  Convert a mixed number to an improper fraction before you multiply.

  Example: $\left(1\frac{1}{2}\right)^2 \longrightarrow \left(\frac{3}{2}\right)^2 \qquad \frac{3}{2} \times \frac{3}{2} = \frac{9}{4} = 2\frac{1}{4}$

Practice:

Simplify 1–5.

1. $9 + 3 \times 5 - 4^2 =$ ________

2. $\left(1\frac{1}{3}\right)^2 =$ ________

3. $3^2 - \sqrt{9} =$ ________

4. $2^3 + \sqrt{16} - 2 \times 5 =$ ________

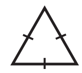
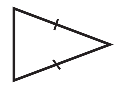
5. $3^3 - 2^2 + 9 \times 4 =$ ________

6. Write the standard notation: $(3 \times 10^3) + (5 \times 10^2) =$ ________

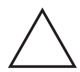
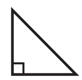
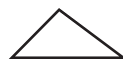
Name ____________________

• Classifying Triangles

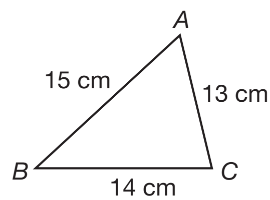
Classifying Triangles by Sides

Characteristic	Type	Example
Three sides of equal length	Equilateral triangle	
Two sides of equal length	Isosceles triangle	
Three sides of unequal length	Scalene triangle	

Classifying Triangles by Angles

Characteristic	Type	Example
All acute angles	Acute triangle	
One right angle	Right triangle	
One obtuse angle	Obtuse triangle	

Practice:



1. Which of these terms describes triangle *ABC*? ________

   A. acute triangle **B.** isosceles triangle **C.** right triangle **D.** obtuse triangle

2. What is the perimeter of an equilateral triangle if one of its sides is 12 inches long? ________

3. If the perimeter of an equilateral triangle is 27 inches, how long is each side? ________

4. An equilateral triangle is also what kind of triangle? ________

5. A right triangle can also be an isosceles triangle? True or false? ________

• Writing Fractions and Decimals as Percents, Part 2

- To change a number to a percent:
  1. Multiply the number by 100%.
  2. With fractions, cancel if possible.

Example: Write $\frac{6}{5}$ as a percent.

$$\frac{6}{\cancel{5}_{1}} \times \frac{\cancel{100}^{20}\%}{1} = 120\%$$

Write 1.2 as a percent.

$$1.2 \times 100\% = 120\%$$

3. If a fraction will not cancel to a 1 in the denominator:
   Multiply across.
   Divide the fraction.

Example: Change $\frac{1}{3}$ to a percent.

$$\frac{1}{3} \times \frac{100\%}{1} = \frac{100\%}{3} \longrightarrow 3\overline{)100\%} = 33\tfrac{1}{3}\%$$

Remember: to change a fraction to a percent, multiply the fraction by 100%.
to change a decimal number to a percent, multiply by 100%.

Practice:

1. Change $\frac{2}{5}$ to a percent. ________

2. Change $\frac{1}{7}$ to a percent. ________

3. Change $\frac{3}{8}$ to a percent. ________

4. Change 0.92 to a percent. ________

5. Change 0.406 to a percent. ________

• Reducing Units Before Multiplying

- We cancel **numbers** in fractions before multiplying.
- Also cancel **units** in measures before multiplying.

Example: Multiply 4 miles per hour by two hours.

Write 4 miles per hour as the ratio 4 miles over 1 hour.
"Per" indicates division.
Write two hours as the ratio 2 hours over 1.

$$\frac{4 \text{ miles}}{1 \cancel{\text{hour}}} \times \frac{2 \cancel{\text{hours}}}{1} = 8 \text{ miles}$$

Practice:

Simplify 1–3.

1. $\frac{8 \text{ dollar}}{1 \text{ hour}} \times 7 \text{ hours} =$ ________

2. $\frac{7 \text{ cents}}{1 \text{ minute}} \times 45 \text{ minutes} =$ ________

3. $\frac{300 \text{ miles}}{1 \text{ day}} \times 2 \text{ days} =$ ________

4. Multiply 15 teachers by 18 students per teacher. ________

5. Multiply 3.9 meters by 100 centimeters per meter. ________

• Functions

A **function** pairs one unknown with another unknown.

1. Study the table to find the function rule.

Example:

Position	**First**	**Second**	**Third**	**Fourth**	**Fifth**	**Sixth**
n	1	2	3	4	5	6
Term	1	4	9	16		

What do you do to 1 to get 1? Multiply by 1 or add 1.
What do you do to 2 to get 4? Multiply by 2 or add 2.
What do you do to 3 to get 9? Multiply by 3 or add 6.
What do you do to 4 to get 16? Multiply by 4 or add 12.
What rule can apply to all the numbers?
Each number is multiplied by itself to get the term.
How can we generalize the rule for this sequence?
Multiply n times itself or n^2.

2. Apply the rule of the function to find the missing numbers.

$5 \times 5 = 25$ $6 \times 6 = 36$

Using the rule, you can predict what the tenth term will be.

10×10 or $10^2 = 100$

Practice:

Find the missing numbers in each function table.

1.

n	2	3	4	5	6
Term	6	9	12		

2.

n	5	10	15	20	25
Term	1	6	11		

3.

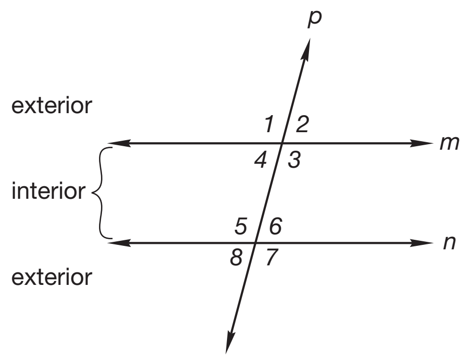
Chair	1	2	3	4	5
Legs	4	8	12		

4.

Gloves	2	4	6	8	10
Fingers	10	20	30		

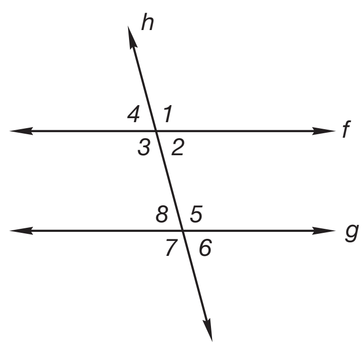
• Transversals

- A line that intersects two or more other lines is a **transversal.**
- $\angle 1$ and $\angle 5$ are **corresponding angles** (same relative position).
- Angles between the parallel lines are **interior angles.**
- $\angle 3$ and $\angle 5$ are **alternate interior angles** (opposite sides of the transversal).
- Angles not between the parallel lines are **exterior angles.**
- $\angle 1$ and $\angle 7$ are **alternate exterior angles** (opposite sides of the transversal).



Practice:

Use the figure at right to answer questions 1–6.
Lines *f* and *g* are parallel.



1. Angle *3* measures 110°.

What is the measure of $\angle 7$? ________

2. Which angle is an alternate

interior angle to $\angle 2$? ________

3. Angle *4* measures 70°.

What is the measure of $\angle 8$? ________

4. Which angle is an alternate exterior angle to $\angle 6$? ________

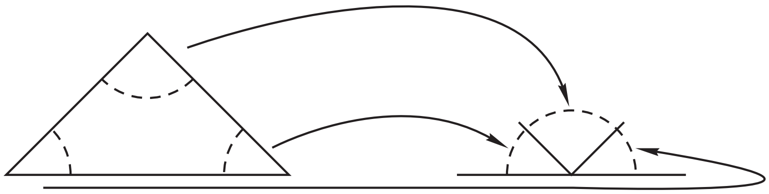
5. Which line is a transversal? ________

6. Which angle corresponds to $\angle 1$? ________

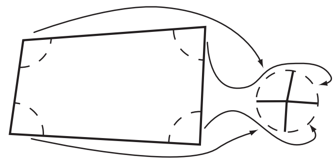
Name ______________________________

• Sum of the Angle Measures of Triangles and Quadrilaterals

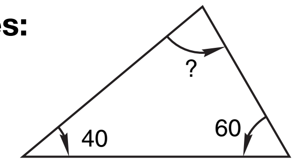
The sum of the interior angles of a triangle is 180°.



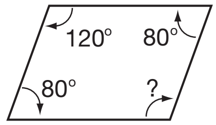
The sum of the interior angles of a quadrilateral is 360°.



Examples:



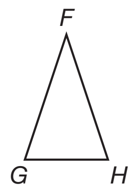
$180° - (40° + 60°) = 80°$



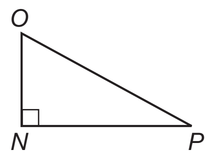
$360° - (120° + 80° + 80°) = 80°$

Practice:

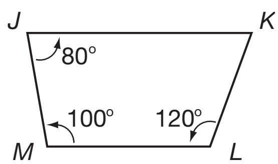
1. Triangle *FGH* is an isosceles triangle. Angles *G* and *H* each measure 65°. What is the measure of angle *F*? ________



2. Triangle *ABC* is a right triangle. Angle *A* measures 90° and angle *B* measures 50°. What is the measure of angle *C*? ________



3. What is the measure of ∠*K* in quadrilateral *JKLM*? ________



4. What is the sum of the measures of the four interior angles of a square? ________

• Fraction-Decimal-Percent Equivalents

- Fractions, decimals, and percents are three ways to express parts of a whole.
- You can show equivalent fractions, decimals, and percents in a table.

	Fraction	Decimal	Percent
1.	$\frac{1}{2}$	**a.**	**b.**
2.	**a.**	0.3	**b.**
3.	**a.**	**b.**	40%

→

	Fraction	Decimal	Percent
1.	$\frac{1}{2}$	**a.** 0.5	**b.** 50%
2.	**a.** $\frac{3}{10}$	0.3	**b.** 30%
3.	**a.** $\frac{4}{10} = \frac{2}{5}$	**b.** 0.4	40%

Practice:

Complete this table.

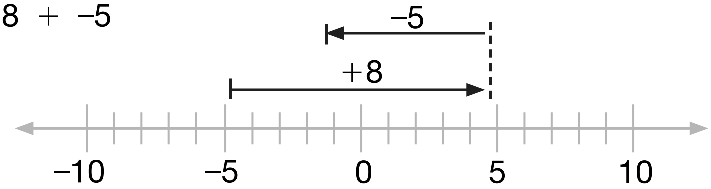
	Fraction	Decimal	Percent
1.	$\frac{4}{5}$	**b.**	**b.**
2.	**a.**	**a.**	6%
3.	**a.**	1.7	**b.**

Name ____________________

• Algebraic Addition of Integers

- **Integers:** the set of numbers that includes all the counting numbers, their opposites, and zero
- To add integers as illustrated on a number line:
  1. Begin at zero.
  2. Move right or left as indicated by the sign of the first number.
  3. Then move right or left as indicated by the second number.

  Example: $+8 + -5$



The sum is $+3$ or 3.

- To add signed numbers:
  If the signs are the same, add the absolute values and keep the same sign.
  If the signs are different, subtract the absolute values; keep the sign of the number with the greater absolute value.

  Examples: $(-5) + (-3) = -8$
  $(+8) + (-5) = +3$

- Adding the opposite of a number to subtract is called **algebraic addition.**
  Instead of subtracting a negative, add a positive.
  Instead of subtracting a positive, add a negative.
  Change the number after a subtraction sign to its opposite and then add.

  Examples: $-10 - (-6)$ $\quad\quad$ $-3 - (+5)$

  $-10 + (+6) = -4$ $\quad\quad$ $-3 + (-5) = -8$

Practice:

Simplify 1–4.

1. $-2 + -7 =$ ________ **2.** $-3 - (-6) =$ ________

3. $-9 - (-5) =$ ________ **4.** $-4 + -8 =$ ________

5. At 6 a.m. the temperature was –4°F. By noon the temperature had risen to 10°F.

How many degrees had the temperature risen? ________

6. At 6 a.m. the temperature was –9°C. By noon the temperature had risen to –1°C.

How many degrees had the temperature risen? ________

