Lesson 15

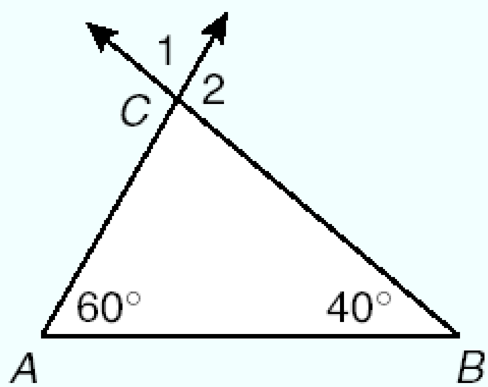
TAKS Review

Objective 6

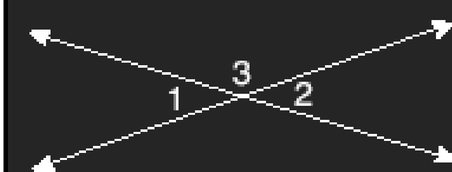
The student will demonstrate an understanding of geometric relationships and spatial reasoning.

Example:

In $\triangle ABC$ below, find the measures of $\angle 1$ and $\angle 2$.



Vertical angles are formed by the intersection of two lines. Vertical angles are always congruent. The adjacent angles formed by the intersection of two lines are always supplementary angles. The sum of the measures of supplementary angles is 180°.



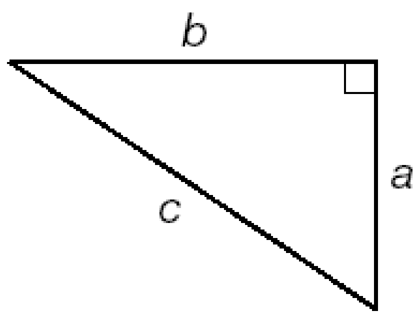
$m\angle 1 = m\angle 2$
$m\angle 1 + m\angle 3 = 180°$
$m\angle 2 + m\angle 3 = 180°$

Example:

If $\angle A$ is the supplement of $\angle B$ and $\angle B$ is the supplement of $\angle C$, what is the relationship between the measures of $\angle A$ and $\angle C$?

What Patterns in Right Triangles Can You Use to Solve Problems?

The **Pythagorean Theorem**, $a^2 + b^2 = c^2$, can be used to solve problems involving the lengths of sides of right triangles.

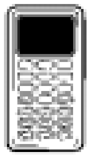


$$a^2 + b^2 = c^2$$

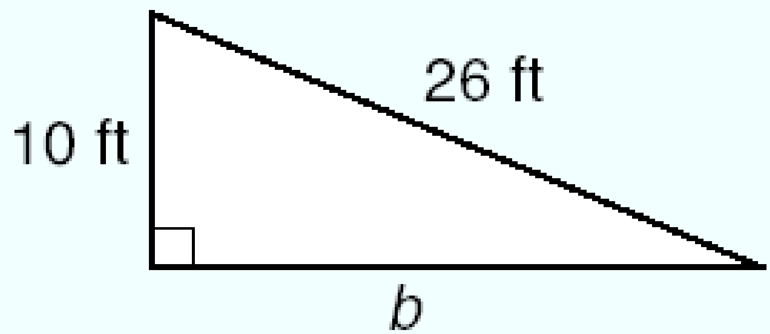
A set of three whole numbers that satisfy the Pythagorean Theorem is called a **Pythagorean triple**. Pythagorean triples can be used to find a missing side in a right triangle.

Multiply each of the numbers in a Pythagorean triple by any whole number to find another Pythagorean triple.

Example:



Find the length of side b in the right triangle below.



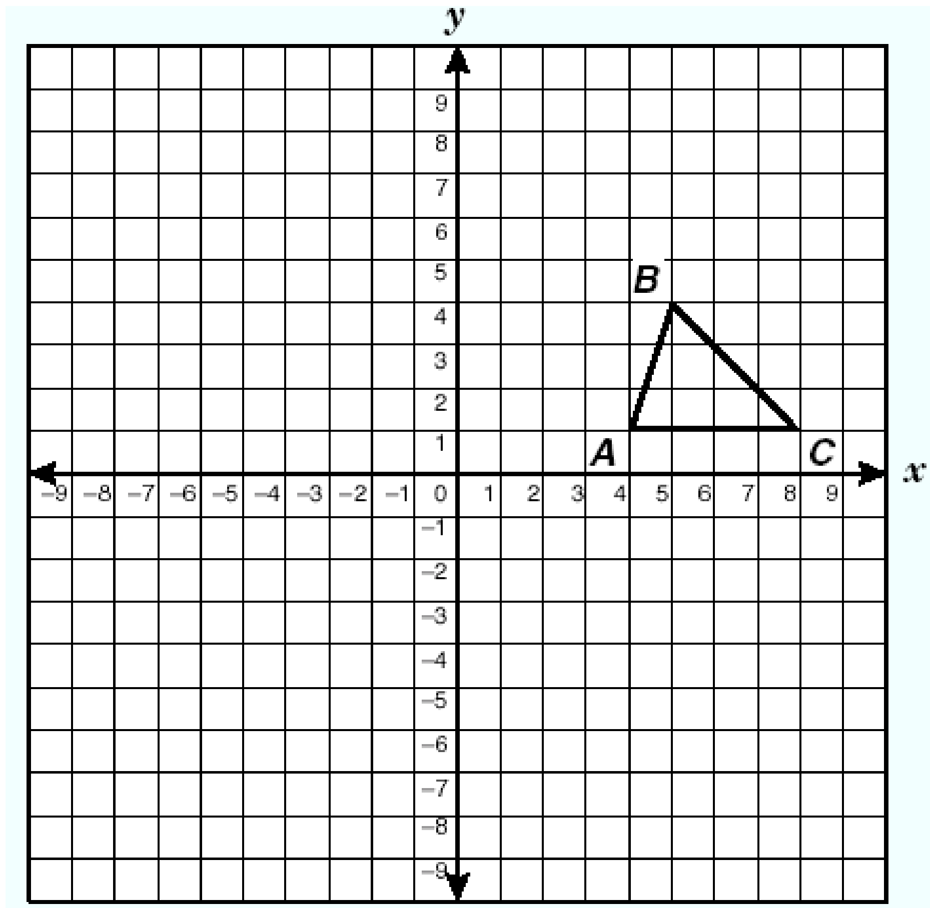
How Do You Use Transformations to Solve Problems?

Translations, reflections, and rotations are transformations of geometric figures that do not change the lengths of the segments of the figures. The original figure and its transformed image are congruent.

When figures are transformed, prime notation is often used to name the image. The point P' is the image of point P.

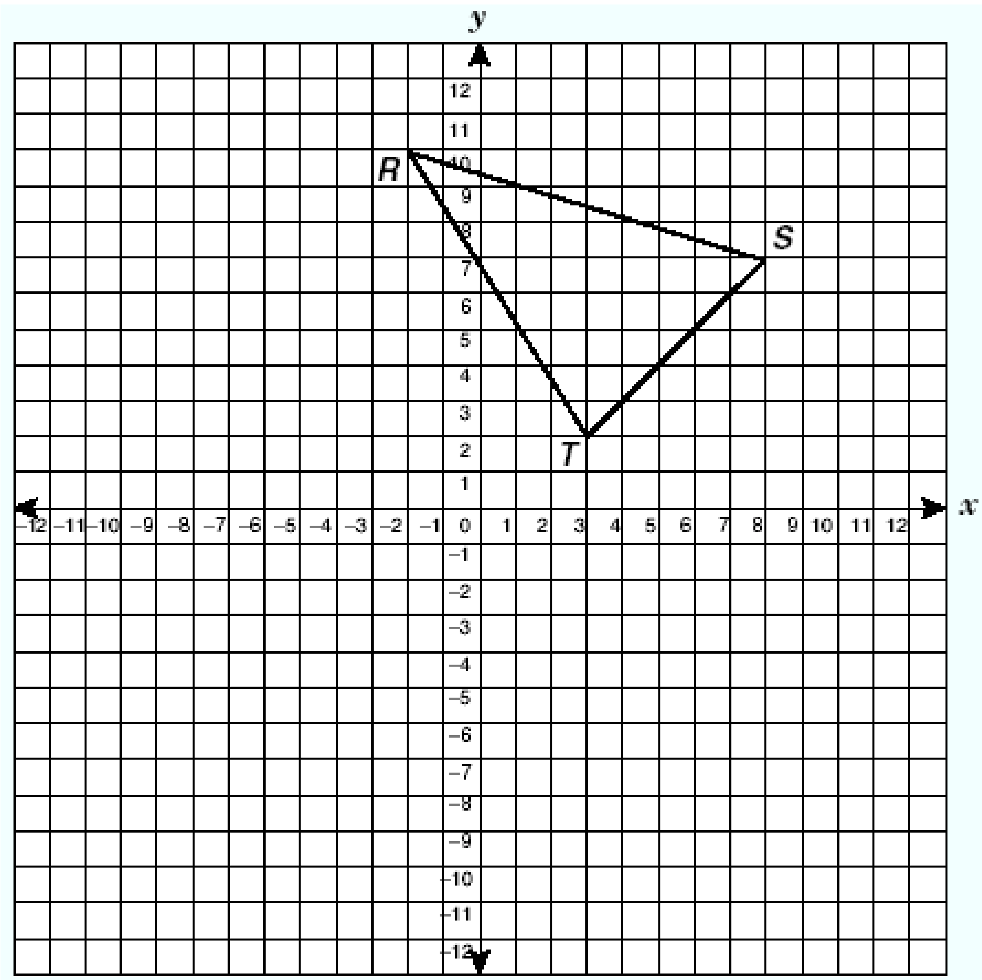
Example:

The graph of $\triangle ABC$ is shown below. Find the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$ reflected across the *y*-axis and translated 2 units up.



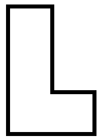
Example:

The graph of $\triangle RST$ is shown below. Find the coordinates of S' if $\triangle RST$ is rotated 90° clockwise around point T.



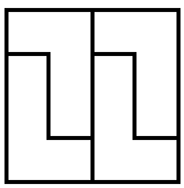
Example:

Look at the shape below.

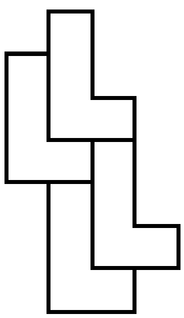


Which of these patterns can be made using only translations, rotations, or a combination of translations and rotations?

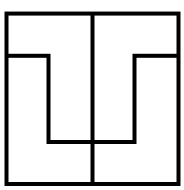
I



II



III



A I and II only

B I and III only

C II and III only

D I, II, and III

Objective 7

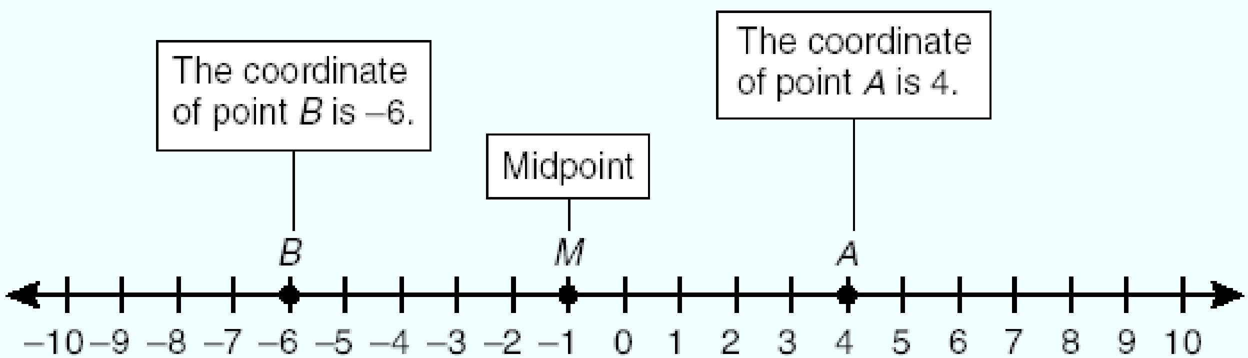
The student will demonstrate an understanding of two- and three-dimensional representations of geometric relationships and shapes.

How Do You Locate and Name Points on a Line or Plane?

A number line is used to locate and name points on a line.

Example:

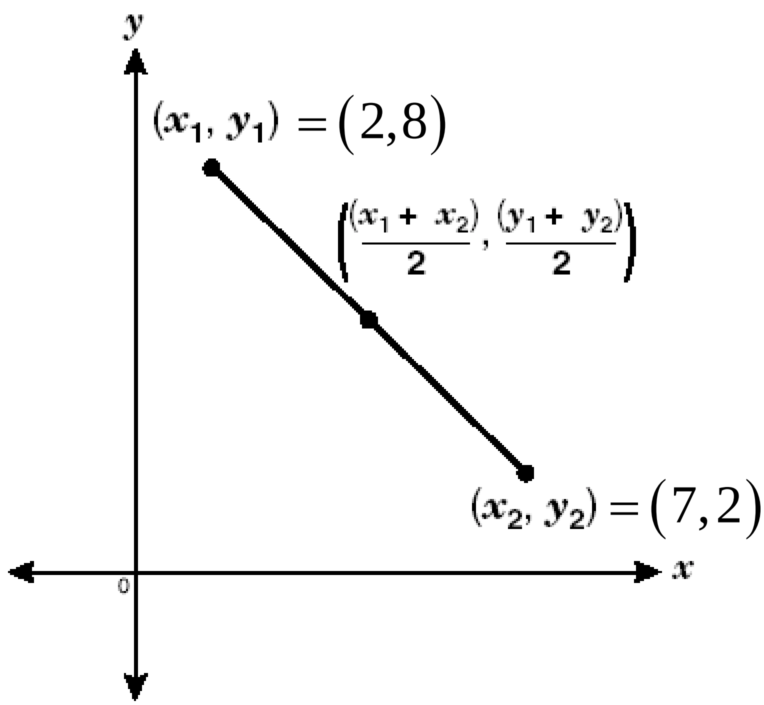
Find the coordinate of the midpoint of $\overline{AB}$.



Midpoint Formula

For any two points (x_1, y_1) and (x_2, y_2), the coordinates of the midpoint of the line segment they determine are given by the formula below.

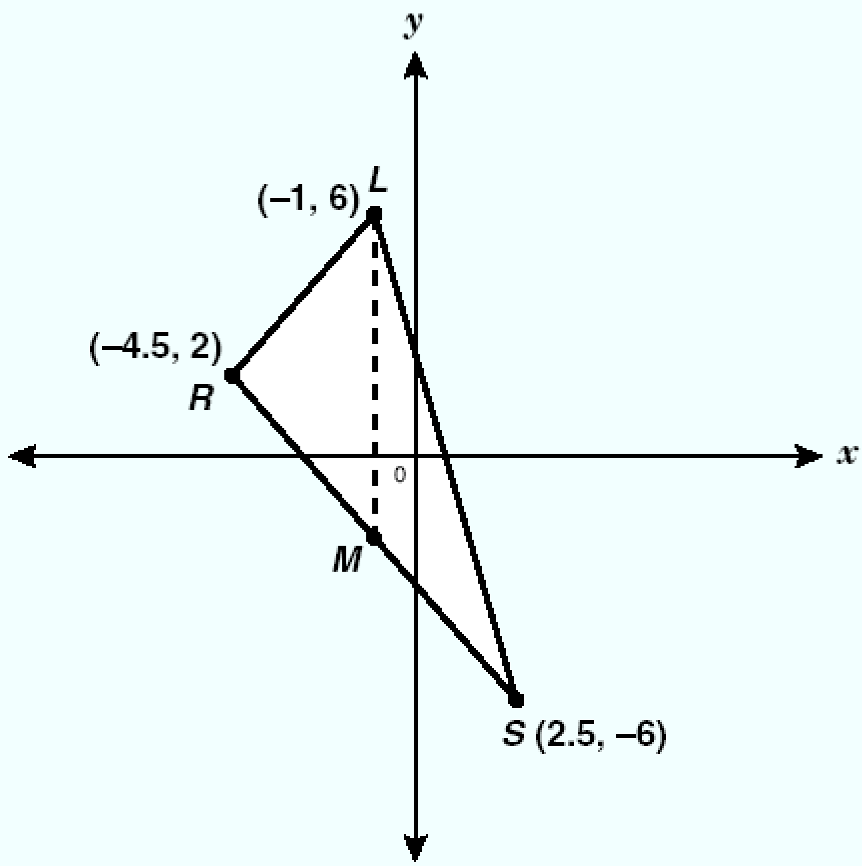
$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$



A **median** of a triangle is a line segment drawn from a vertex to the midpoint of the opposite side.

Example:

Triangle *LRS* has the following vertices: *L* (−1, 6), *R* (−4.5, 2), and *S* (2.5, −6). Find the coordinates of point *M*, the endpoint of median *LM* drawn to $\overline{RS}$.



Grades 9, 10, and 11 Exit Level
Mathematics Chart

LENGTH

Metric	Customary
1 kilometer = 1000 meters	1 mile = 1760 yards
1 meter = 100 centimeters	1 mile = 5280 feet
1 centimeter = 10 millimeters	1 yard = 3 feet
	1 foot = 12 inches

CAPACITY AND VOLUME

Metric	Customary
1 liter = 1000 milliliters	1 gallon = 4 quarts
	1 gallon = 128 ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 ounces

MASS AND WEIGHT

Metric	Customary
1 kilogram = 1000 grams	1 ton = 2000 pounds
1 gram = 1000 milligrams	1 pound = 16 ounces

TIME

1 year = 365 days
1 year = 12 months
1 year = 52 weeks
1 week = 7 days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

Metric and customary rulers can be found on the tear-out Mathematics Chart in the back of this book.

Grades 9, 10, and 11 Exit Level Mathematics Chart

Perimeter	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
Surface Area	cube	$S = 6s^2$
	cylinder (lateral)	$S = 2\pi rh$
	cylinder (total)	$S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$
	cone (lateral)	$S = \pi rl$
	cone (total)	$S = \pi rl + \pi r^2$ or $S = \pi r(l + r)$
	sphere	$S = 4\pi r^2$
Volume	prism or cylinder	$V = Bh$*
	pyramid or cone	$V = \frac{1}{3}Bh$*
	sphere	$V = \frac{4}{3}\pi r^3$
**B represents the area of the Base of a solid figure.*		
Pi	π	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$
Pythagorean Theorem		$a^2 + b^2 = c^2$
Distance Formula		$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Slope of a Line		$m = \frac{y_2 - y_1}{x_2 - x_1}$
Midpoint Formula		$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
Quadratic Formula		$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Slope-Intercept Form of an Equation		$y = mx + b$
Point-Slope Form of an Equation		$y - y_1 = m(x - x_1)$
Standard Form of an Equation		$Ax + By = C$
Simple Interest Formula		$I = prt$