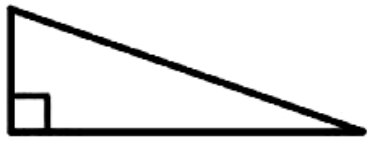
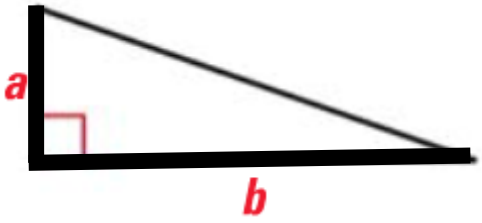
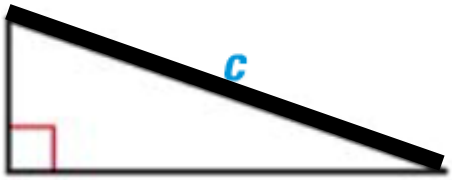
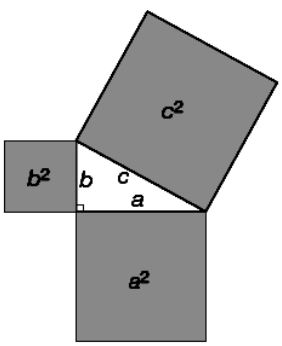
Notes: **THE PYTHAGOREAN THEOREM**

Content Objective: ***I will be able to apply the Pythagorean Theorem to right triangles as well as right triangles within quadrilaterals and other triangles.***

TERM	DESCRIPTION	EXAMPLE
	A triangle that contains one angle that measures _____^{o}.	
	The sides of a triangle that form a _____^{o} angle.	
	The _____ side that is opposite the _____^{o} angle in a triangle.	

The Pythagorean Theorem is a relationship among the lengths of the sides of a RIGHT TRIANGLE.

MULTIPLE REPRESENTATIONS OF THE PYTHAGOREAN THEOREM

ALGEBRAIC	VERBAL	GEOMETRIC MODEL
$a^2 + b^2 = c^2$	In any right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.	

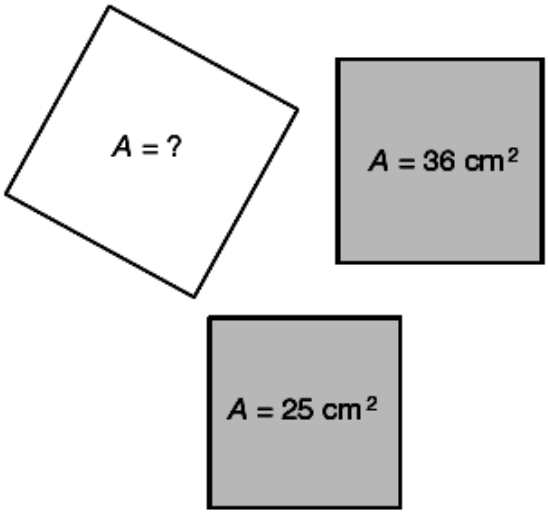
The Pythagorean Theorem is

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

$$(Leg_1)^2 + (Leg_2)^2 = (Hypotenuse)^2$$

EXAMPLE 1:

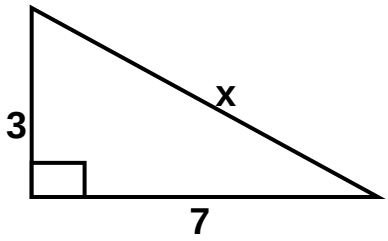
In the diagram at right, two of the three square are labeled with their areas. The three squares are to form a right triangle when joined at their vertices. One side of each of the two shaded squares will be the legs and one side of the unshaded square will be the hypotenuse. What is the area of the un-shaded square?



A = _____

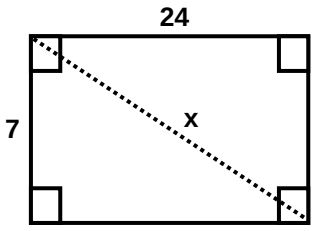
EXAMPLE 2: *When two of three sides of a right triangle are known, the third side can be found using the Pythagorean Theorem. Determine the value of x for each triangle.*

a.



x = _____

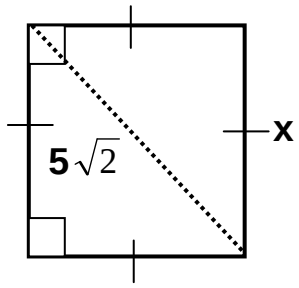
b.



x = _____

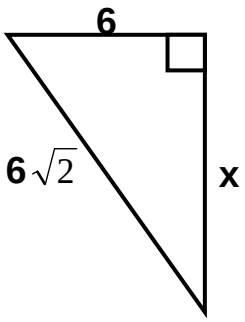
*For Examples 3 – 4, determine the value of **x** in each of the figures shown.*

EXAMPLE 3:



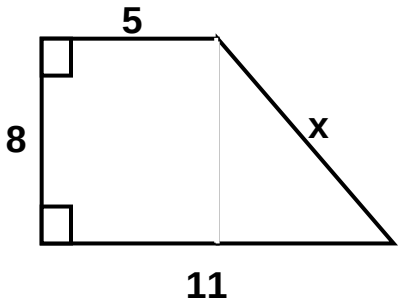
x = _____

QUICK CHECK:



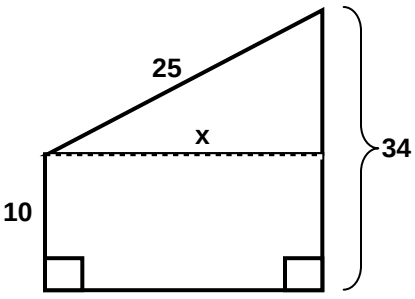
x = _____

EXAMPLE 4:



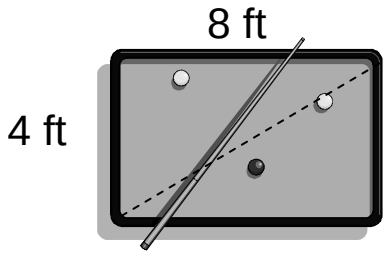
x = _____

QUICK CHECK:



x = _____

EXAMPLE 5: A pool table measures 4 feet by 8 feet. What is the distance, to the nearest tenth of a foot, from one corner pocket to the opposite corner pocket?



d = _____

QUICK CHECK: Find the length of a diagonal of a rectangle with length 12 and width 5.
(Hint: Draw and label the picture.)

d = _____

EXAMPLE 6: The older, square shaped floppy diskettes had a perimeter of 21 inches. What is the diagonal length of the diskette to the nearest tenth of an inch?
(Hint: Draw and label a picture.)

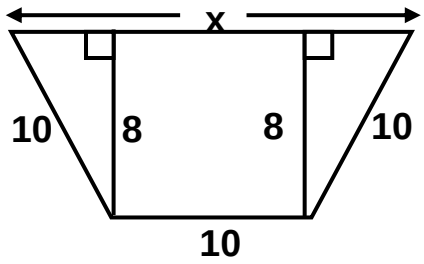
d = _____

QUICK CHECK: Find the length of the diagonal of a square with a perimeter of 36.
(Hint: Draw and label a picture.)

d = _____

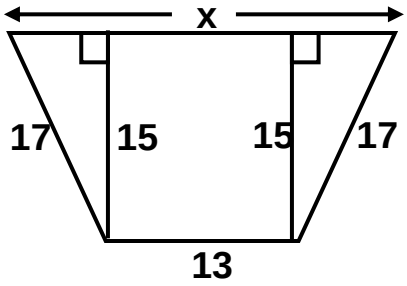
Determine the value of x using the trapezoids shown.

EXAMPLE 7:



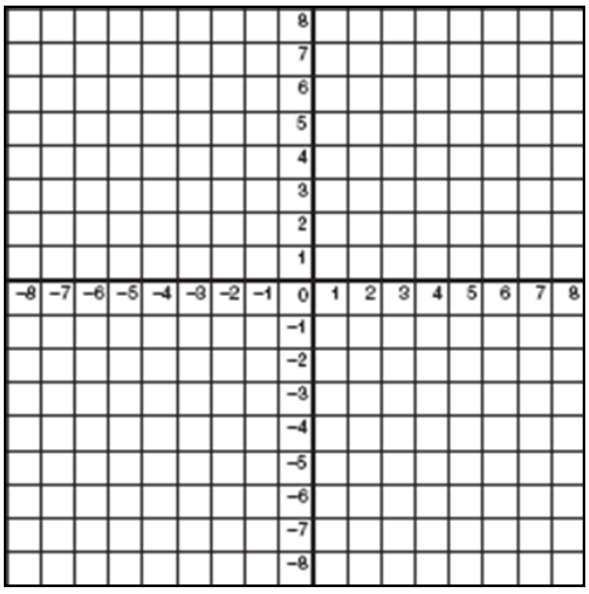
x = _____

QUICK CHECK:



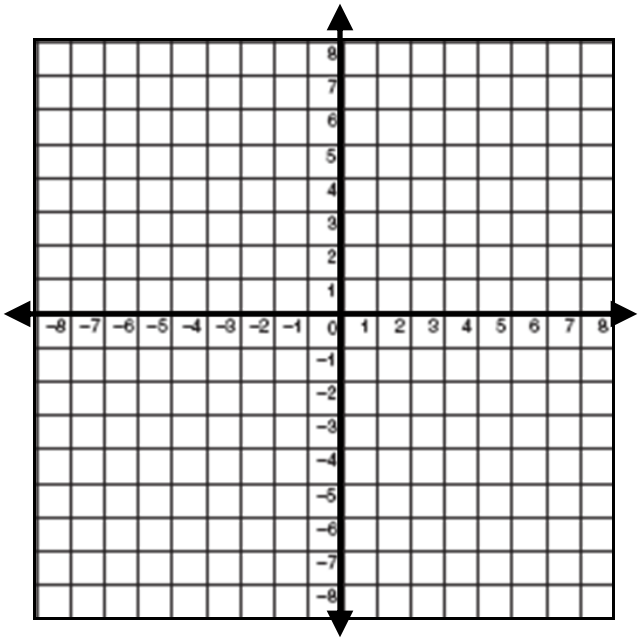
x = _____

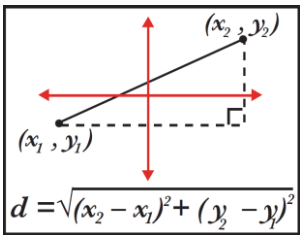
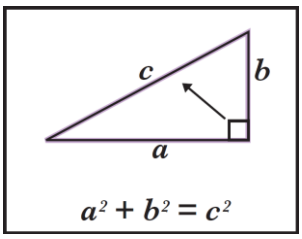
EXAMPLE 8: *Find the distance between (3, -2) and (-1, 1) using the Pythagorean Theorem*



d = _____

QUICK CHECK: *Find the distance between (-7, -1) and (1, 5) using both the Distance Formula and the Pythagorean Theorem.*



Distance Formula:	Pythagorean Theorem:
	
d = _____	d = _____

Compare and contrast the two methods for finding distance.

_____

_____

_____