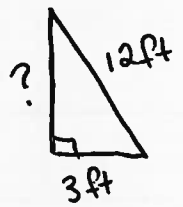
Pythagorean Theorem word problems ws #1 Name _____

Solve each of the following. Please draw a picture and use the Pythagorean Theorem to solve. ***Be sure to label all answers and leave answers in exact simplified form.***

1. The bottom of a ladder must be placed 3 feet from a wall. The ladder is 12 feet long. How far above the ground does the ladder touch the wall?



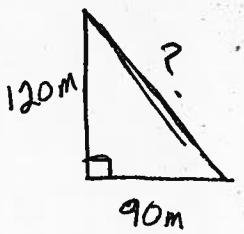
$12^2 - 3^2 = b^2$

$144 - 9 = b^2$

$b^2 = 135$

$b \approx 11.62$ ft

2. A soccer field is a rectangle 90 meters wide and 120 meters long. The coach asks players to run from one corner to the corner diagonally across the field. How far do the players run?



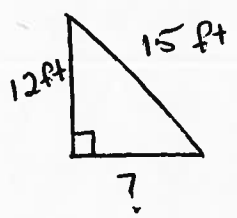
$120^2 + 90^2 = c^2$

$14400 + 8100 = c^2$

$c^2 = 22500$

$c = 150$ m

3. How far from the base of the house do you need to place a 15' ladder so that it exactly reaches the top of a 12' wall?



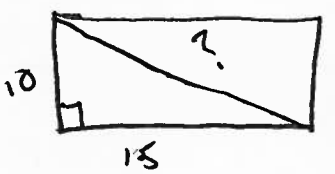
$15^2 - 12^2 = a^2$

$225 - 144 = a^2$

$a^2 = 81$

$a = 9$ ft

4. What is the length of the diagonal of a 10 cm by 15 cm rectangle?



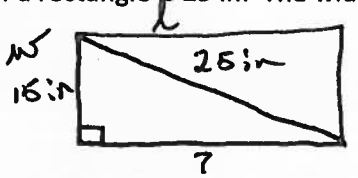
$15^2 + 10^2 = c^2$

$225 + 100 = c^2$

$c^2 = 325$

$c \approx 18.03$ cm

5. The diagonal of a rectangle is 25 in. The width is 15 in. What is the area of the rectangle?



$25^2 - 15^2 = b^2$

$625 - 225 = b^2$

$b^2 = 400$

$b = 20$

$A = l \cdot w$

$20 \cdot 15 = 300$

$A = 300$ in^2

6. Two sides of a right triangle are 8" and 12".

$A = \frac{1}{2} b \cdot h$

A. Find the the area of the triangle if 8 and 12 are legs.

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

$8^2 + 12^2 = c^2$ $\quad c \approx 14.4$

$64 + 144 = c^2$

$208 = c^2$

$A = \frac{1}{2}(8in)(12in)$

$\boxed{A = 48 in^2}$

B. Find the area of the triangle if 8 and 12 are a leg and hypotenuse.

$12^2 - 8^2 = x^2$ $\quad x \approx 8.94$

$144 - 64 = x^2$

$\sqrt{x^2} = \sqrt{80}$

$A = \frac{1}{2}(8in)(8.94in)$

$\boxed{A = 35.81 in^2}$

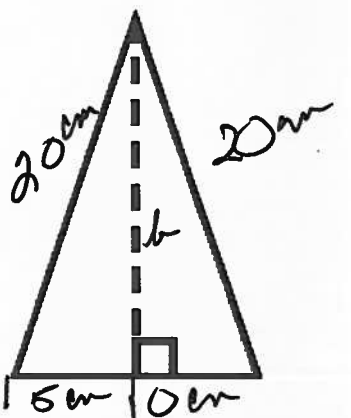
7. The area of a square is 81 cm^2. Find the perimeter of the square.

$\sqrt{81} = 9 cm$

$P = 4 \cdot D$

$P = 4 \cdot 9 cm = \boxed{36 cm}$

8. An isosceles triangle has congruent sides of 20 cm. The base is 10 cm. What is the area of the triangle?



$20^2 - 5^2 = b^2$

$400 - 25 = b^2$

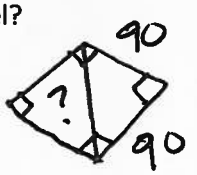
$b^2 = 375$

$b = 19.4 cm$

$A = \frac{1}{2}(10cm)(19.4cm)$

$A = 97 cm^2$

9. A baseball diamond is a square that is 90' on each side. If a player throws the ball from 2nd base to home, how far will the ball travel?



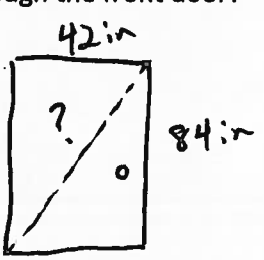
$90^2 + 90^2 = c^2$

$8100 + 8100 = c^2$

$16200 = c^2$

$c = 127.23 ft$

10. Jill's front door is 42" wide and 84" tall. She purchased a circular table that is 96 inches in diameter. Will the table fit through the front door?



$84^2 + 42^2 = c^2$

$7056 + 1764 = c^2$

$c^2 = 8820$

$c \approx 93.91 in$

No, the door is ~~2 in~~ about 2 inches too small.