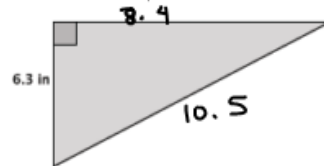


Lesson 18: Applications of the Pythagorean Theorem

Classwork

Exercises

1. The area of the right triangle shown below is 26.46 in^2 . What is the perimeter of the right triangle? Round your answer to the tenths place.



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

$$8.4^2 + 6.3^2 = c^2$$

$$70.56 + 39.69 = c^2$$

$$110.25 = c^2$$

$$10.5 = c$$

$$A = \frac{1}{2}bh$$

$$26.46 = \frac{1}{2}(6.3)h$$

$$\frac{26.46}{3.15} = \frac{3.15h}{3.15}$$

$$8.4 = h$$

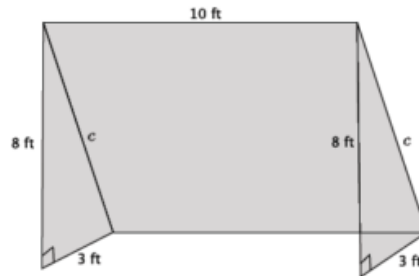
Perimeter = Add all sides

$$P = 10.5 + 6.3 + 8.4$$

$$P = 25.2$$

The perimeter of this right triangle is 25.2 in.

2. The diagram below is a representation of a soccer goal.



- a. Determine the length of the bar, c , that would be needed to provide structure to the goal. Round your answer to the tenths place.

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

$$8^2 + 3^2 = c^2$$

$$64 + 9 = c^2$$

$$73 = c^2$$

$$c = \sqrt{73}$$

$$c \approx 8.5$$

- b. How much netting (in square feet) is needed to cover the entire goal?

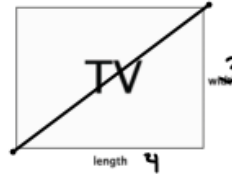
2 triangles + rectangle

$$2 \left(\frac{1}{2} (3)(8) \right) + (10)(8.5)$$

$$24 + 85 = 109$$

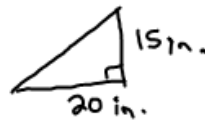
We would need approximately 109 ft² of netting to cover the entire goal.

3. The typical ratio of length to width that is used to produce televisions is 4:3.



A TV with length 20 inches and width 15 inches, for example, has sides in a 4:3 ratio; as does any TV with length $4x$ inches and width $3x$ inches for any number x .

- a. What is the advertised size of a TV with length 20 inches and width 15 inches?



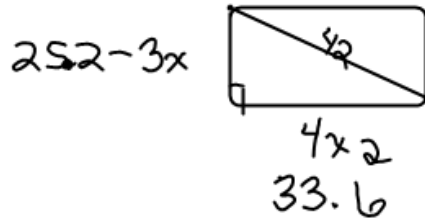
$$a^2 + b^2 = c^2$$

$$15^2 + 20^2 = c^2 \quad c = 25$$

$$225 + 400 = c^2$$

$$625 = c^2$$

- b. A 42" TV was just given to your family. What are the length and width measurements of the TV?



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

$$(3x)^2 + (4x)^2 = 42^2$$

$$9x^2 + 16x^2 = 1764$$

$$\frac{25x^2}{25} = \frac{1764}{25}$$

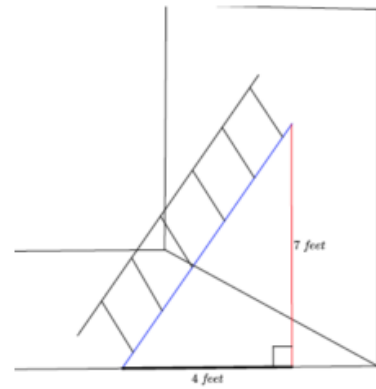
$$x^2 = 70.56$$

$$x = 8.4$$

- c. Check that the dimensions you got in part (b) are correct using the Pythagorean theorem.
- d. The table that your TV currently rests on is 30" in length. Will the new TV fit on the table? Explain.
4. Determine the distance between the following pairs of points. Round your answer to the tenths place. Use graph paper if necessary.
- a. $(7, 4)$ and $(-3, -2)$
- b. $(-5, 2)$ and $(3, 6)$

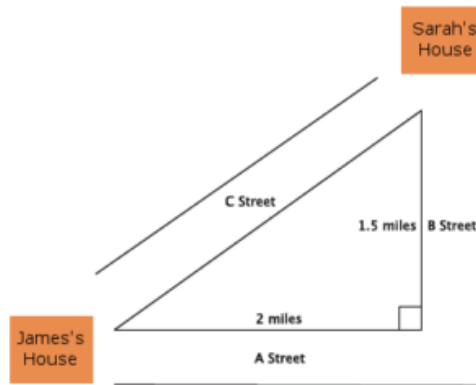
c. Challenge: (x_1, y_1) and (x_2, y_2) . Explain your answer.

5. What length of ladder is needed to reach a height of 7 feet along the wall when the base of the ladder is 4 feet from the wall? Round your answer to the tenths place.



Problem Set

1. A 70" TV is advertised on sale at a local store. What are the length and width of the television?
2. There are two paths that one can use to go from Sarah's house to James' house. One way is to take C Street, and the other way requires you to use A Street and B Street. How much shorter is the direct path along C Street?

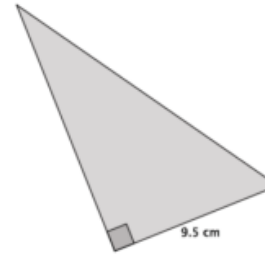


3. An isosceles right triangle refers to a right triangle with equal leg lengths, s , as shown below.



What is the length of the hypotenuse of an isosceles right triangle with a leg length of 9 cm? Write an exact answer using a square root and an approximate answer rounded to the tenths place.

4. The area of the right triangle shown to the right is 66.5 cm^2 .
- What is the height of the triangle?
 - What is the perimeter of the right triangle? Round your answer to the tenths place.



5. What is the distance between points $(1, 9)$ and $(-4, -1)$? Round your answer to the tenths place.
6. An equilateral triangle is shown below. Determine the area of the triangle. Round your answer to the tenths place.

