NAME: _____

Handwritten (top right):
$$4 \quad x \quad 4^2 + 7^2 = c^2$$
$$7 \quad 16 + 49 = c^2$$
$$\sqrt{65} = \sqrt{c^2}$$
$$C = 8.1$$

1. John and Gloria start hiking from the same point. After John hikes 7 *km* due east and Gloria hikes 4 *km* due north, how many kilometers apart are the two hikers?

   A) 5.3　　　　B) 5.4　　　　C) 8.1　　　　D) 9.3

2. A right triangle has one leg that is 24 *cm* and a hypotenuse that is 25 *cm*. Find the length, in *cm*, of the third side.

   A) 1　　　　B) 7　　　　C) 24　　　　D) 49

Handwritten:
$$b^2 = c^2 - a^2$$
$$b^2 = 25^2 - 24^2$$
$$b^2 = 625 - 576$$
$$\sqrt{b^2} = \sqrt{49} \quad \boxed{b = 7}$$

3. Which set of side measures form a right triangle?

   A) 15, 30, 34　　B) 16, 28, 32　　C) 7, 7, 14　　D) 18, 24, 30

Handwritten:
$$225, 900, 1156 \qquad 256 + 784 = 1024 \qquad 49 + 49 \neq 196 \qquad 324 + 576 = 900$$
$$1040 \neq 1024$$

4. What is the length of side $\overline{AC}$?

   A) 5 cm　　　B) 7 cm　　　C) 25 cm　　　D) 49 cm

Handwritten:
$$Side = \sqrt{Area}$$
$$= \sqrt{25}$$
$$= 5$$

A
9 cm²
25 cm²
B
16 cm²
C

5. Which set is a Pythagorean Triple?

   A) 2, 3, 6
   B) 6, 8, 10
   C) 10, 11, 15
   D) 20, 30, 40

Handwritten:
$$A) \ 4 + 9 \neq 36$$
$$B) \ 36 + 64 = 100$$

6. A rectangular patio has dimensions of 9 m by 12 m. How far must A be from B to be certain that the corners are 90º?
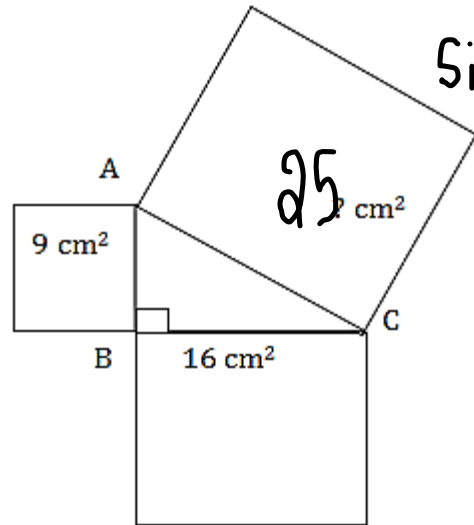
   A) 3m
   B) 9m
   C) 15m
   D) 21m

Handwritten:
$$a^2 + b^2 = c^2$$
$$9^2 + 12^2 = c^2$$
$$81 + 144 = c^2$$
$$\sqrt{225} = \sqrt{c^2}$$
$$\boxed{C = 15}$$

7. Is this a right angle triangle? Explain how you know?

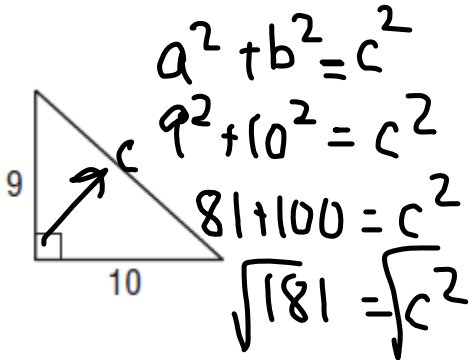$$a^2 + b^2 \overset{?}{=} c^2$$
$$4^2 + 6^2 \overset{?}{=} 7^2$$
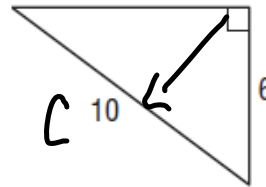$$16 + 36 \overset{?}{=} 49$$
$$52 \neq 49$$

∴ it is NOT a right triangle since $a^2 + b^2 \neq c^2$

4m
6m
7m
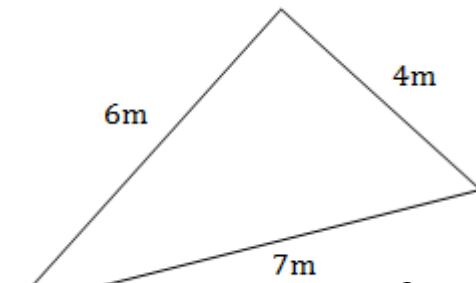
8. Find the missing side of each right triangle.

$$a^2 + b^2 = c^2$$
$$9^2 + 10^2 = c^2$$
$$81 + 100 = c^2$$
$$\sqrt{181} = \sqrt{c^2}$$

$$\boxed{c = 13.5}$$

9
10

$$b^2 = c^2 - a^2$$
$$b^2 = 10^2 - 6^2$$
$$b^2 = 100 - 36$$
$$\sqrt{b^2} = \sqrt{64}$$

$$\boxed{b = 8}$$

C 10
6

9. A 4m ladder is resting up against a tree. The base of the ladder is 1m away from the base of the tree. How high up the tree does the ladder reach?

4m
x
1m

finding the leg

$$b^2 = c^2 - a^2$$
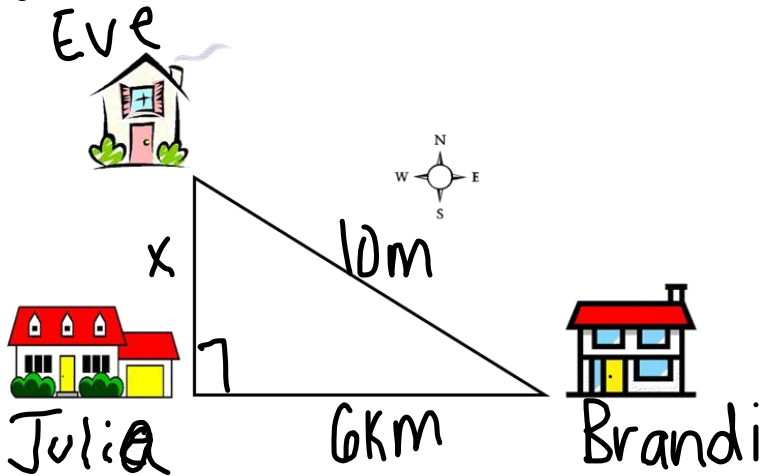$$b^2 = 4^2 - 1^2$$
$$b^2 = 16 - 1$$
$$\sqrt{b^2} = \sqrt{15}$$

$$\boxed{b = 3.9m}$$

The ladder reaches 3.9m up the tree.

10.   Brandi lives to the east of Julia. Julia lives to the south of Eve. There is a bike path that connects all three houses to form a triangle.

A)   Label the diagram to show where these three friends live in relation to each other.

Eve

x 10m

Julia   6km   Brandi

B)   If Brandi lives 6 km from Julia and Eve lives 10km from Brandi, how many kilometers is it from Julia's house to Eve's house? Show your reasoning.
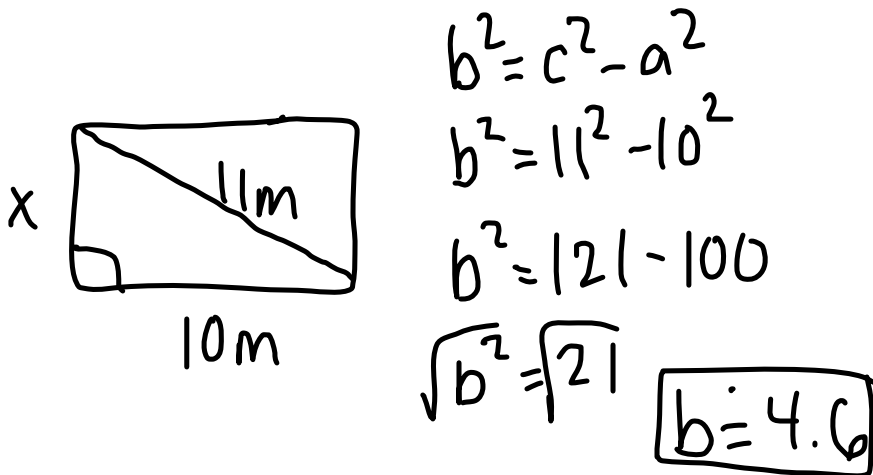
$$b^2 = c^2 - a^2$$
$$b^2 = 10^2 - 6^2$$
$$b^2 = 100 - 36 \quad \boxed{b = 8}$$
$$\sqrt{b^2} = \sqrt{64}$$

It is 8km from Julia's house to Eve's house.

11.   The city wants to put a fence around the perimeter of a rectangular playground. The playground has a width of 10m and a diagonal measure of 11m.

a) Draw and label a sketch of the playground and then determine how many meters of fencing is needed?

x 11m

10m

$$b^2 = c^2 - a^2$$
$$b^2 = 11^2 - 10^2$$
$$b^2 = 121 - 100$$
$$\sqrt{b^2} = \sqrt{21}$$
$$\boxed{b \doteq 4.6}$$

Perimeter
$$= 4.6 + 10 + 4.6 + 10$$
$$= 29.2m \text{ of fencing needed.}$$

b) If fencing **can only be purchased** in lengths of 2 m, how many pieces will be required?

$29.2m \div 2 = 14.6$, so 15 pieces will be required.

12. A bridge is made of 2 right triangles with dimensions shown below. A car is travelling across the bridge from point A to point B. What is the length of the bridge?

B 15   8   A

8 m   6 m
          10 m
   17 m
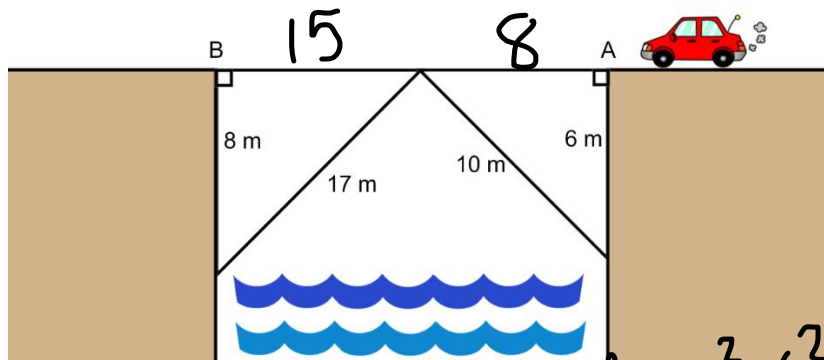
The bridge is

$15 + 8 = 23m$

$b^2 = 10^2 - 6^2$

$b^2 = 100 - 36$

$\sqrt{b^2} = \sqrt{64}$

$b = 8$
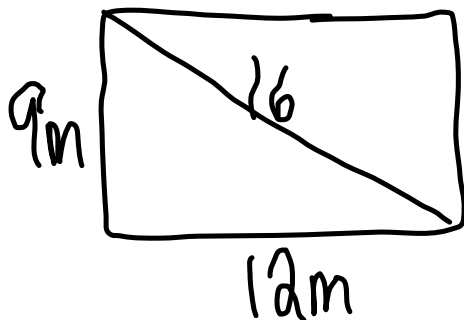
$b^2 = 17^2 - 8^2$

$b^2 = 289 - 64$

$\sqrt{b^2} = \sqrt{225}$ $b = 15$

13. Bill is building a floor for his garage. He measure the side lengths to be 9 meters by 12 meters. He measures across the diagonal of the floor and gets a length of 16 meters. Is the angle between the two sides a right angle?
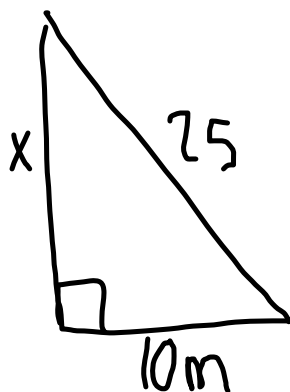
9m   16

12m

$a^2 + b^2 \overset{?}{=} c^2$

$9^2 + 12^2 \overset{?}{=} 16^2$ ∴ it is NOT

$81 + 141 \overset{?}{=} 256$

$222 \neq 256$

14. A wire runs from the top of a cellphone tower to the ground. The wire touches the ground 10 m from the base of the tower, and the wire is 25m long. How high is the cellphone tower?

x   25

10m

$b^2 = c^2 - a^2$

$b^2 = 25^2 - 10^2$

$b^2 = 625 - 100$

$\sqrt{b^2} = \sqrt{525}$ $b = 22.9m$