Lesson 1.5: The Pythagorean Theorem
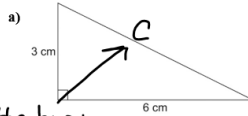
1. Find the length of the unmarked side in each right triangle.
   Give your answers to one decimal place.

a)

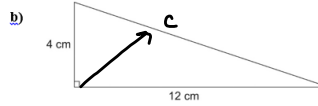3 cm C 6 cm

finding the hyp:

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

$3^2 + 6^2 = c^2$

$9 + 36 = c^2$

$\sqrt{c^2} = \sqrt{45}$ $c = 6.7 \text{ cm}$

b)

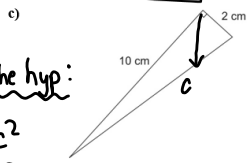4 cm c 12 cm

finding the hyp:

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

$4^2 + 12^2 = c^2$

$16 + 144 = c^2$

$\sqrt{160} = \sqrt{c^2}$

$c = 12.6$
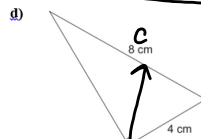
c)

2 cm 10 cm c

finding the hyp:

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

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

$4 + 100 = c^2$

$\sqrt{104} = \sqrt{c^2}$

$c = 10.2$

d)

8 cm C 4 cm
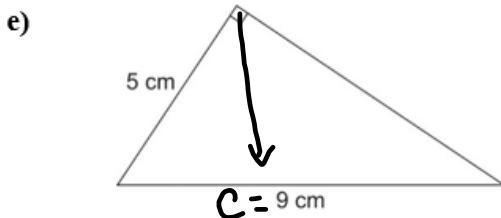
finding a leg:

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

$b^2 = 8^2 - 4^2$

$b^2 = 64 - 16$

$\sqrt{b^2} = \sqrt{48}$

$b = 6.9$

e)

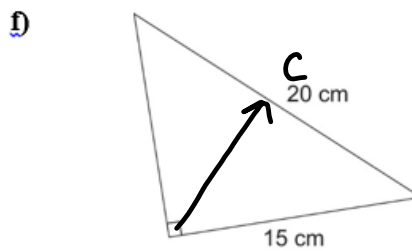5 cm $C = 9$ cm

finding the leg:

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

$b^2 = 9^2 - 5^2$

$b^2 = 81 - 25$

$\sqrt{b^2} = \sqrt{56}$

$b = 7.5$

f)

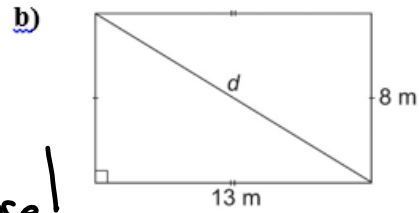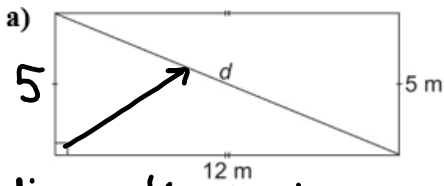C 20 cm 15 cm

finding the leg:

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

$b^2 = 20^2 - 15^2$

$b^2 = 400 - 225$

$\sqrt{b^2} = \sqrt{175}$

$b = 13.2$

2. Find the length of the diagonal, *d*, in each rectangle.
   Give your answers to two decimal places where needed.

a)

5

d

5 m

12 m

b)

d

8 m

13 m

The diagonal is the hypothenuse!

$$a^2 + b^2 = c^2$$
$$5^2 + 12^2 = c^2$$
$$25 + 144 = c^2$$
$$\sqrt{169} = \sqrt{c^2}$$
$$\boxed{c = 13}$$

$$a^2 + b^2 = c^2$$
$$13^2 + 8^2 = c^2$$
$$169 + 64 = c^2$$
$$\sqrt{233} = \sqrt{c^2}$$
$$\boxed{c = 15.3}$$