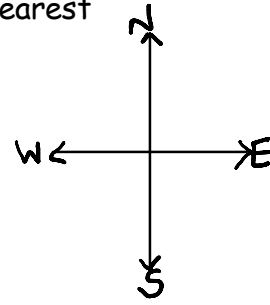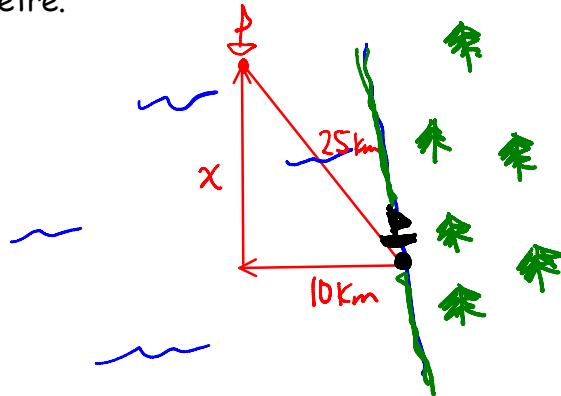8.5 Applying the Pythagorean Relationship

1. A ship leaves the Pacific coast of BC and travels west for 10 km. Then, it turns and travels north. If the boat is 25 km from its starting point, what distance did it travel north? Give your answer to the nearest tenth of a kilometre.
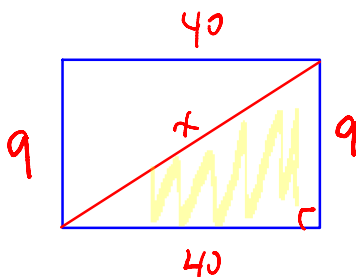
$$x^2 = 25^2 - 10^2$$
$$x^2 = 625 - 100$$
$$x^2 = 525$$
$$x = 22.9 \text{ km}$$

3. Two telephone poles are 60 meters apart. The poles are 42 meters and 60 meters high. What is the distance between the tops of these two poles?
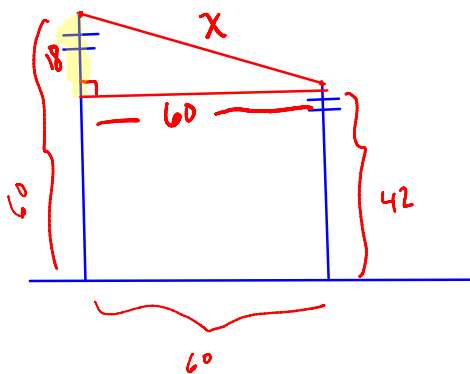
$$x^2 = 18^2 + 60^2$$
$$x^2 = 325 + 3600$$
$$x^2 = 3925$$
$$x = 62.6$$

4. The perimeter of a rectangle is 98 cm and one of its sides is 9 cm. Find the length of the diagonal of this rectangle.

$$98 = 2(9) + 2l$$
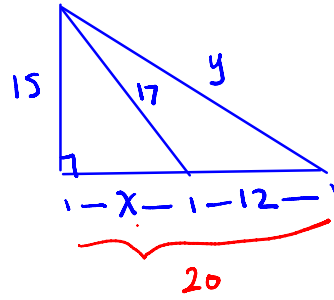$$98 = 18 + 2l$$
$$80 = 2l$$
$$40 = l$$

$$x^2 = 9^2 + 40^2$$
$$x^2 = 1681$$
$$x = 41$$

9, 40, 41

5. Find the length of the sides labelled x and y.

$$x^2 = 17^2 - 15^2$$
$$x^2 = 64$$
$$x = 8$$

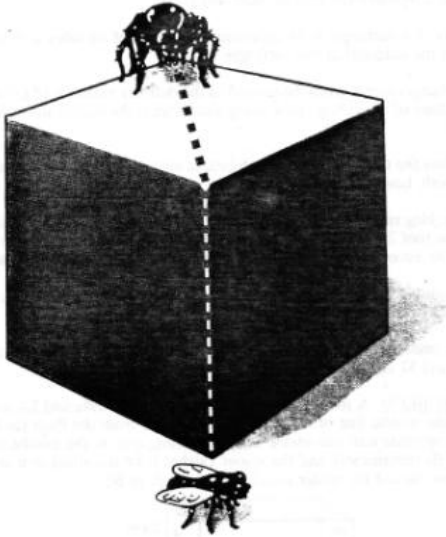$$y^2 = 15^2 + 20^2$$
$$y^2 = 625$$
$$y = 25$$

15, 17, y

$|-x-|-12-|$

20

6. A square is inscribed in a circle whose diameter is 20 cm.
   Find the length of the side of the square.
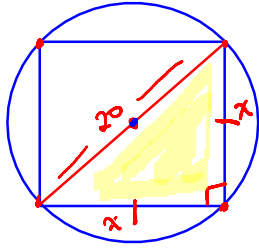
$$x^2 + x^2 = 20^2$$
$$2x^2 = 400$$
$$x^2 = 200$$
$$x = \sqrt{200}$$
$$x = 14.1 \text{ cm}$$
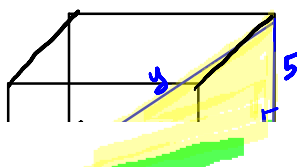
Assignment p110 #3-14

Use pythagorean theorem to prove to the spider that he did **not** choose the Shortest path.
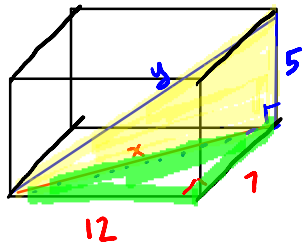
Shortest Catch...

The spider is hungry and impatient. Her plan is to charge the fly, following a path along the dotted line as shown. Is this the shortest possible route for the spider to reach the fly? *Prove if yes or no.*

p104

#16

5

$$x^2 = 7^2 + 12^2$$

#16

$x^2 = 7^2 + 12^2$

$x^2 = 49 + 144$

$x^2 = 193$

← Got here
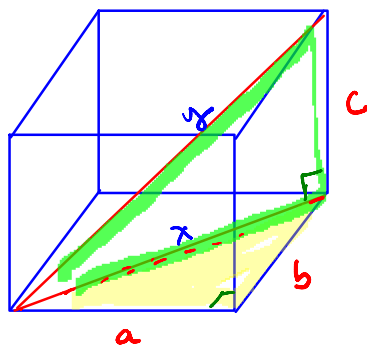
$x = 13.9$

$x^2 + 5^2 = y^2$

$193 + 25 = y^2$

$218 = y^2$

$14.8 = y$

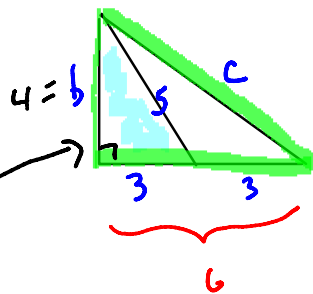---

why does $y = \sqrt{12^2 + 7^2 + 5^2} = 14.8$?

Proof

$a^2 + b^2 = x^2$

$x^2 + c^2 = y^2$

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

$\sqrt{a^2 + b^2 + c^2} = y$

---

p104 #14)

$c^2 = 4^2 + 6^2$

$c^2 = 16 + 36$

$c^2 = 52$

$c = 7.2$

$b^2 = 5^2 - 3^2$

$b^2 = 25 - 9$

$4 = b$ 5 c

3 3

6

$c = 4 \rightarrow 6$

$c^2 = 16 + 36$

$c^2 = 52$

$c = 7.2$

$b^2 = 5^2 - 3^2$

$b^2 = 25 - 9$

$b^2 = 16$

$b = 4$

15)

B

x 4

A 2

$x^2 = 4^2 + 2^2$

$x^2 = 16 + 4$

$x^2 = 20$

$x = 4.5$