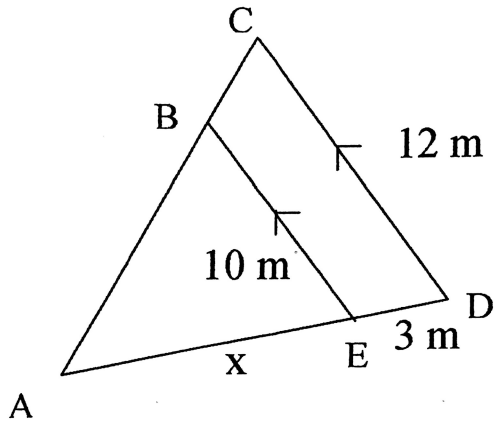
Practice: Similar Triangles and the Pythagorean Theorem

1. Determine the length of the side x (no proof required).



Given: ΔABE ~ ΔACD

Since $\triangle ABE \sim \triangle ACD$

then $AB:BE:EA = AC:CD:DA$

$AB:10:x = AC:12:x+3$

$\frac{AB}{AC} = \frac{10}{12} = \frac{x}{x+3}$

$12x = 10(x+3)$

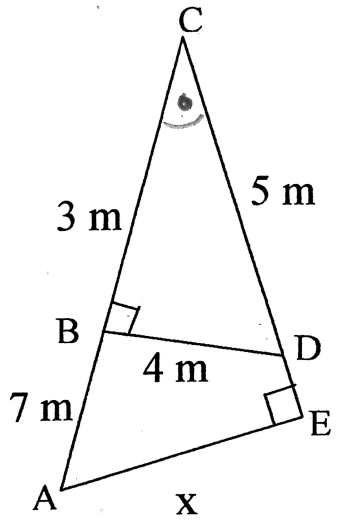
$12x = 10x + 30$

$12x - 10x = 30$

$\frac{2x}{2} = \frac{30}{2}$

$x = 15m$

2. Determine the length of the side x (include a proof).



Since $\angle CBD = \angle CEA$ (90°)

$\angle BCD = \angle ACE$ (common)

then $\triangle ACE \sim \triangle DCB$ (AA~)

Since $\triangle ACE \sim \triangle DCB$

then $AC:CE:EA = DC:CB:BD$

$10:CE:x = 5:3:4$

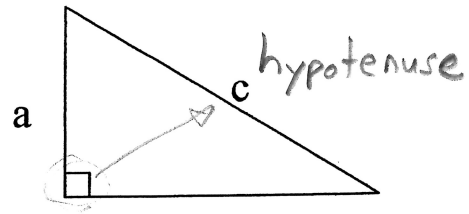
$\frac{10}{5} = \frac{CE}{3} = \frac{x}{4}$

$\frac{10}{5} = \frac{x}{4}$

$\frac{5x}{5} = \frac{40}{5}$

$x = 8m$

Pythagorean Theorem

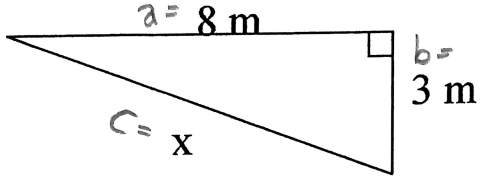


Recall: $a^2 + b^2 = c^2$ **and** $c^2 = a^2 + b^2$

- **where 'c' is the hypotenuse**
- **'a' and 'b' are the smaller sides**

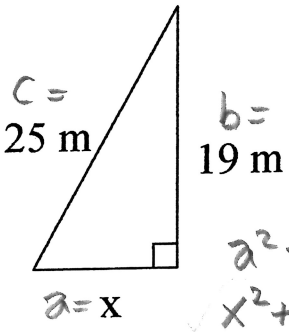
1. Determine the length of the side x.

a)



$c^2 = a^2 + b^2$
$x^2 = 8^2 + 3^2$
$x^2 = 64 + 9$
$\sqrt{x^2} = \sqrt{73}$
$x \approx 8.5\text{m}$

b)

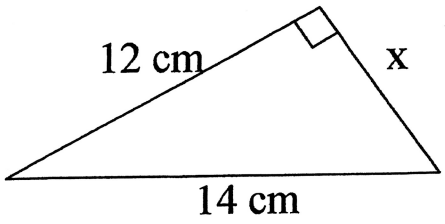


$a^2 + b^2 = c^2$
$x^2 + 19^2 = 25^2$
$x^2 + 361 = 625$
$x^2 = 625 - 361$
$\sqrt{x^2} = \sqrt{264}$
$x \approx 16.2\text{m}$

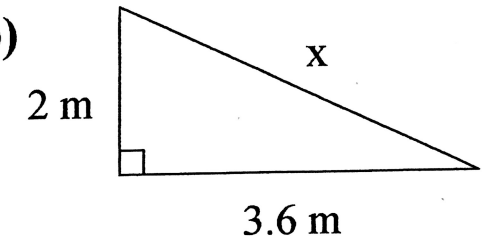
Homework:

Determine the length of the side x in the triangles below

a)



b)



Complete Questions 3b,d, 4, 6, 8, 10, 12 on SPUST sheet.