

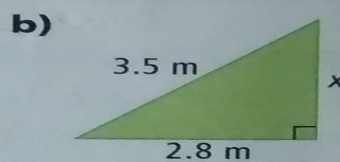
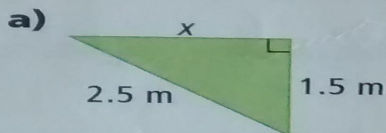
Using the Pythagorean Theorem

Textbooks (we used them last time!)

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5. Find the length of the missing side in each triangle.



$$x^2 = 2.5^2 - 1.5^2$$

$$x^2 = 6.25 - 2.25$$

$$x^2 = 4$$

$$x = \sqrt{4}$$

$$x = 2.0\text{m}$$

$$x^2 = 3.5^2 - 2.8^2$$

$$x^2 = 12.25 - 7.84$$

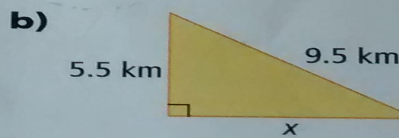
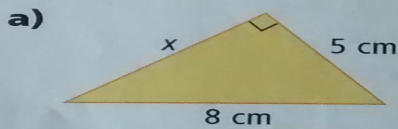
$$x^2 = 4.41$$

$$x = \sqrt{4.41}$$

$$x = 2.1\text{m}$$

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6. Find the length of the missing side in each triangle. Round your answers to the nearest tenth.



$$x^2 = 8^2 - 5^2$$

$$x^2 = 64 - 25$$

$$x^2 = 39$$

$$x = \sqrt{39}$$

$$x = 6.2449979$$

$$\Rightarrow x = 6.2 \text{ cm}$$

$$x^2 = 9.5^2 - 5.5^2$$

$$x^2 = 90.25 - 30.25$$

$$x^2 = 60$$

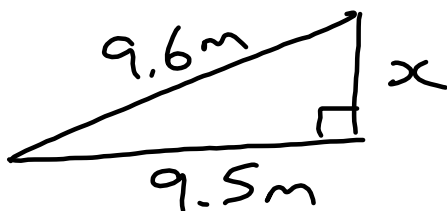
$$x = \sqrt{60}$$

$$x = 7.7459666$$

$$\Rightarrow x = 7.7 \text{ km}$$

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7. A wheelchair ramp is 9.6 m long. The horizontal distance it spans is 9.5 m. What vertical height does the ramp let a person rise? Round your answer to the nearest tenth.



$$x^2 = 9.6^2 - 9.5^2$$

$$x^2 = 92.16 - 90.25$$

$$x^2 = 1.91$$

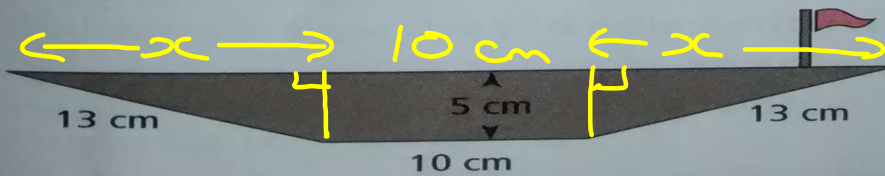
$$x = \sqrt{1.91}$$

$$x = 1.3820274$$

$$\Rightarrow x = 1.4 \text{ m}$$

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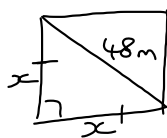
8. Dev plans to build a toy boat for his younger brother. The side view of his plan is shown. What length of wood will he need to cut to make the top deck of the boat?



$$\begin{aligned}
 x^2 &= 13^2 - 5^2 & \Rightarrow \text{length} &= \\
 x^2 &= 169 - 25 & & 12 + 10 + 12 \\
 x^2 &= 144 & & = 34\text{cm} \\
 x &= \sqrt{144} \\
 x &= 12\text{cm}
 \end{aligned}$$

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9. A square park has diagonal paths that are each 48 m long.
 a) What is the perimeter of the park, to the nearest metre?
 b) What is the area of the park?



$$\begin{aligned}
 x^2 + x^2 &= 48^2 \\
 x^2 + x^2 &= 2304 \\
 x^2 &= \frac{2304}{2} \\
 x^2 &= 1152 \\
 x &= \sqrt{1152} \\
 x &= 33.9\text{m} \\
 \Rightarrow \text{Perimeter} &= 4 \times 33.9 \\
 &= 135.6\text{m} \\
 &= 136\text{m} \\
 \Rightarrow \text{Area} &= 33.9 \times 33.9 \\
 &= 1152\text{m}^2
 \end{aligned}$$

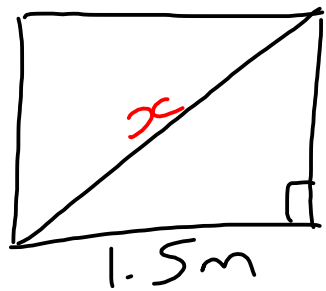
or

$$\begin{aligned}
 x^2 &= 24^2 + 24^2 \\
 x^2 &= 576 + 576 \\
 x^2 &= 1152 \\
 x &= \sqrt{1152} \\
 x &= 33.9
 \end{aligned}$$

Then follow through as above.

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10. Max was preparing to install a new pane of glass in the living room window. It measured 1.3 m by 1.5 m. He noticed a scratch that stretched across half the diagonal of the glass. Approximately how long was the scratch?



$$x^2 = 1.5^2 + 1.3^2$$

$$x^2 = 2.25 + 1.69$$

$$x^2 = 3.94$$

$$x = \sqrt{3.94}$$

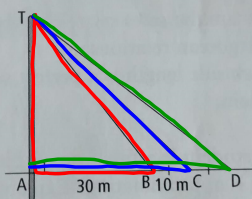
$$x = 1.9849$$

We only want half of the hypotenuse
 $\Rightarrow 1.9849 \div 2 = 0.99\text{m}$
 $\approx 1\text{metre}$

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11. Many steel cables are used to support a suspension bridge. In the diagram, three of the cables are shown.

- a) Cable TB is 50 m long. Find the height of the tower, TA.
- b) Find the length of cables TC and TD.
- c) How much longer is cable TC than cable TB? Can you add this amount to the length of TC to find the length of TD? Explain.



$$a) TA^2 = 50^2 - 30^2$$

$$TA^2 = 2500 - 900$$

$$TA^2 = 1600$$

$$TA = \sqrt{1600}$$

$$TA = 40\text{m}$$

$$b) TC^2 = 40^2 + 40^2$$

$$TC^2 = 1600 + 1600$$

$$TC^2 = 3200$$

$$TC = \sqrt{3200}$$

$$TC = 56.6\text{m}$$

$$TD^2 = 40^2 + 50^2$$

$$TD^2 = 1600 + 2500$$

$$TD^2 = 4100$$

$$TD = \sqrt{4100}$$

$$TD = 64.0\text{m}$$

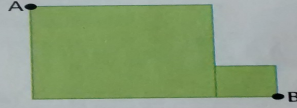
$$c) \text{Difference} = 56.6 - 50 = 6.6\text{m}$$

$$56.6 + 6.6 = 63.2\text{m}$$

$$\Rightarrow \underline{\underline{\text{not the same as TD}}}$$

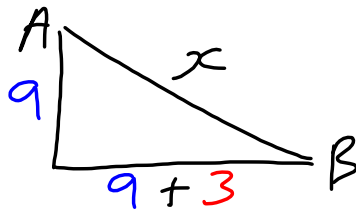
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12. Find the shortest distance from A to B if the larger square has a perimeter of 36 cm and the smaller square has an area of 9 cm^2 .



$$\begin{aligned} \text{Perimeter of large} &= 36 \text{ cm} \\ \Rightarrow \text{side length} &= 36 \div 4 \\ &= 9 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Area of small} &= 9 \text{ cm}^2 \\ \Rightarrow \text{side length} &= \sqrt{9} \\ &= 3 \text{ cm} \end{aligned}$$



$$\begin{aligned} x^2 &= 9^2 + (9+3)^2 \\ x^2 &= 9^2 + 12^2 \\ x^2 &= 81 + 144 \\ x^2 &= 225 \\ x &= \sqrt{225} = 15 \text{ cm} \end{aligned}$$

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