

Applying the Pythagorean Theorem

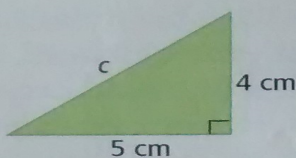
Textbooks (yeah, remember those?)

Page 66 #s 6, 7, 8, 10, 12, 13, 17, 18 & 19

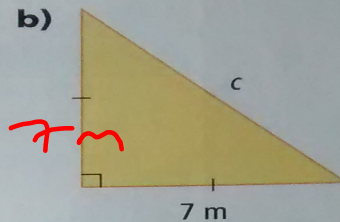
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6. Find the length of the hypotenuse of each triangle. Round your answers to the nearest tenth.

a)



b)

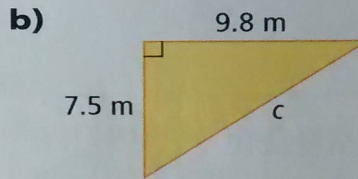
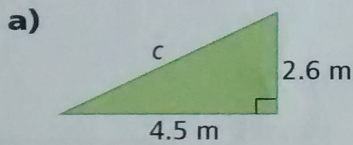


$$\begin{aligned} \text{(a)} \quad c^2 &= a^2 + b^2 \\ c^2 &= 5^2 + 4^2 \\ c^2 &= 25 + 16 \\ c^2 &= 41 \\ c &= \sqrt{41} = 6.4 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad c^2 &= a^2 + b^2 \\ c^2 &= 7^2 + 7^2 \\ c^2 &= 49 + 49 \\ c^2 &= 98 \\ c &= \sqrt{98} \\ c &= 9.9 \text{ m} \end{aligned}$$

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7. Find the length of the hypotenuse of each triangle. Round your answers to the nearest tenth.



$$\begin{aligned} (a) \quad c^2 &= a^2 + b^2 \\ c^2 &= 4.5^2 + 2.6^2 \\ c^2 &= 20.25 + 6.76 \\ c^2 &= 27.01 \\ c &= \sqrt{27.01} \\ c &= 5.2 \text{ m} \end{aligned}$$

$$\begin{aligned} (b) \quad c^2 &= a^2 + b^2 \\ c^2 &= 7.5^2 + 9.8^2 \\ c^2 &= 56.25 + 96.04 \\ c^2 &= 152.29 \\ c &= \sqrt{152.29} \\ c &= 12.3 \text{ m} \end{aligned}$$

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8. Which of the following could be the side lengths of a right triangle? Explain how you came to your conclusions.

- a) 2 cm, 4 cm, 5 cm
b) 6 cm, 8 cm, 10 cm
c) 9 cm, 15 cm, 12 cm
d) 12 cm, 8 cm, 7 cm

$$\begin{aligned} (a) \quad 2^2 + 4^2 &= 5^2 \\ 4 + 16 &= 25 \\ 20 &\neq 25 \\ \Rightarrow &\text{NOT a right } \Delta \end{aligned}$$

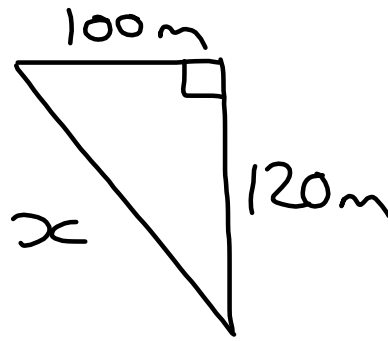
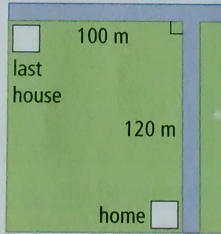
$$\begin{aligned} (c) \quad 9^2 + 12^2 &= 15^2 \\ 81 + 144 &= 225 \\ 225 &= 225 \\ \Rightarrow &\text{IS a right } \Delta \end{aligned}$$

$$\begin{aligned} (b) \quad 6^2 + 8^2 &= 10^2 \\ 36 + 64 &= 100 \\ 100 &= 100 \\ \Rightarrow &\text{IS a right } \Delta \end{aligned}$$

$$\begin{aligned} (d) \quad 7^2 + 8^2 &= 12^2 \\ 49 + 64 &= 144 \\ 113 &\neq 144 \\ \Rightarrow &\text{NOT a right } \Delta \end{aligned}$$

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10. Ahmed delivers newspapers. He starts from home and goes down his street a distance of 120 m. Then, he turns left at the corner and goes another 100 m to the last house on his route. Ahmed has a walkie-talkie with a range of 150 m. Can he call his brother, who is at home, from the farthest point on his route?



$$x^2 = 100^2 + 120^2$$

$$x^2 = 10000 + 14400$$

$$x^2 = 24400$$

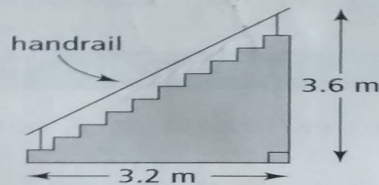
$$x = \sqrt{24400}$$

$$x = 156.2 \text{ m}$$

⇒ Can't talk on the walkie-talkie
It is out of range by 6 metres.

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12. Tia is making a handrail for a staircase. The staircase rises 3.6 m over a horizontal distance of 3.2 m. How long should the handrail be, to the nearest tenth of a metre?



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

$$x^2 = 3.2^2 + 3.6^2$$

$$x^2 = 10.24 + 12.96$$

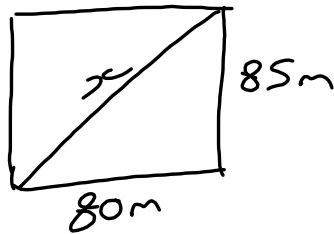
$$x^2 = 23.2$$

$$x = \sqrt{23.2}$$

$$x = 4.8 \text{ m}$$

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13. On his way to the cinema, Tony needs to cross a rectangular parking lot. The lot measures 80 m by 85 m. How many metres fewer will Tony walk if he goes diagonally across the lot rather than walking the length and width? Round your answer to the nearest metre.



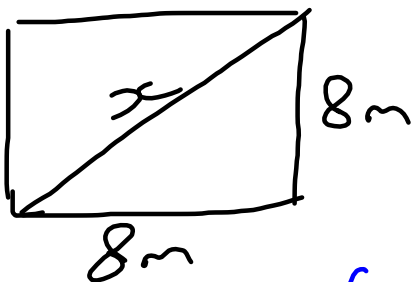
$$\begin{aligned}x^2 &= 80^2 + 85^2 \\x^2 &= 6400 + 7225 \\x^2 &= 13625 \\x &= \sqrt{13625} \\x &= 116.7\text{ m}\end{aligned}$$

$$\begin{aligned}\text{Walking around} &= 80 + 85 \\ \text{the edge} &= 165\text{ m}\end{aligned}$$

$$\begin{aligned}\text{Distance} &= 165 - 116.7 \\ \text{Saved} &= 48.3\text{ m}\end{aligned}$$

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17. Jessie is preparing a gymnastics routine for an upcoming competition. Each of her cartwheels uses a distance of 2.5 m to complete. How many cartwheels can she perform along the diagonal of an 8 m by 8 m gymnasium mat?



$$\begin{aligned}x^2 &= 8^2 + 8^2 \\x^2 &= 64 + 64 \\x^2 &= 128 \\x &= \sqrt{128} \\x &= 11.3\text{ m}\end{aligned}$$

⇒ Total of
4 cartwheels

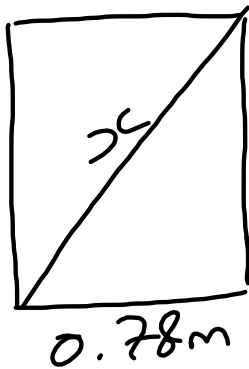
$$\begin{aligned}\# \text{ of} &= 11.3 \div 2.5 \\ \text{cartwheels} &= 4.5\end{aligned}$$

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18. A doorway is 0.78 m wide and 2.00 m high. Will a round tabletop with a diameter of 2.50 m fit through the doorway?

- a) Draw and label a diagram to model the problem.
b) Use numbers and words to justify your answer.



$$x^2 = 0.78^2 + 2.00^2$$

$$x^2 = 0.6084 + 4$$

$$x^2 = 4.6084$$

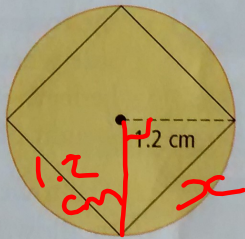
$$x = \sqrt{4.6084}$$

$$x = 2.15 \text{ m}$$

⇒ Diameter is too big. It needs to be less than 2.15m to fit.

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19. A square peg fits snugly inside a round hole, as shown. What is the perimeter of the square, to the nearest millimetre?



$$x^2 = 1.2^2 + 1.2^2$$

$$x^2 = 1.44 + 1.44$$

$$x^2 = 2.88$$

$$x = \sqrt{2.88}$$

$$x = 1.697 \text{ cm}$$

$$P = 4 \times x$$

$$P = 4 \times 1.697$$

$$P = 6.788$$

$$P = 6.8 \text{ cm}$$

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