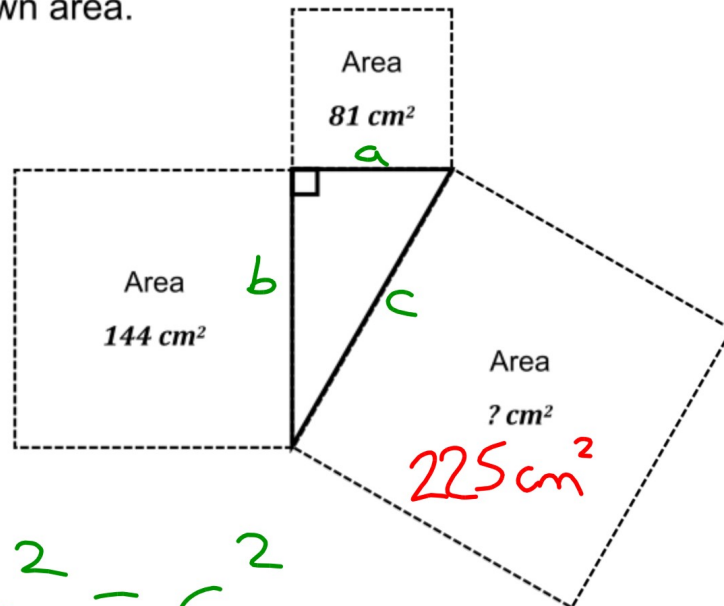


Determine the unknown area.



MTH1W Grade 9 Mathematics

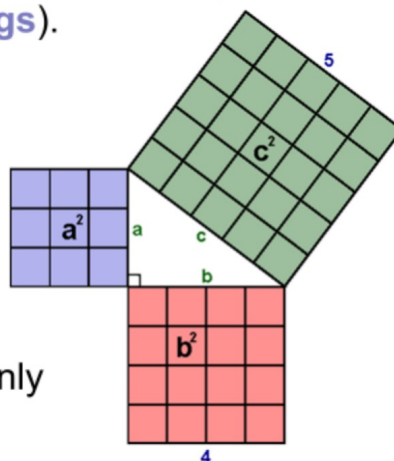
6.2 Sides of Right Triangles

Goal(s) - Use side length relationship in right triangles to solve problems

Recall...

The **Pythagorean theorem** states that in a right triangle, the square of the length of the **hypotenuse** (longest side in a right triangle; opposite the 90° angle) is equal to the sum of the squares of the lengths of the two shorter sides (**legs**).

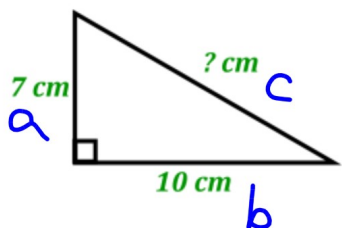
$$a^2 + b^2 = c^2$$



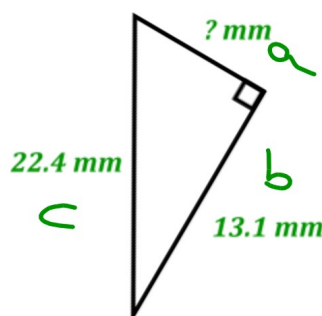
Remember... This relationship is only true for **RIGHT TRIANGLES**!

Dec 21-8:44 AM

Determine each unknown length.



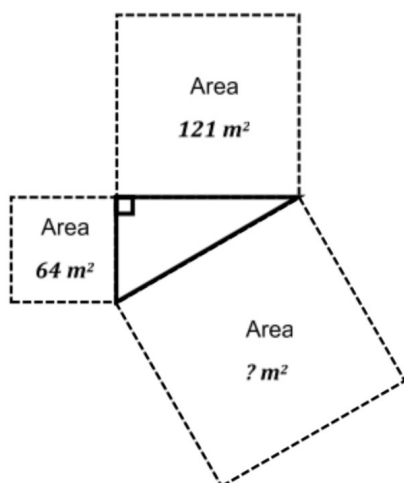
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 7^2 + 10^2 &= c^2 \\ 49 + 100 &= c^2 \\ 149 &= c^2 \\ \sqrt{149} &= \sqrt{c^2} \\ 12.2 \text{ cm} &= c \end{aligned}$$



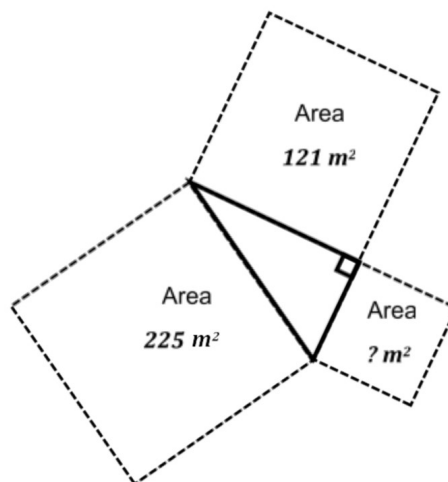
$$\begin{aligned} c^2 - b^2 &= a^2 \\ 22.4^2 - 13.1^2 &= a^2 \\ 501.76 - 171.61 &= a^2 \\ 330.15 &= a^2 \\ \sqrt{330.15} &= \sqrt{a^2} \\ 18.2 \text{ mm} &= a \end{aligned}$$

Dec 21-8:52 AM

Determine each unknown area.



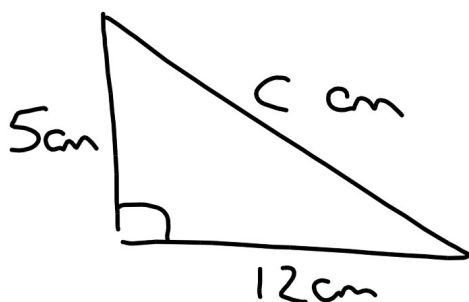
$$\begin{aligned} ? &= 64 + 121 \\ ? &= 185 \text{ m}^2 \end{aligned}$$



$$\begin{aligned} ? &= 225 - 121 \\ ? &= 104 \text{ m}^2 \end{aligned}$$

Dec 21-8:52 AM

A right triangle has legs **5 cm** and **12 cm**. Sketch the triangle. What is the perimeter? What is the area?

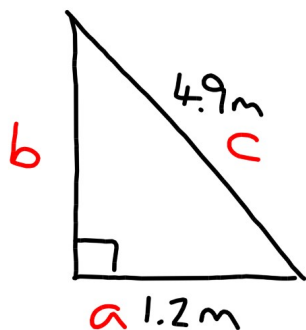


$$\begin{aligned} C^2 &= a^2 + b^2 \\ C^2 &= 5^2 + 12^2 \\ C^2 &= 25 + 144 \\ C^2 &= 169 \\ C &= \sqrt{169} = 13 \text{ cm} \end{aligned}$$

$$\begin{aligned} P &= 5 + 12 + 13 \\ P &= 30 \text{ cm} \\ A &= \frac{\text{base} \times \text{height}}{2} \\ A &= \frac{12 \times 5}{2} \\ A &= 30 \text{ cm}^2 \end{aligned}$$

Dec 21-9:04 AM

A ladder is 4.9 m long. It leans against a wall with its foot 1.2 m from the base of the wall. The distance from the foot of the ladder should be about $\frac{1}{4}$ the distance the ladder reaches up the wall. Is the ladder safely positioned? Justify your answer.



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

$$b^2 = 4.9^2 - 1.2^2$$

$$b^2 = 24.01 - 1.44$$

$$b^2 = 22.57$$

$$b = \sqrt{22.57} = 4.75\text{ m}$$

To be safe
distance a
needs to be $\approx \frac{1}{4}$ of b

$$\begin{aligned} &\Rightarrow \frac{1}{4} \text{ of } 4.75 \\ &= 0.25 \times 4.75 \\ &= 1.1875\text{ m} \\ &\Rightarrow \text{It is safe!} \end{aligned}$$