

Sine and Cosine Ratios

Recall: $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ $\cos \theta = \frac{\text{adj}}{\text{hyp}}$ $\tan \theta = \frac{\text{opp}}{\text{adj}}$

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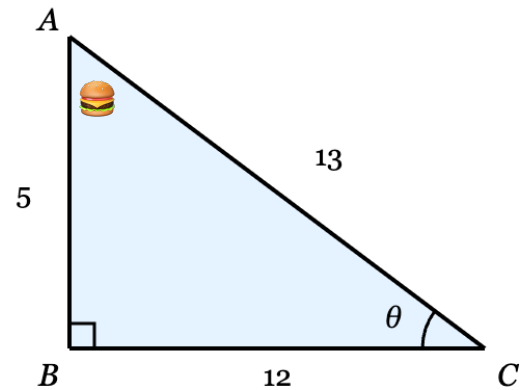
1. For the triangle at right...

a) State the ratios for $\sin \theta$, $\cos \theta$, and $\tan \theta$.

b) Then state the ratios for \sin 🍔, \cos 🍔, and \tan 🍔.

$$\sin \theta = \frac{5}{13} \quad \cos \theta = \frac{12}{13} \quad \tan \theta = \frac{5}{12}$$

$$\sin \text{ 🍔} = \frac{12}{13} \quad \cos \text{ 🍔} = \frac{5}{13} \quad \tan \text{ 🍔} = \frac{12}{5}$$



2. Solve the triangle below. Find the measures of all unknown sides and angles.

NOTE: Round side lengths to one decimal place and angles to the nearest full degree.

TIP: There are many ways to solve a triangle. Approach may vary.

$$\tan P = \frac{\text{opp}}{\text{adj}}$$

$$\tan 40^\circ = \frac{p}{8}$$

$$8 \cdot \tan 40^\circ = \left[\frac{p}{8} \right] \cdot 8$$

$$8 \cdot 0.839 = p$$

$$6.712 = p$$

$$6.7 = p$$

$$\text{hyp}^2 = \text{leg}_1^2 + \text{leg}_2^2$$

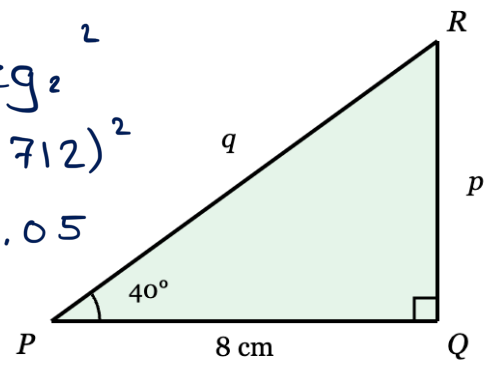
$$q^2 = 8^2 + (6.712)^2$$

$$q^2 = 64 + 45.05$$

$$q^2 = 109.05$$

$$\sqrt{q^2} = \sqrt{109.05}$$

$$q = 10.4$$



$$\angle R = 180^\circ - \angle P - \angle Q$$

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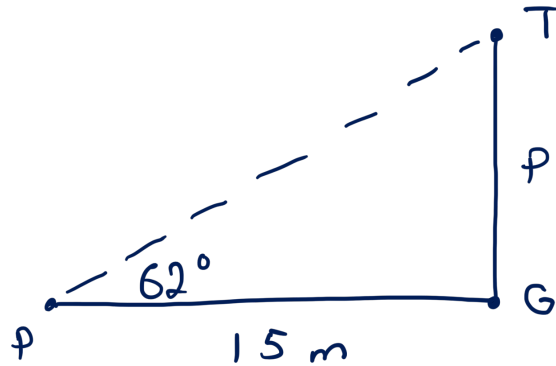
$$\angle R = 180^\circ - 40^\circ - 90^\circ$$

$$\angle R = 50^\circ$$

3. A person standing on flat ground looks up at the top of a cell tower. The angle of elevation to the top of the tower is 62° . The person is standing 15 m from the base of the tower.

- Sketch and label a diagram. Mark the angle of elevation clearly.
- Find the height of the cell tower to the nearest tenth of a metre.

a)



b)

$$\tan P = \frac{\text{opp}}{\text{adj}}$$

$$\tan 62^\circ = \frac{p}{15}$$

$$15 \cdot \tan 62^\circ = \left[\frac{p}{15} \right] \cdot 15$$

$$15 \cdot (1.881) = p$$

$$28.215 = p$$

$$28.2 = p$$

\therefore , the height of the cell phone tower is approximately 28.2 metres.