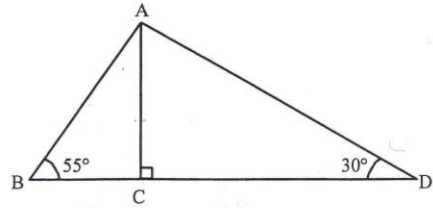


- 1 Given triangle ABC and its height \overline{AC} as shown in the diagram below. Which of the following statements is FALSE?



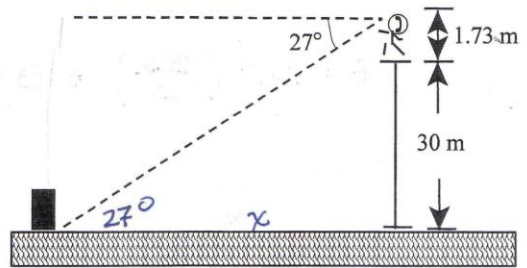
A) $\sin \angle ADC = \frac{m \overline{AC}}{m \overline{AD}}$ ✓

C) $\tan \angle ABC = \frac{m \overline{BC}}{m \overline{AC}}$ $\tan \angle ABC = \frac{m \overline{AC}}{m \overline{BC}}$

B) $m \overline{AC} = \frac{m \overline{AD}}{2}$

D) $\frac{m \overline{BC}}{\sin \angle BAC} = \frac{m \overline{AC}}{\sin \angle ABC}$

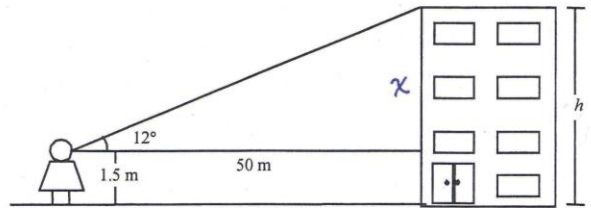
- 2 An individual who is 1.73 metres tall is standing on a tower that is 30 metres high. Using a clinometer, he is able to determine that the angle of depression between him and the base of the monument is 27° . What is the distance from the base of the tower to the base of the monument?



$\tan 27^\circ = \frac{31.73}{x} \Rightarrow x = \frac{31.73}{\tan 27^\circ}$

$x = 62.27 \text{ m}$

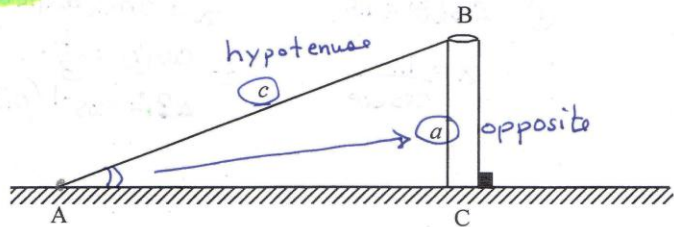
- 3 Karine is on her way to school. As shown in the diagram, at a distance of 50 metres, she observes the top of the school at an angle of elevation of 12° . What is the height, h of the school?



$\tan 12^\circ = \frac{x}{50} \Rightarrow x = 50(\tan 12^\circ)$
 $x = 10.6278$

height = $10.6278 + 1.5$
 $= 12.13 \text{ m}$

- 4 Mark, who is standing at point A, wants to know the height of a pole (BC) located at a certain distance from point A. The diagram below illustrates this situation. From Mark's position, which trigonometric ratio corresponds to $\frac{a}{c}$?



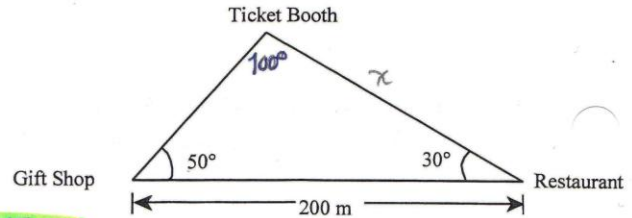
A) $\tan B$

C) $\cos A$

B) $\sin A$

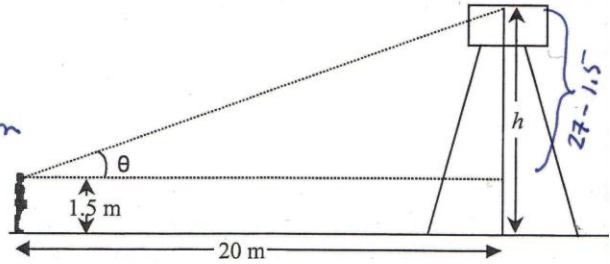
D) $\sin B$

- 5 The vertices of the following triangle represent the ticket booth, the restaurant and the gift shop at an amusement park. **How far is it from the ticket booth to the restaurant?**



$$\frac{200}{\sin 100^\circ} = \frac{x}{\sin 50^\circ} \Rightarrow x = 155.57 \text{ m}$$

- 6 John stands 20 metres from the base of the Belvedere Observation Tower. His eyes are 1.5 metres above the ground and to see the top of the tower he must elevate his eyes θ . **The height of the tower is 27 m.**

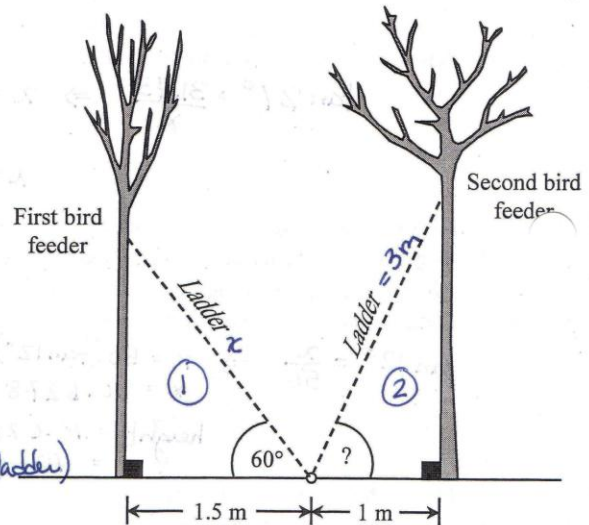


What is the angle of elevation from John's eye level to the top of the tower?

$$\theta = \tan^{-1}\left(\frac{25.5}{20}\right) \Rightarrow \theta = 51.89^\circ$$

- 7 Luke wants to hang two bird feeders on trees. To hang up the first bird feeder, Luke rests the ladder against a tree trunk so that the ladder makes an angle of 60° with the ground. The foot of the ladder is located 1.5 m from the base of the tree.

To hang up the second bird feeder, Luke comes down from the ladder and swings it over without moving its base. The top of the ladder now rests against the trunk of another tree located 1 m from the base of the ladder. This situation is illustrated below.



What is the measure of the angle between the ground and the ladder after Luke swings it over to rest against the other tree?

① $\cos 60^\circ = \frac{1.5}{x}$
 $x = \frac{1.5}{\cos 60^\circ}$
 $x = 3 \text{ m (length of ladder)}$
 ② $\cos(?) = \frac{1}{3}$
 $\angle? = \cos^{-1}(0.33) = 70.53^\circ$

- 8 Two bird watchers, 4 metres apart, are located at positions A and B as shown on the figure. Both are looking at the top of a 15-metre tree. From point A, the angle of elevation is 65° . **What is the angle of elevation of the bird watcher at position B?**

$$\tan 65^\circ = \frac{15}{x}$$

$$x = \frac{15}{\tan 65^\circ}$$

$$x = 6.995 \text{ m}$$

$$x = \overline{AC}$$

$$\text{So } \overline{BC} = 6.995 - 4 = 2.995$$

$$\tan(?) = \frac{15}{2.995}$$

$$\angle? = \tan^{-1}\left(\frac{15}{2.995}\right)$$

$$\angle? = 78.71^\circ$$

