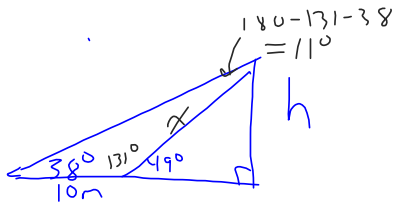


MPM2D

# Applications of Trigonometry

## Example 1

A lumberjack wants to estimate the height of a tree. She begins by measuring the angle of elevation to the top of the tree to  $38^\circ$ . She then walks 10m closer to the tree and measures the angle of elevation to be  $49^\circ$ . Find the height of the tree.



$$\frac{x}{\sin 38^\circ} = \frac{10}{\sin 11^\circ}$$

$$x \approx 32.26 \text{ m}$$

$$\sin 49^\circ = \frac{h}{32.26}$$

$$h = 32.26 \sin 49^\circ$$

$$h \approx 24.3 \text{ m}$$

## Example 2

A regular octagon has all side lengths equal to 15 cm. Find the length of the apothem.

### NOTES:

**Regular polygon** – has all sides and angles equal.

**Apothem** – the distance from the centre of a regular polygon to one of the vertices.

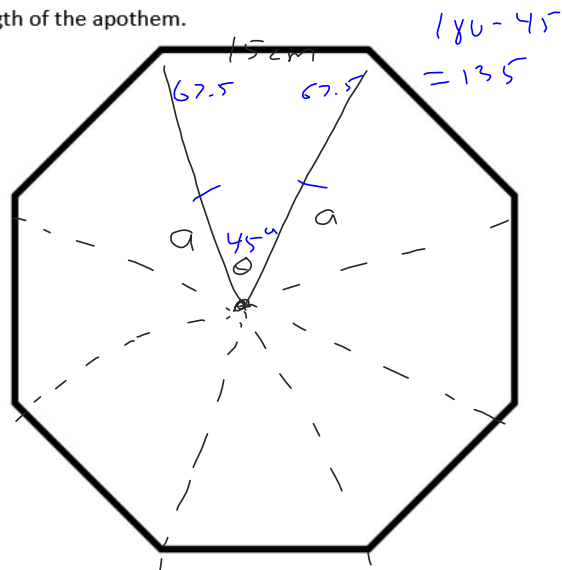
$$\theta = \frac{360^\circ}{8}$$

$$\theta = 45^\circ$$

$$\frac{a}{\sin 67.5^\circ} = \frac{15}{\sin 45^\circ}$$

$$a = \frac{15 \sin 67.5^\circ}{\sin 45^\circ}$$

$$a \approx 19.6 \text{ cm}$$



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