

SOH-CAH-TOA

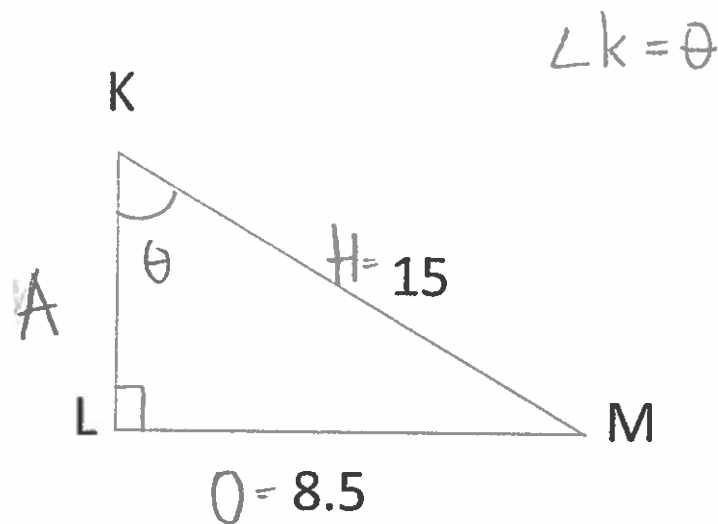
Notes

FMPC 10

Angles and Basic Trigonometric Ratios

- Basic trigonometric ratios can be used to determine the degree measure of an acute angle in a right-angled triangle.
- To find the degree measure, one has to take the inverse of a trigonometric ratio.
- If any two sides in a right-angled triangle are known, the acute angles in that triangle can be calculated.

Example 1: Find the degree measure of $\angle K$ and $\angle M$. Round your answer to the nearest degree.



Find $\angle K$:

$$\sin \theta = \frac{O}{H}$$

$$\sin \theta = \frac{8.5}{15}$$

$$\theta = \sin^{-1}\left(\frac{8.5}{15}\right)$$

$$\theta = 34.5^\circ$$

$$\therefore \angle K = 34.5^\circ$$

Find $\angle M$:

$$\angle M = 180^\circ - 90^\circ - 34.5^\circ$$

$$\angle M = 55.5^\circ$$

$$\therefore \angle M = 55.5^\circ$$

Example 2: Solve the triangle ABC. Note, to solve a triangle means to find all the missing information about its angles and side lengths.

Find θ : $\theta = \angle A$

$$\tan \theta = \frac{O}{A}$$

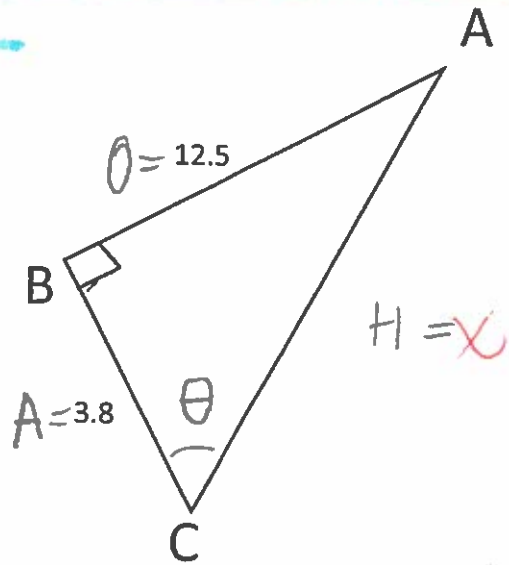
$$\tan \theta = \frac{12.5}{3.8}$$

$$\theta = \tan^{-1}\left(\frac{12.5}{3.8}\right)$$

$$\therefore \theta = 73.1^\circ$$

$$\angle A = 180^\circ - 90^\circ - 73.1^\circ$$

$$\therefore \angle A = 16.9^\circ$$



Find H: (PT)

$$H^2 = A^2 + O^2$$

$$H^2 = 3.8^2 + 12.5^2$$

$$\sqrt{H^2} = \sqrt{170.69}$$

$$\therefore H = 13.1$$

OR

Find H: (trig ratios)

$$\sin \theta = \frac{O}{H}$$

$$\sin 73.1^\circ = \frac{12.5}{x}$$

$$x = 12.5 \div \sin 73.1^\circ$$

$$\therefore x = 13.1$$

Note:

An inverse of a trigonometric ratio is written in a way that resembles an exponent of a negative one. This is only an unfortunate notation. An inverse of a trigonometric ratio has nothing to do with exponents.

An inverse is a reverse operation.

Angle of Elevation

- an angle that is above a horizontal while between the line of sight and the horizontal.
- "Looking up"



Angle of Depression

- an angle that is below a horizontal while between the line of sight and the horizontal.
- "Looking down"

