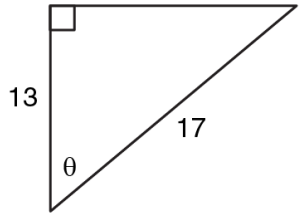
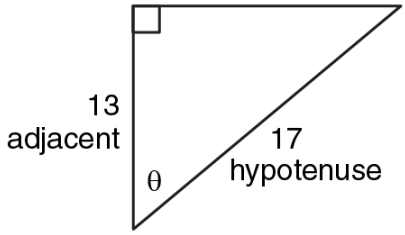
Solving for Unknown Angle Measures Using Sine or Cosine

1. Determine the measure of angle θ, to the nearest degree.



Step 1: Identify and label the sides as being adjacent to, opposite, or the hypotenuse, in relation to the angle indicated.



Step 2: State the appropriate ratio.

$$cosine\ of\ \ angle\ \theta = \frac{length\ adjacent\ \ to\ \theta}{hypotenuse}$$

Step 3: Substitute known values, and calculate the unknown value.

$$\cos\theta = \frac{adj}{hyp}$$

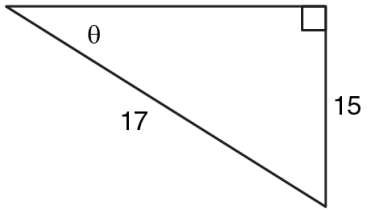
$$\cos\theta = \frac{13}{17}$$

$$\theta = \cos^{-1}\left(\frac{13}{17}\right)$$

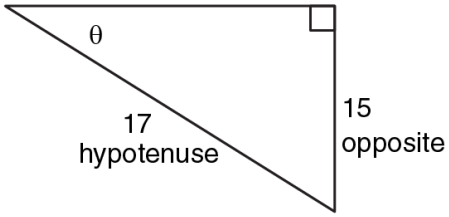
$$\theta = 40°$$

The measure of angle θ is approximately 40°.

2. Determine the measure of angle θ, to the nearest degree.



Step 1: Identify and label the sides as being adjacent to, opposite, or the hypotenuse, in relation to the angle indicated.



Step 2: State the appropriate ratio.

$$sine\ of\ \ angle\ \theta = \frac{length\ opposite\ \theta}{hypotenuse}$$

Step 3: Substitute known values, and calculate the unknown value.

$$\sin\theta = \frac{opp}{hyp}$$

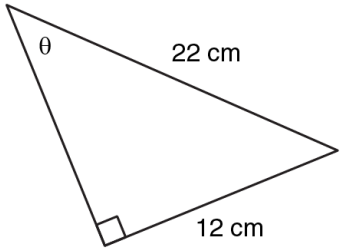
$$\sin\theta = \frac{15}{17}$$

$$\theta = \sin^{-1}\left(\frac{15}{17}\right)$$

$$\theta = 62°$$

The measure of angle θ is approximately 62°.

3. Determine the measure of angle θ, to the nearest degree.



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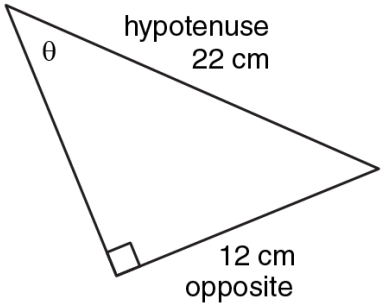


Step 2: State the appropriate ratio.

$$sine\ of\ \ angle\ \theta = \frac{length\ opposite\ \theta}{hypotenuse}$$

Step 3: Substitute known values, and calculate the unknown value.

$$\sin\theta = \frac{opp}{hyp}$$

$$\sin\theta = \frac{12\ \cancel{cm}}{22\ \cancel{cm}}$$

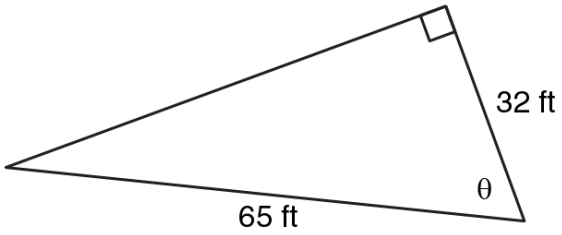
$$\sin\theta = \frac{12}{22}$$

$$\theta = \sin^{-1}\left(\frac{12}{22}\right)$$

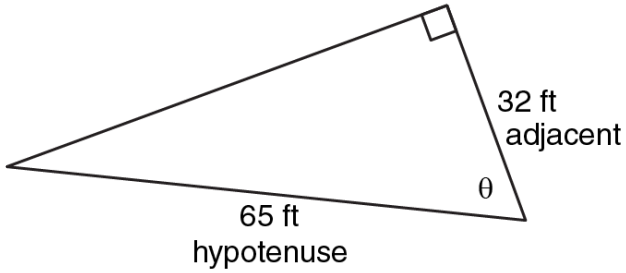
$$\theta = 33°$$

The measure of angle θ is approximately 33°.

4. Determine the measure of angle θ, to the nearest degree.



Step 1: Identify and label the sides as being adjacent to, opposite, or the hypotenuse, in relation to the angle indicated.



Step 2: State the appropriate ratio.

$$cosine\ of\ \ angle\ \theta = \frac{length\ adjacent\ \ to\ \theta}{hypotenuse}$$

Step 3: Substitute known values, and calculate the unknown value.

$$\cos\theta = \frac{adj}{hyp}$$

$$\cos\theta = \frac{32\ \cancel{ft}}{65\ \cancel{ft}}$$

$$\cos\theta = \frac{32}{65}$$

$$\theta = \cos^{-1}\left(\frac{32}{65}\right)$$

$$\theta = 61°$$

The measure of angle θ is approximately 61°.