

Date: _____

Sine and Cosine

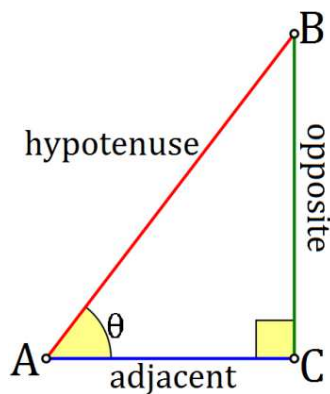
The trig ratios compare the lengths of sides for a given angle within a right-triangle.

Sine Ratio

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

Cosine Ratio

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$



Example 1

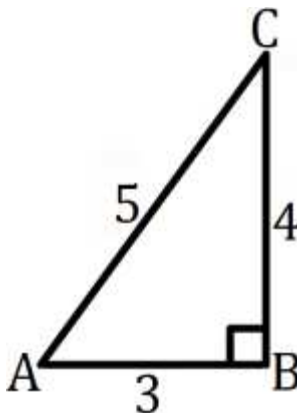
State the trig ratios.

$$\sin A =$$

$$\cos A =$$

$$\sin C =$$

$$\cos C =$$



Example 2

Use a calculator to evaluate each of the following trig ratios to 4 decimal places. Make sure your calculator is in degree (DEG) mode.

a) $\cos 65^\circ =$ _____

b) $\sin 15^\circ =$ _____

Example 3

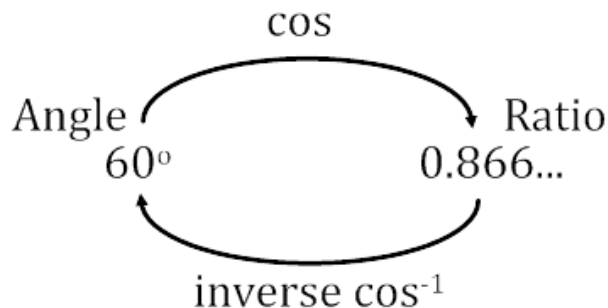
Use a calculator to find the value of the angle, in degrees, having the given trig ratio.

a) $\sin\theta = 0.5$

b) $\cos\theta = 0.25$

$\theta =$ _____

$\theta =$ _____



Example 4

Find the length of x to 1 decimal place.

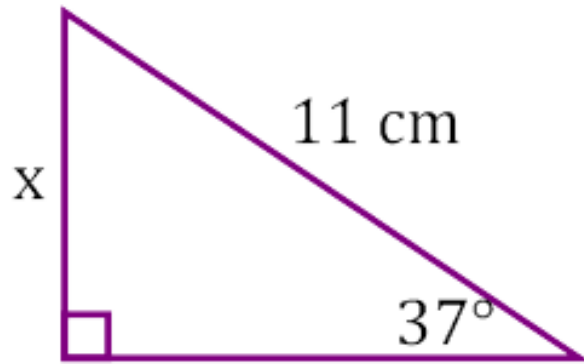
Step 1: Which trig ratio should I use?

Compared to the given angle _____

x is _____

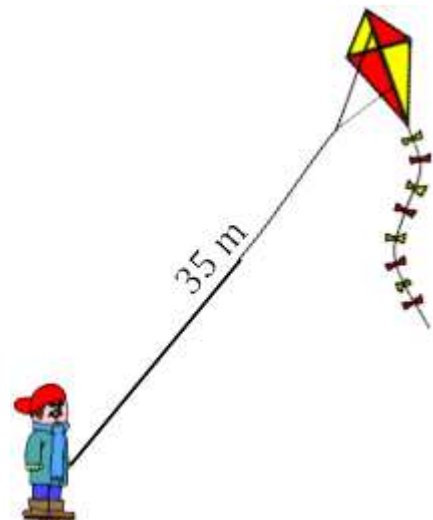
11 cm is _____

Step 2: Set up an equation then solve.



Example 5

Euclid's kite string is 35 m long. It makes an angle of 50° with the ground. Determine the horizontal distance to the kite.



Example 6

Hypatia is supervising the installation of an escalator at a new office building. The escalator will make an angle of 30° with the ground and will rise a vertical distance of 20 ft. How long is the escalator?

Homework

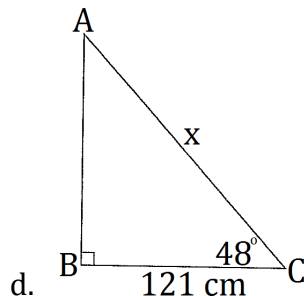
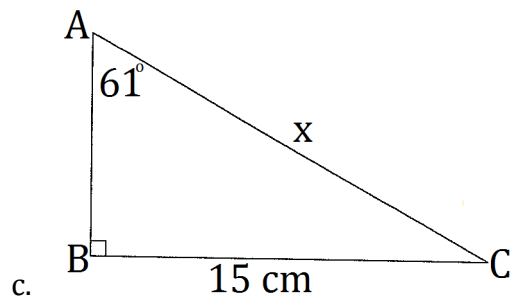
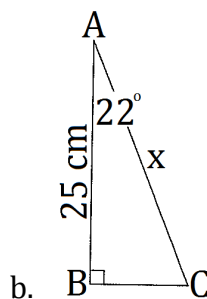
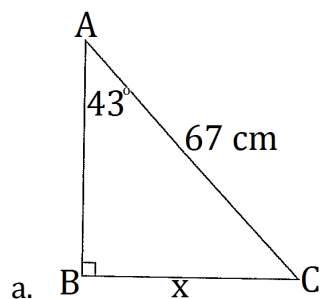
1. Find the value of the following to 4 decimal places.

- | | | |
|----------------------------|----------------------------|----------------------------|
| a. $\cos 75^\circ =$ _____ | b. $\sin 12^\circ =$ _____ | c. $\sin 53^\circ =$ _____ |
| d. $\cos 8^\circ =$ _____ | e. $\sin 66^\circ =$ _____ | f. $\cos 81^\circ =$ _____ |

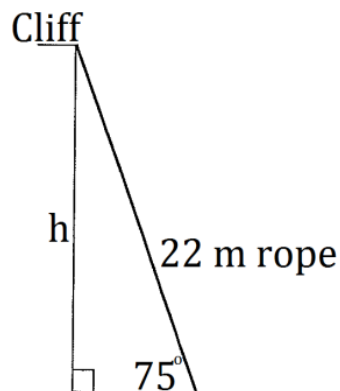
2. Find the value of theta, θ , to one decimal place.

- | | | |
|---------------------------|---------------------------|---------------------------|
| a. $\cos \theta = 0.1636$ | b. $\sin \theta = 0.9386$ | c. $\cos \theta = 0.2232$ |
| d. $\cos \theta = 0.5867$ | e. $\sin \theta = 0.4587$ | f. $\cos \theta = 0.6892$ |

3. Find the value of the x for the missing side to one decimal place.



4. While mountain climbing, one end of a 22 m long rope is at the top of a cliff. The angle the rope makes with the ground is 75° . How high is the cliff to the nearest centimetre?



Answers

1.

a. 0.2588

b. 0.2079

c. 0.7986

d. 0.9903

e. 0.9135

f. 0.1564

2.

a. 80.6°

b. 69.8°

c. 77.1°

d. 54.1°

e. 27.3°

f. 46.4°

3.

a. 45.7 cm

b. 27.0 cm

c. 17.2 cm

d. 180.8 cm

4. 21.25 m