

Name _____ Date _____

Study Guide

The Sine and Cosine Ratios

If an angle is an acute angle of a right triangle:

$$\sin A = \frac{\text{measure of the leg opposite } \angle A}{\text{measure of the hypotenuse}}$$

$$\cos A = \frac{\text{measure of the leg adjacent to } \angle A}{\text{measure of the hypotenuse}}$$

Example 1 Use the cosine ratio to find the value of x .

From the diagram: $m\angle A = 20^\circ$

adjacent leg = 50 cm

hypotenuse = x cm

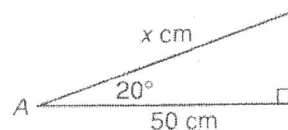
$$\cos 20^\circ = \frac{50}{x} \quad \leftarrow \begin{array}{l} \text{adjacent leg} \\ \text{hypotenuse} \end{array}$$

$$(\cos 20^\circ)(x) = 50$$

$$x = \frac{50}{\cos 20^\circ}$$

Use a calculator: $50 \div \cos 20^\circ = 53.20888862$

$$x \approx 53 \text{ cm}$$



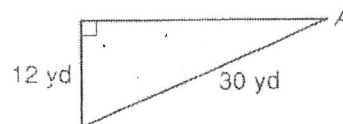
Example 2 Use the sine ratio to find the measure of $\angle A$.

$$\sin A = \frac{12}{30} \quad \leftarrow \begin{array}{l} \text{opposite leg} \\ \text{hypotenuse} \end{array}$$

Use a calculator:

$$12 \div 30 = \sin^{-1} 23.57817848$$

$$m\angle A \approx 24^\circ$$



Complete each exercise using the information in the figure.
Find angle measures to the nearest degree.

1. $\sin A = \frac{\quad}{\quad}$

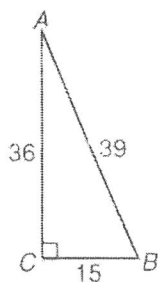
$\sin B = \frac{\quad}{\quad}$

$\cos A = \frac{\quad}{\quad}$

$\cos B = \frac{\quad}{\quad}$

$m\angle A = \quad$

$m\angle B = \quad$



2. $\sin L = \frac{\quad}{\quad}$

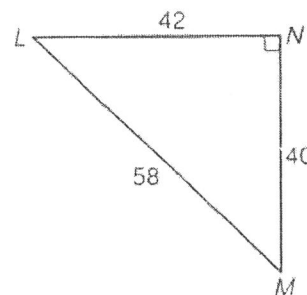
$\sin M = \frac{\quad}{\quad}$

$\cos L = \frac{\quad}{\quad}$

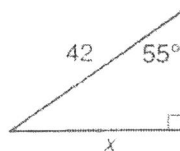
$\cos M = \frac{\quad}{\quad}$

$m\angle L = \quad$

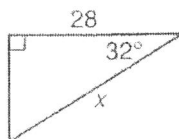
$m\angle M = \quad$



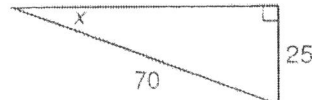
3.

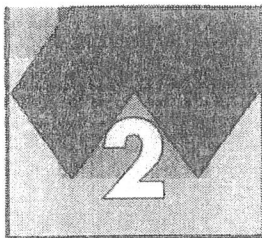


4.



5.





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Practice

The Sine and Cosine Ratios

Use the figures at the right for Exercises 1-12. Write the ratios in simplest form. Find angle measures to the nearest degree.

1. Find $\sin D$. 2. Find $\cos D$.

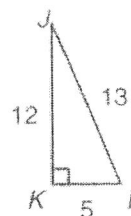
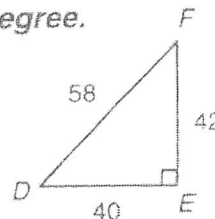
3. Find $m \angle D$. 4. Find $\sin F$.

5. Find $\cos F$. 6. Find $m \angle F$.

7. Find $\sin L$. 8. Find $\cos L$.

9. Find $m \angle L$ 10. Find $\sin J$.

11. Find $\cos J$. 12. Find $m \angle J$.



Complete each exercise using the information in the figure. Find angle measures to the nearest degree.

13. $\sin A = \frac{?}{?}$ $\cos A = \frac{?}{?}$ $m \angle A = \frac{?}{?}$
 $\sin C = \frac{?}{?}$ $\cos C = \frac{?}{?}$ $m \angle C = \frac{?}{?}$

14. $\sin S = \frac{?}{?}$ $\cos S = \frac{?}{?}$ $m \angle S = \frac{?}{?}$
 $\sin T = \frac{?}{?}$ $\cos T = \frac{?}{?}$ $m \angle T = \frac{?}{?}$

Find the value of x to the nearest tenth or to the nearest degree.

