
8-3

INVERSE TRIG FUNCTIONS



OBJECTIVE

TO USE SINE, COSINE, AND
TANGENT RATIOS TO FIND
ANGLE MEASURES IN
RIGHT TRIANGLES

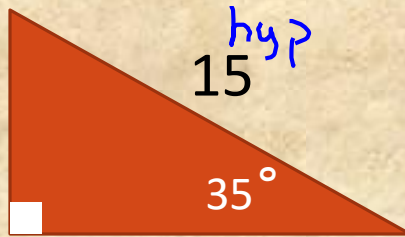
KEY CONCEPT

When we know one acute angle and one side of a right triangle, we can use trig ratios to find the other sides.

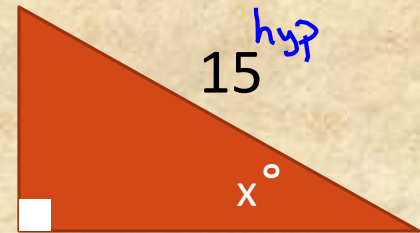
$$\sin 35 = \frac{x}{15}$$

$$x = 15(\sin 35) = 8.60$$

opp
x



opp
8.6



When we know two sides, we can use the trig ratios to find the acute angles of the right triangles by using the inverse (opposite operation).

For example, the inverse of sin is \sin^{-1} . $\sin^{-1} x = \frac{8.6}{15}$

$$x = \sin^{-1}\left(\frac{8.6}{15}\right) = 35^\circ$$

SUMMARY

- $\text{SIN } A = \frac{\textit{opp}}{\textit{hyp}}$ SOH

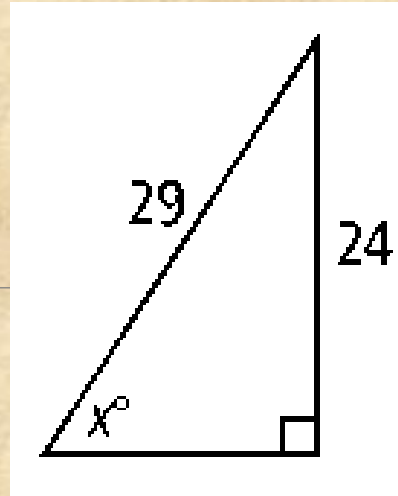
- $\text{COS } A = \frac{\textit{adj}}{\textit{hyp}}$ CAH

- $\text{TAN } A = \frac{\textit{opp}}{\textit{adj}}$ TOA

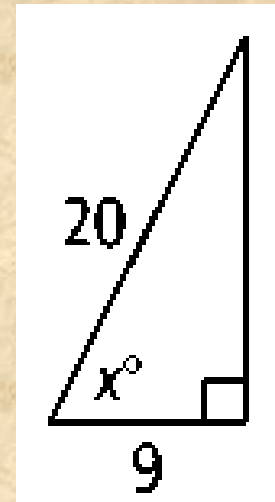
CLASS WORK

Find the
value of x .
Round to the
nearest
degree.

1.



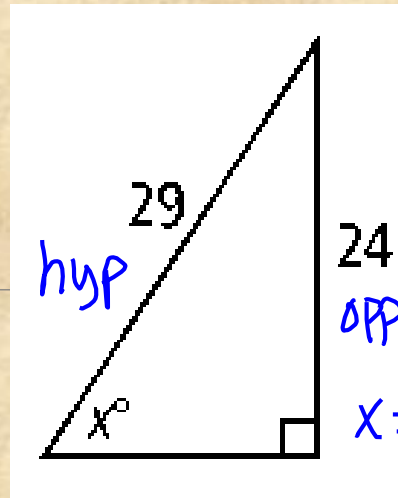
2.



CLASS WORK

Find the
value of x .
Round to the
nearest
degree.

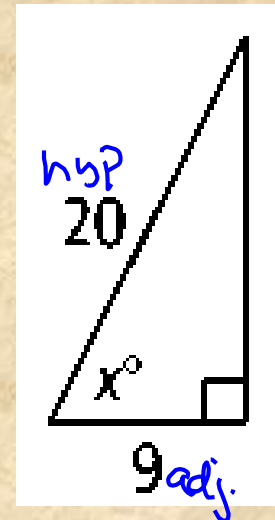
1.



$$\sin x = \frac{24}{29}$$

$$x = \sin^{-1}\left(\frac{24}{29}\right) \approx 56^\circ$$

2.



$$\cos x = \frac{9}{20}$$

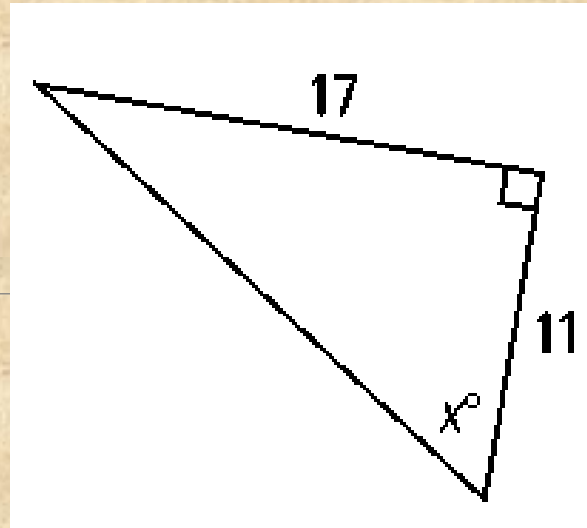
$$x = \cos^{-1}\left(\frac{9}{20}\right)$$

$$x \approx 63^\circ$$

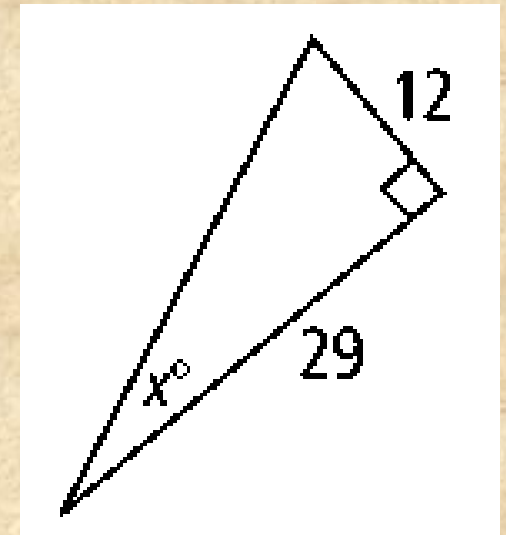
CLASS WORK

Find the
value of x .
Round to the
nearest
degree.

3.



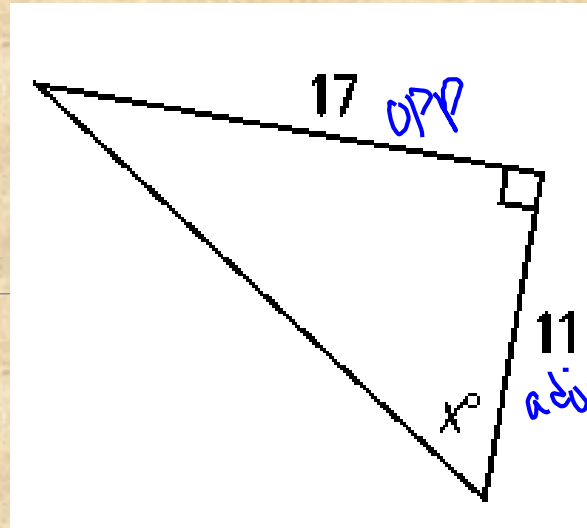
4.



CLASS WORK

Find the
value of x .
Round to the
nearest
degree.

3.



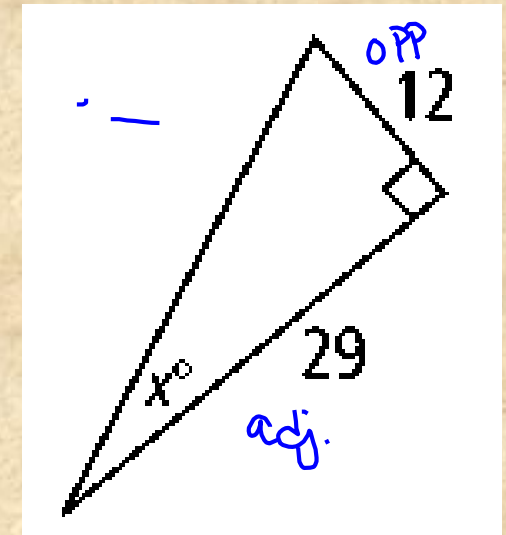
$$\tan x = \frac{17}{11}$$

$$x = \tan^{-1}\left(\frac{17}{11}\right) = 57^\circ$$

4.

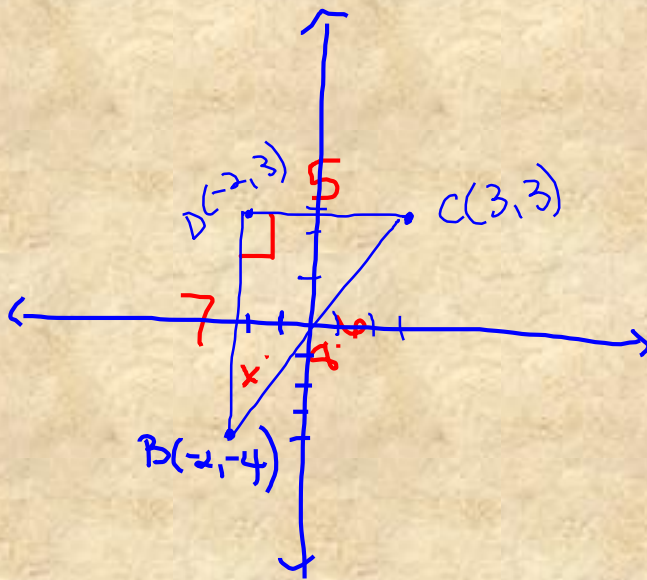
$$\tan x = \frac{12}{29}$$

$$x = \tan^{-1}\left(\frac{12}{29}\right) \approx 22^\circ$$



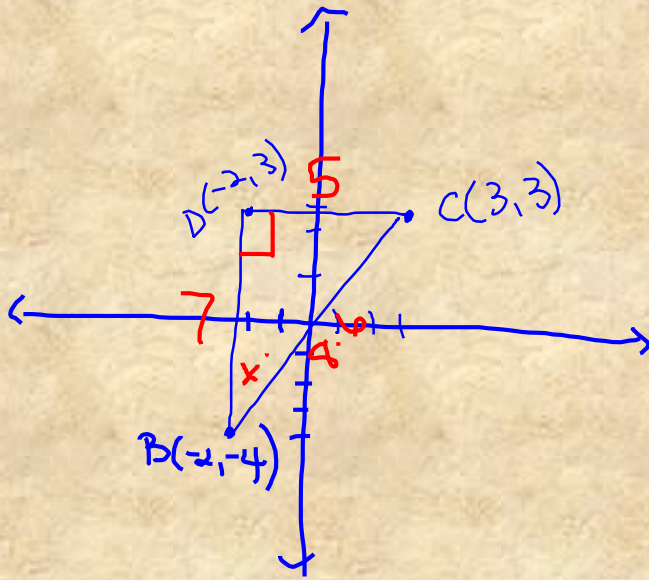
For each triangle, find all three side lengths to the nearest hundredth and all three angle measures to the nearest degree.

19. $B(-2, -4)$, $C(3, 3)$, $D(-2, 3)$



For each triangle, find all three side lengths to the nearest hundredth and all three angle measures to the nearest degree.

19. $B(-2, -4)$, $C(3, 3)$, $D(-2, 3)$



$$DC = 5$$

$$BD = 7$$

$$BC = \sqrt{5^2 + 7^2} = \sqrt{74} \approx 8.60$$

$$\tan x = \frac{5}{7}$$

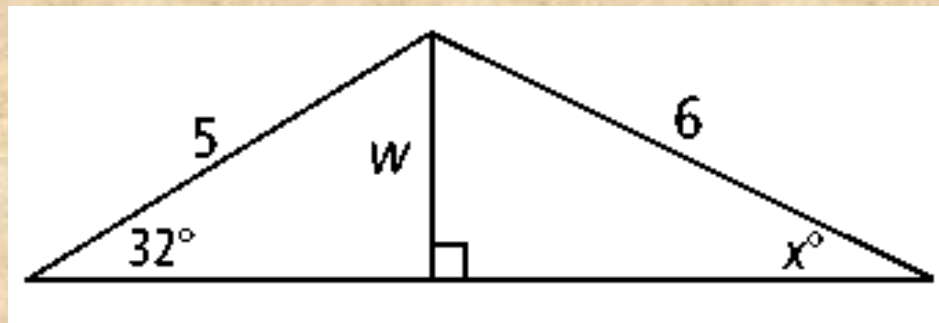
$$m\angle B = x = \tan^{-1}\left(\frac{5}{7}\right) \approx 36^\circ$$

$$m\angle C = 90 - 36 = 54^\circ$$

$$m\angle D = 90^\circ$$

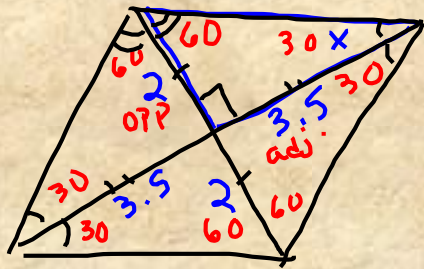
CLASS WORK

5. The lengths of the diagonals of a rhombus are 4 in. and 7 in. Find the measures of the angles of the rhombus to the nearest degree.
6. Find the values of w and then x . Round lengths to the nearest tenth and angle measures to the nearest degree.



CLASS WORK

5. The lengths of the diagonals of a rhombus are 4 in. and 7 in. Find the measures of the angles of the rhombus to the nearest degree.



$$\tan x = \frac{2}{3.5}$$

$$x = 30^\circ$$

∠s of rhombus:

60, 60, 120, 120

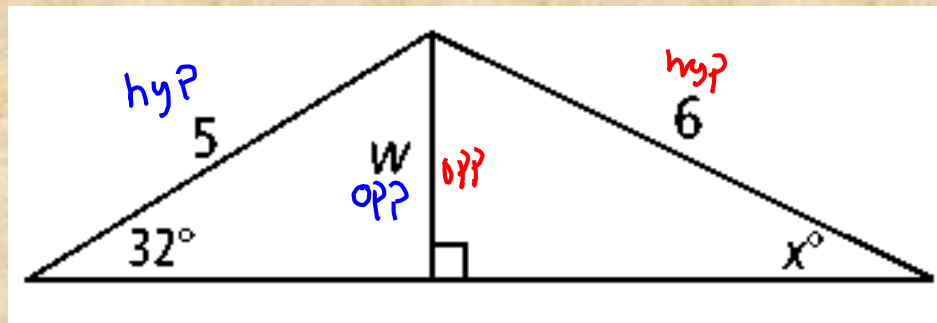
6. Find the values of w and then x . Round lengths to the nearest tenth and angle measures to the nearest degree.

$$\sin 32 = \frac{w}{5}$$

$$w = 5(\sin 32)$$

$$w = 2.6496$$

$$w = 2.6$$



$$\sin x = \frac{2.6496}{6}$$

$$x = 26^\circ$$

SUMMARY

- USE SIN, COS, AND TAN FUNCTIONS TO FIND SIDES IN A RIGHT TRIANGLE.

- USE SIN^{-1} , COS^{-1} , AND TAN^{-1} FUNCTIONS TO FIND ANGLES IN A RIGHT TRIANGLE.

HOMework

PAGES 556 – 558

22 – 44 EVEN

48, 54, 56, 60, 66, 68
