Warm-Up

1) Convert to degrees-minutes-seconds:

278.8925 → 278°53′33″

2) Convert to decimal degrees:

217°47′42″ → 217.795°

SOLVING RIGHT TRIANGLES

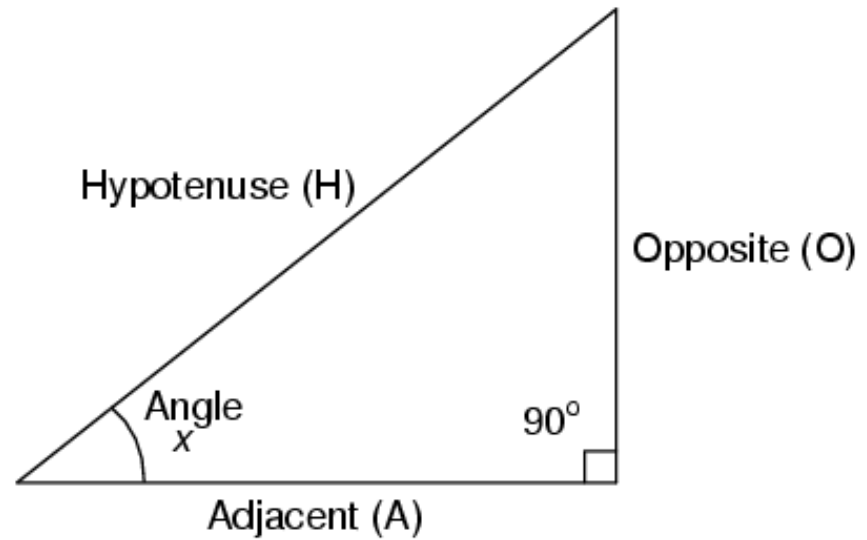9-1: Use trigonometry to find unknown sides or angles of a right triangle
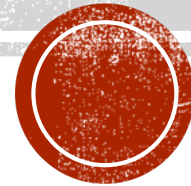
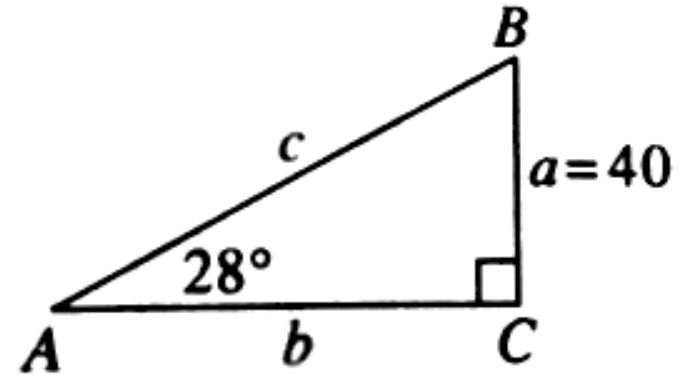# SOH CAH TOA - REVIEW

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

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

$$\tan \theta = \frac{opp}{adj}$$

Hypotenuse (H)

Opposite (O)

Angle
x

90°

Adjacent (A)

EXAMPLE 1:

For the right triangle ABC, find the value of b.

$$\tan \theta = \frac{opp}{adj}$$

$$\tan 28^\circ = \frac{40}{b}$$

$$b = \frac{40}{\tan 28^\circ} \qquad b = 75.2$$

EXAMPLE 2:

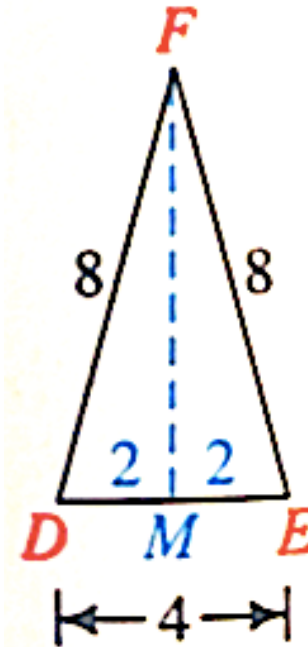A triangle has sides 8, 8, and 4. Find the measures of all angles of the triangle.

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

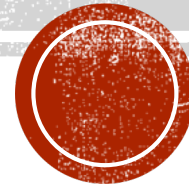$$\cos D = \frac{2}{8} = 0.25$$

$$\angle D = \cos^{-1} 0.25 = 75.5°$$

$$\angle E = 75.5°$$

$$\angle F = 180° - 2(75.5°) = 29.0°$$

THE AREA OF A TRIANGLE

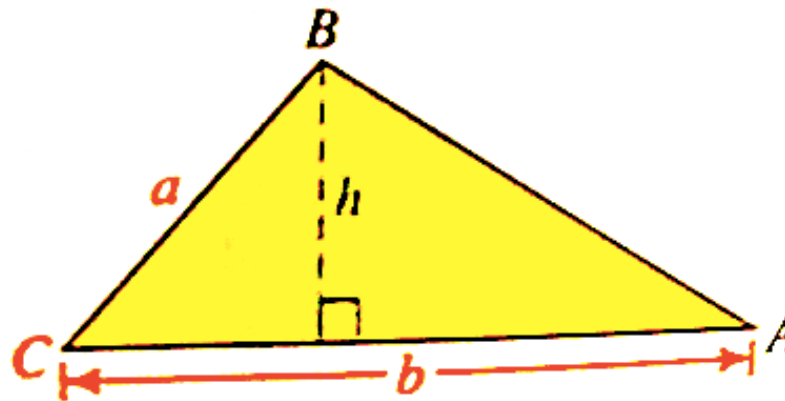9-2: Find the area of a triangle given the lengths of two sides and the measure of the included angle.

THE AREA OF A TRIANGLE

$$K = \frac{1}{2}ab \sin C$$

$$= \frac{1}{2}bc \sin A$$

$$= \frac{1}{2}ac \sin B$$

EXAMPLE 3:

Two sides of a triangle have lengths 7 cm and 4 cm. The angle between the sides measures 73°. Find the area of the triangle.

$$K = \frac{1}{2} * 7 * 4 * \sin 73^{\circ}$$

$$\approx 13.4 \text{ cm}^2$$

EXAMPLE 4:

The area of $\triangle PQR$ is 15. If $p = 5$ and $q = 10$, find all possible measures of $\angle R$.
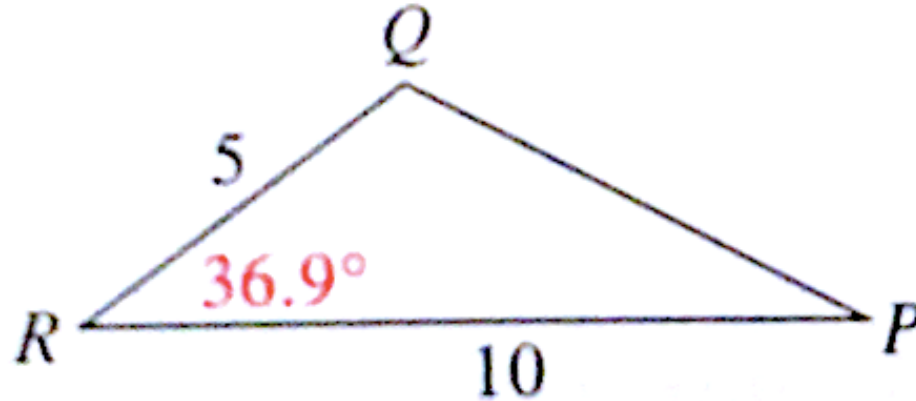
$$K = \frac{1}{2}pq\sin R$$

$$15 = \frac{1}{2} * 5 * 10 * \sin R$$

$$15 = 25\sin R$$

$$0.6 = \sin R$$

$$\angle R = \sin^{-1}0.6$$

$$\angle R = 36.9°$$

EXAMPLE 4:

The area of ΔPQR is 15. If $p = 5$ and $q = 10$, find all possible measures of $\angle R$.
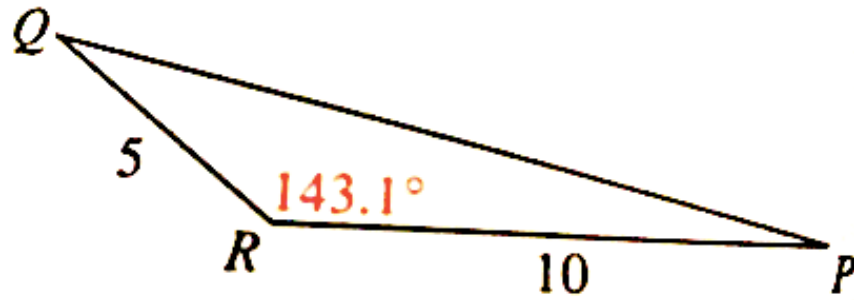
$$K = \frac{1}{2} ac \sin R$$

$$15 = \frac{1}{2} * 5 * 10 * \sin R$$

$$15 = 25 \sin R$$

$$0.6 = \sin R$$

$$\angle R = \sin^{-1} 0.6$$

$$\angle R = 36.9° \qquad \text{or} \qquad \angle R = 180° - 36.9° = 143.1°$$

PRACTICE PROBLEMS

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