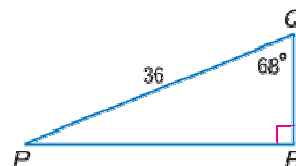


Lesson 14-2

Example 1

Find the following in $\triangle PQR$.

- PR to the nearest tenth
- $m\angle P$
- QR to the nearest tenth



Solution

- Decide which trigonometric ratio relates the known side PQ , the unknown side PR , and the known acute angle, $\angle Q$. Think: PQ is the *hypotenuse*. PR is *opposite* $\angle Q$. The ratio that relates the hypotenuse and the side opposite an angle is the *sine*.

$$\sin Q = \frac{PR}{PQ}$$

$$\sin 68^\circ = \frac{PR}{36}$$

$$0.9272 = \frac{PR}{36} \quad \text{calculator approximation of } \sin 68^\circ$$

$$PR = 36(0.9272) \approx 33.4$$

- $m\angle P = 90^\circ - 68^\circ = 22^\circ$
- Use the Pythagorean Theorem to find QR .

$$(PR)^2 + (QR)^2 = (PQ)^2$$

$$(33.4)^2 + (QR)^2 = (36)^2$$

$$1115.56 + (QR)^2 = 1296$$

$$(QR)^2 = 180.44$$

$$QR \approx 13.4$$

Example 2

SURVEYING A surveyor is 680 ft from the base of the Howard Libby redwood, the world's tallest tree, in Humboldt County, CA. The tree is 362 ft tall. Find the angle of elevation of the top of the tree from the spot where the surveyor is standing.

Solution

The angle of elevation is $\angle A$, formed by the top of the horizontal line of the ground and the line slanting to the top of the tree. BC is opposite $\angle A$, and AC is adjacent to $\angle A$. The trigonometric ratio relating opposite and adjacent is the tangent.

$$\tan A = \frac{362}{680} \approx 0.5324$$
$$\tan^{-1} 0.5324 \approx 28.0^\circ$$

The angle of elevation is approximately 28.0° .

