

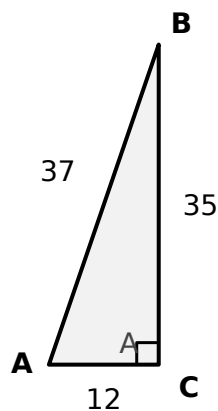
# Solving Right Triangles with Sine, Cosine and Tangent

Grade 10 – Geometry math · Test Answer Key · Standards: G-SRT.C.6, G-SRT.C.7, G-SRT.C.8

Each solution shows the ratio, the substitution and the final rounded answer. The scoring line explains where partial credit is earned, so students can see which step cost them points.

**Standards:** G-SRT.C.6, G-SRT.C.7, G-SRT.C.8 · **Level:** Grade 10 Geometry

## Question 1 Three Ratios (3 points)



Opposite A is 35, adjacent is 12.

(a)  $\sin A = \frac{35}{37}$ .

(b)  $\cos A = \frac{12}{37}$ .

(c) For angle B, opposite is AC = 12, adjacent is BC = 35:  $\tan B = \frac{12}{35}$ .

Scoring: 1 point per part.

## Question 2 Complementary Equation (2 points)

Sine equals cosine of the complement, so  $(2x + 4) + (3x - 4) = 90$ . Then  $5x = 90$  and  $x = 18$ .

Check:  $\sin 40^\circ = \cos 50^\circ$ , correct.

Scoring: 1 point for the complementary relationship, 1 point for the answer.

### Question 3 Find a Side (2 points)

BC is opposite the  $58^\circ$  angle and AB is the hypotenuse:  $\sin 58^\circ = \frac{18.4}{x}$ .

$$x = \frac{18.4}{(\sin 58^\circ)} \approx \frac{18.4}{0.8480} \approx 21.7.$$

$$x \approx 21.7$$

Scoring: 1 point for the correct ratio, 1 point for the answer.

### Question 4 Find an Angle (2 points)

The horizontal distance is adjacent to the angle and the ramp is the hypotenuse:  $\cos \theta = \frac{17}{25} = 0.68$ .

$$\theta = \cos^{-1}(0.68) \approx 47.16^\circ.$$

$$\theta \approx 47.2^\circ$$

Scoring: 1 point for the ratio, 1 point for the answer.

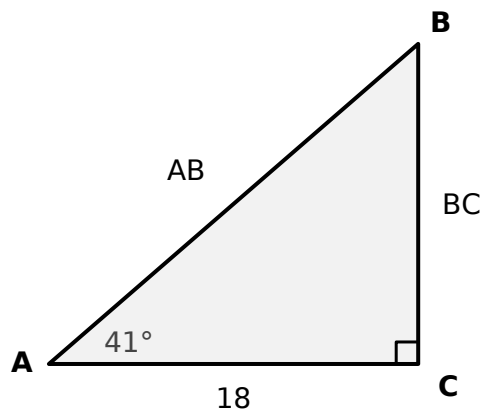
### Question 5 Special Right Triangle (2 points)

Short leg =  $26 \div 2 = 13$ . Long leg =  $13\sqrt{3}$ .

**13 in and  $13\sqrt{3}$  in**

Scoring: 1 point for each leg.

### Question 6 Solve the Triangle (3 points)



*Solution sketch.*

$$B = 90^\circ - 41^\circ = 49^\circ.$$

$$BC = 18 \cdot \tan 41^\circ \approx 18 \cdot 0.8693 = 15.65. \quad AB = \frac{18}{(\cos 41^\circ)} \approx \frac{18}{0.7547} \approx 23.85.$$

$$\mathbf{B = 49^\circ, BC \approx 15.6, AB \approx 23.9}$$

*Scoring: 1 point for B, 1 point for BC, 1 point for AB.*

### Question 7 Height of a Building (3 points)

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$$\text{Height above eye level} = 65 \cdot \tan 47^\circ \approx 65 \cdot 1.0724 = 69.7 \text{ ft. Add 6 ft: } 75.7 \text{ ft.}$$

$$\approx \mathbf{76 \text{ ft}}$$

*Scoring: 1 point for the ratio, 1 point for the product, 1 point for adding the eye height.*

### Question 8 Two Buoys (3 points)

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$$\text{Horizontal distances: } \frac{150}{(\tan 21^\circ)} \approx 390.8 \text{ ft and } \frac{150}{(\tan 36^\circ)} \approx 206.5 \text{ ft.}$$

$$\text{Difference: } 390.8 - 206.5 \approx 184.3.$$

$$\approx \mathbf{184 \text{ ft}}$$

*Scoring: 1 point for each distance, 1 point for the difference.*