Topic: Solving right triangles

Question: If the measure of the acute angle of a right triangle that's opposite one of the legs is $2\pi/5$, what is the measure of the acute angle that's opposite the other leg?

Answer choices:

A $\frac{\pi}{10}$

B $\frac{6\pi}{5}$

C $\frac{3\pi}{5}$

D $\frac{11\pi}{10}$

Solution: A

Let $\theta = 2\pi/5$ and let α be the other acute angle. The measures of θ and α sum to $90°$, so

$$\theta + \alpha = \frac{\pi}{2}$$

$$\frac{2\pi}{5} + \alpha = \frac{\pi}{2}$$

Solve for α.

$$\alpha = \frac{\pi}{2} - \frac{2\pi}{5}$$

$$\alpha = \frac{5\pi}{10} - \frac{4\pi}{10}$$

$$\alpha = \frac{\pi}{10}$$

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Question: The length of one leg of a right triangle is 5 and the opposite angle has measure $58°$. What is the length of the other leg?

Answer choices:

A 2.65

B 8.00

C 4.24

D 3.12

Solution: D

Use the definition of sine.

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin 58^\circ = \frac{5}{c}$$

$$c = \frac{5}{\sin 58^\circ} \approx \frac{5}{0.848408} \approx 5.8959$$

Now use the Pythagorean Theorem to find the length of the other leg.

$$a^2 + b^2 = c^2$$

$$b^2 = c^2 - a^2$$

$$b^2 \approx 5.8959^2 - 5^2$$

$$b^2 \approx 34.7615 - 25$$

$$b^2 \approx 9.7615$$

$$b \approx \sqrt{9.7615}$$

$$b \approx 3.12$$

Topic: Solving right triangles

Question: The length of one leg of a right triangle is 2.4, and the angle opposite the other leg has measure $28°$. What is the length of the triangle's hypotenuse?

Answer choices:

A 2.72

B 4.51

C 1.28

D 5.11

Solution: A

Use the definition of sine.

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin 62^\circ = \frac{2.4}{c}$$

$$c = \frac{2.4}{\sin 62^\circ} \approx \frac{2.4}{0.883} \approx 2.72$$