

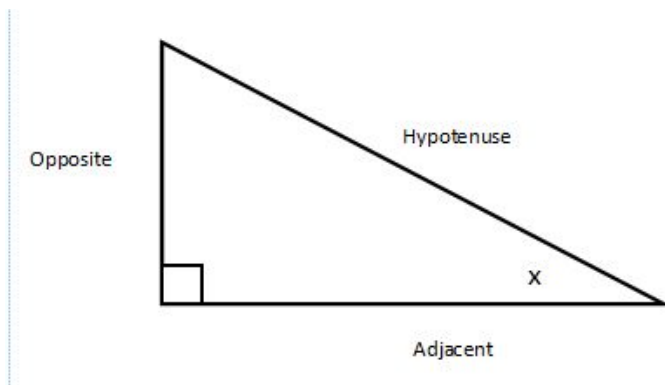
The SAT Initiative

G8 Topic Breakdown
SOL - Geometry
Crystal Ding

Topic: Solve real-world problems involving right triangles by using the Pythagorean Theorem and its converse properties of special right triangle trigonometry.

Determine lengths of sides if a right triangle is formed.

Sine-cosine-and tangent

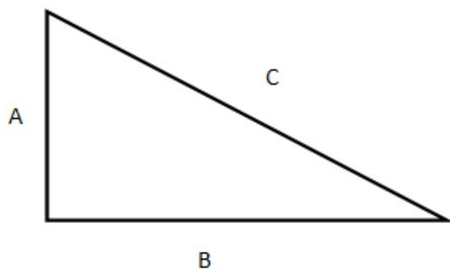


$$\sin x = \frac{opp}{hyp}$$

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

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

$$A^2 + B^2 = C^2$$

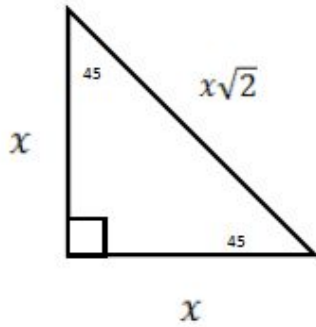


Example:

A triangle with side 3, 4, 5 is a right triangle because:

$$3^2 + 4^2 = 5^2$$

Solving for 45-45-90 triangle

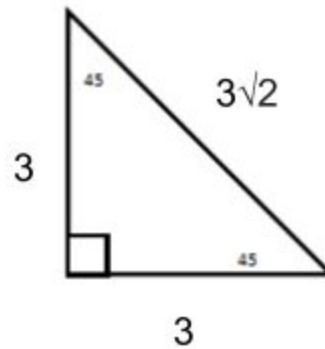


$$\sin 45^\circ = \frac{1}{\sqrt{2}}$$

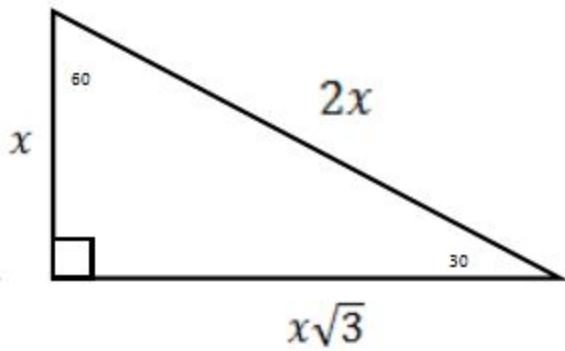
$$\cos 45^\circ = \frac{1}{\sqrt{2}}$$

$$\tan 45^\circ = 1$$

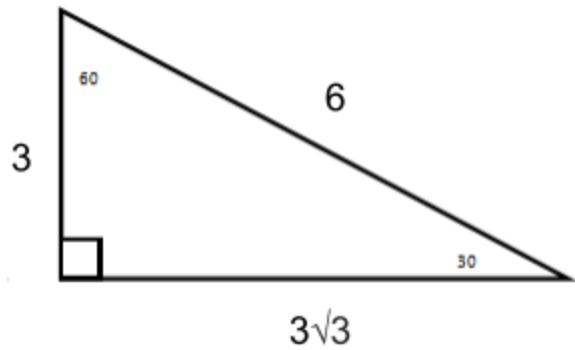
Example:



Solving for 30-60-90 triangles



Example:



$$\sin 30^\circ = \frac{1}{2}$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\tan 30^\circ = \frac{1}{\sqrt{3}}$$

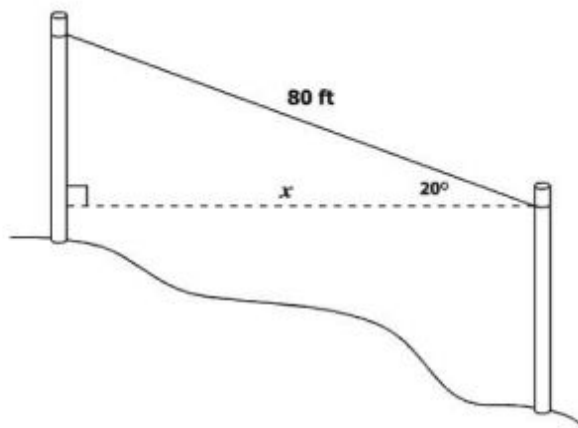
$$\sin 60^\circ = \frac{\sqrt{3}}{2}$$

$$\cos 60^\circ = \frac{1}{2}$$

$$\tan 60^\circ = \sqrt{3}$$

Real world problems

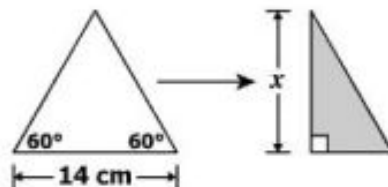
Reuben attached a wire between two poles on a hill as shown.



Which is closest to x , the distance between the two poles?

- A 27 ft
- B 29 ft
- C 60 ft
- D 75 ft

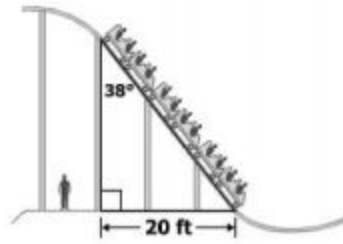
An equilateral triangle is folded in half.



What is x , the height of the equilateral triangle?

- A $14\sqrt{3}$ cm
- B 14 cm
- C $7\sqrt{3}$ cm
- D 7 cm

A spectator is viewing the six cars of a roller coaster as it travels down a hill at an amusement park.



Which is closest to the total length of the six cars?

- A 12.3 ft
- B 15.8 ft
- C 25.6 ft
- D 32.5 ft

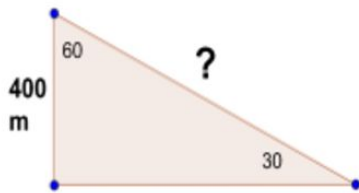
Additional Practice Problems

G.8 Geometry

Question 1

You are walking up a 400m hill, how far will it take you to reach the top?

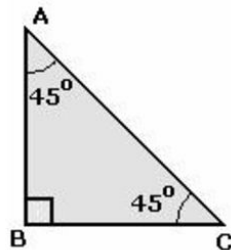
- A) 400
- B) $400\sqrt{3}$
- C) 600
- D) 800



Question 2:

The area of a right isosceles triangle is 50. Find the lengths of the hypotenuse of the triangle.

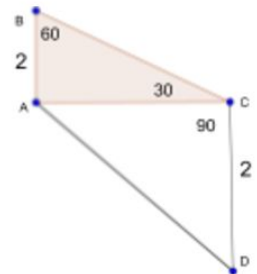
- A) $10\sqrt{2}$
- B) 10
- C) 50
- D) $50\sqrt{2}$



Question 3:

Find the hypotenuse of triangle ACD.

- A) 2
- B) $2\sqrt{2}$
- C) 4
- D) $4\sqrt{2}$

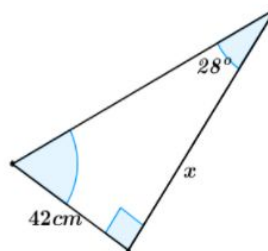


Question 4: Evaluate $2 \sin 30^\circ + 4 \cos 60^\circ$

- A) 3
- B) 4
- C) 4.5
- D) 6

Question 5: Find x.

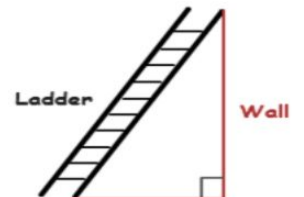
- A) 76
- B) 78
- C) 79
- D) 81



Question 6:

A ladder is leaning towards the wall, creating a 45 degrees angle with the ground. If the distance from the ladder to the wall is 8, what is the length of the ladder?

- A) 8
- B) $8\sqrt{2}$
- C) 16
- D) $16\sqrt{2}$

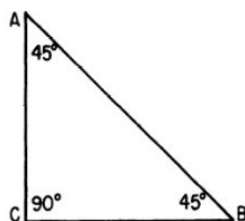


Question 7:

The perimeter of the triangle below is

$8 + 4\sqrt{2}$. What is the length of its side?

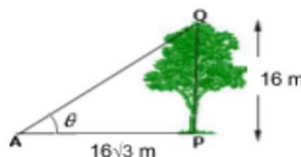
- A) 2
- B) $2\sqrt{2}$
- C) 4
- D) $4\sqrt{2}$



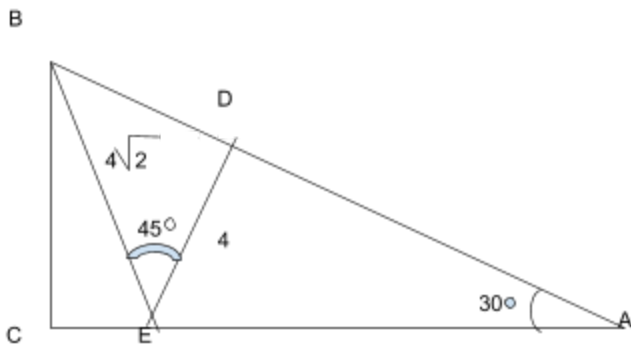
Question 8:

What is the value of angle θ ?

- A) 30
- B) 45
- C) 60
- D) 80



Question 9: $\triangle ABC$ is a right triangle. $\angle A = 30^\circ$. $\angle BED = 45^\circ$. $DE = 4$. $BE = 4\sqrt{2}$. How long is CE ?



Guidance:

What kind of triangle is $\triangle BDE$?

How long is BD ?

What kind of triangle is $\triangle ADE$?

How long is AD ? How long is AE ?

What kind of triangle is $\triangle ABC$?

How long is AC ?

How long is CE ?

$$\sin 45^\circ = \frac{1}{\sqrt{2}}$$

$$\cos 45^\circ = \frac{1}{\sqrt{2}}$$

$$\tan 45^\circ = 1$$

$$\sin 30^\circ = \frac{1}{2}$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\tan 30^\circ = \frac{1}{\sqrt{3}}$$

Answer Key: Practice Problems

G.8 Geometry

1.	D
2.	A
3.	C
4.	A
5.	C
6.	B
7.	C
8.	A
9.	$2\sqrt{3} - 2$