LESSON MAKER PRO

Find the Missing Side

Use trigonometric ratios in right triangles

HIGH SCHOOL · G.RT.1.4

G.RT.1.4 "Apply the trigonometric functions as ratios (sine, cosine, tangent) to find side lengths in right triangles in mathematical models, including the coordinate plane."

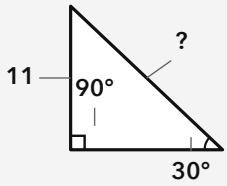
NAME _____ DATE _____

CHOOSE A RATIO

In a right triangle, sin θ = opposite/hypotenuse, cos θ = adjacent/hypotenuse, and tan θ = opposite/adjacent. Use sin 30° = 1/2, sin 45° = cos 45° = √2/2, cos 60° = 1/2, tan 45° = 1, and tan 60° = √3.

WORKED EXAMPLE

Find the hypotenuse x in the triangle.



1. Use sine: sin 30° = 11/x.
2. Substitute: 1/2 = 11/x.
3. Solve: x = 22.

Answer: 22

PRACTICE 4 problems

1 Solve for x: cos 60° = x/18.

ANSWER _____

2 Solve for x: tan 45° = x/12.

ANSWER _____

3 Solve for x: sin 45° = x/(8√2).

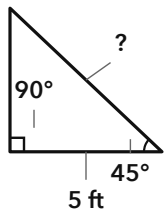
ANSWER _____

4 Solve for x: tan 60° = x/4.

ANSWER _____

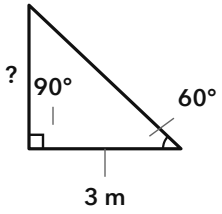
APPLY IT Show your work

1 A skateboard ramp has the dimensions shown. Find its length x.



ANSWER _____

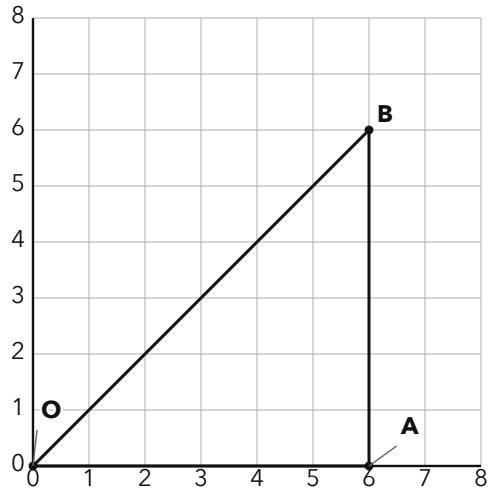
2 A drone rises from its launch point as shown. Find its height x.



ANSWER _____

CHALLENGE One step up

In the grid, angle O is 45°. Use a trig ratio to find AB, and explain your choice.



WORK SPACE AND ANSWER

ANSWER KEY

Find the Missing Side

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve for x: cos 60° = x/18.	**9**
2	Solve for x: tan 45° = x/12.	**12**
3	Solve for x: sin 45° = x/(8√2).	**8**
4	Solve for x: tan 60° = x/4.	**4√3**

PART 2 · APPLY IT

1. **5√2 ft** cos 45° = 5/x, so √2/2 = 5/x. Solving gives x = 5√2 ft.
2. **3√3 m** tan 60° = x/3, so √3 = x/3. Thus x = 3√3 m.

CHALLENGE

AB = 6 units. OA = 6 units from the grid, and tan 45° = AB/OA = 1.

Accept equivalent exact radical forms, such as 5√2 ft or 10/√2 ft. The challenge explanation must identify tangent as opposite over adjacent.