LESSON MAKER PRO

Find the Angle

Use right-triangle ratios to find sides and angles.

HIGH SCHOOL · G.RT.1.3

G.RT.1.3 "Use the definition of the trigonometric functions to determine the sine, cosine, and tangent ratio of an acute angle in a right triangle. Apply the inverse trigonometric functions to find the measure of an acute angle in right triangles."

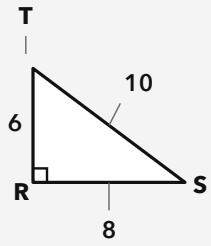
NAME _____ **DATE** _____

RATIOS AND ANGLES

For an acute angle, sin = opposite/hypotenuse, cos = adjacent/hypotenuse, and tan = opposite/adjacent. Use an inverse trig function to find an angle from its ratio. For exact angles, recall the side ratios 1:sqrt(3):2 for a 30°-60°-90° triangle and 1:1:sqrt(2) for a 45°-45°-90° triangle.

WORKED EXAMPLE

Find sin S in the figure.



1. Opposite S = 6; hypotenuse = 10.
2. sin S = opposite/hypotenuse.
3. sin S = 6/10 = 3/5.

Answer: 3/5

PRACTICE 4 problems

1 Find sin x when opposite = 3 and hypotenuse = 5.

ANSWER _____

2 Find cos x when adjacent = 12 and hypotenuse = 13.

ANSWER _____

3 Find acute x if sin x = 1/2.

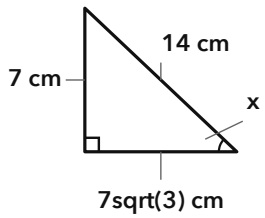
ANSWER _____

4 Find acute x if tan x = sqrt(3).

ANSWER _____

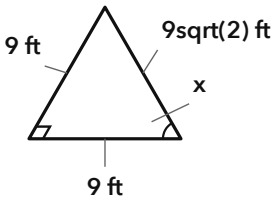
APPLY IT Show your work

1 A tablet stand makes angle x with a desk. Use the figure to find x.



ANSWER _____

2 A skate ramp makes angle x with the ground. Use the figure to find x.



ANSWER _____

CHALLENGE One step up

For an acute angle x, sin x = 20/29. Find cos x and tan x in simplest form.

WORK SPACE AND ANSWER

ANSWER KEY # Find the Angle

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find sin x when opposite = 3 and hypotenuse = 5.	**3/5**
2	Find cos x when adjacent = 12 and hypotenuse = 13.	**12/13**
3	Find acute x if sin x = 1/2.	**30°**
4	Find acute x if tan x = sqrt(3).	**60°**

PART 2 · APPLY IT

1. **30°** At x, opposite/hypotenuse = 7/14 = 1/2. Therefore sin x = 1/2 and x = 30°.
2. **45°** At x, opposite/adjacent = 9/9 = 1. Therefore tan x = 1 and x = 45°.

CHALLENGE

cos x = 21/29; tan x = 20/21

For the challenge, the missing leg is sqrt($29^2 - 20^2$) = 21. Accept equivalent exact fractions.