LESSON MAKER PRO

Right Triangle Ratios

Match each acute angle to its opposite, adjacent, and hypotenuse sides.

HIGH SCHOOL · MA.912.T.1.1

MA.912.T.1.1 "Define trigonometric ratios for acute angles in right triangles."

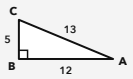
NAME _____ DATE _____

THE BIG IDEA

In a right triangle, the hypotenuse is the side opposite the right angle. For a chosen acute angle, the opposite side is across from the angle, the adjacent side is the non-hypotenuse leg that touches it, and sin = opposite/hypotenuse, cos = adjacent/hypotenuse, and tan = opposite/adjacent.

WORKED EXAMPLE

Use the figure. Find sin A, cos A, and tan A.



1. The hypotenuse is AC = 13 because it is opposite right angle B.
2. For angle A, the opposite side is BC = 5 and the adjacent leg is AB = 12.
3. sin A = 5/13, cos A = 12/13, and tan A = 5/12.

Answer: sin A = 5/13, cos A = 12/13, tan A = 5/12

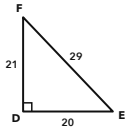
PRACTICE 6 problems

1 Use the figure. Find sin A.



ANSWER _____

2 Use the figure. Find cos F and tan F.



ANSWER _____

3 Triangle XYZ has a right angle at Y. XY = 9, YZ = 40, and XZ = 41. Find tan X.

ANSWER _____

4 Triangle JKL has a right angle at J. JK = 16, JL = 30, and KL = 34. Find cos K.

ANSWER _____

5 For an acute angle M in a right triangle, the opposite leg is 11, the adjacent leg is 60, and the hypotenuse is 61. Find cos M.

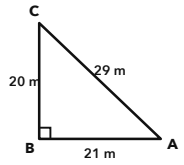
ANSWER _____

6 In a right triangle, sin P = 7/25. If the hypotenuse is 50, find the length of the leg opposite angle P.

ANSWER _____

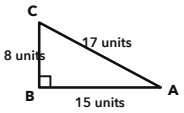
APPLY IT Show your work

1 A school sound crew anchors a lighting cable as shown. Point A is the ground anchor, and point C is the lighting point. Find tan A.



ANSWER _____

2 A game-design team models a skateboard ramp with the right triangle shown. Point A is the base of the ramp. Which ratio compares the vertical rise BC to the ramp surface AC? Write the ratio and its value.



ANSWER _____

CHALLENGE One step up

In a right triangle, tan A = 8/15 and the hypotenuse is 34. Find sin A and cos A. Explain how the given tangent ratio helps you find both ratios.

WORK SPACE AND ANSWER

ANSWER KEY

Right Triangle Ratios

HIGH SCHOOL · MA.912.T.1.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the figure. Find sin A.	**24/25**
2	Use the figure. Find cos F and tan F.	**cos F = 21/29, tan F = 20/21**
3	Triangle XYZ has a right angle at Y. XY = 9, YZ = 40, and XZ = 41. Find tan X.	**40/9**
4	Triangle JKL has a right angle at J. JK = 16, JL = 30, and KL = 34. Find cos K.	**8/17**
5	For an acute angle M in a right triangle, the opposite leg is 11, the adjacent leg is 60, and the hypotenuse is 61. Find cos M.	**60/61**
6	In a right triangle, sin P = 7/25. If the hypotenuse is 50, find the length of the leg opposite angle P.	**14**

PART 2 · APPLY IT

1. **20/21** For angle A, BC is the opposite leg and AB is the adjacent leg. tan A = 20/21.
2. **sin A = 8/17** The rise BC is opposite angle A, and the ramp surface AC is the hypotenuse. Therefore the needed ratio is sin A = 8/17.

CHALLENGE

sin A = 8/17 and cos A = 15/17. A tangent ratio of 8/15 gives opposite and adjacent legs in the ratio 8:15, with hypotenuse 17. Since 34 is twice 17, the legs are 16 and 30, so sin A = 16/34 = 8/17 and cos A = 30/34 = 15/17.

Accept equivalent unsimplified ratios when they compare the correct sides. In written explanations, accept any clear identification of opposite, adjacent, and hypotenuse sides.