LESSON MAKER PRO

Right Triangle Ratios

Find and use sine, cosine, and tangent.

HIGH SCHOOL · GDA.GM.J.35

GDA.GM.J.35 "Discover and apply relationships in similar right triangles. a. Derive and apply the constant ratios of the sides in special right triangles (45˚-45˚-90˚ and 30˚-60˚-90˚). b. Use similarity to explore and define basic trigonometric ratios..."

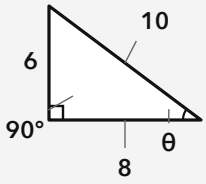
NAME _____ DATE _____

THREE USEFUL RATIOS

For an acute angle in a right triangle, sine is opposite/hypotenuse, cosine is adjacent/hypotenuse, and tangent is opposite/adjacent. Similar right triangles have the same ratios for matching angles. The sine of an angle equals the cosine of its complement.

WORKED EXAMPLE

Find sin θ in the figure.



1. The side opposite θ is 6. The hypotenuse is 10.
2. sin θ = 6/10.
3. Simplify: sin θ = 3/5.

Answer: 3/5

PRACTICE 4 problems

1 A right triangle has legs 9 and 12 and hypotenuse 15. Find the sine of the angle opposite 12.

ANSWER _____

2 A right triangle has a side adjacent to θ of length 5 and a hypotenuse of length 13. Find cos θ.

ANSWER _____

3 A right triangle has sides opposite and adjacent to θ of lengths 7 and 24. Find tan θ.

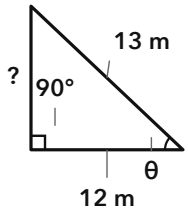
ANSWER _____

4 If sin θ = 7/25, find cos(90° - θ).

ANSWER _____

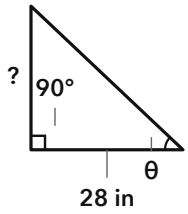
APPLY IT Show your work

1 A camera points from the ground toward a drone as shown. Find sin θ.



ANSWER _____

2 A skateboard ramp has the cross section shown. If tan θ = 3/4, how high is the ramp?



ANSWER _____

CHALLENGE One step up

A right triangle has legs 20 and 21 and hypotenuse 29. For the angle θ opposite 20, find sin θ and cos(90° - θ). Explain why they match.

WORK SPACE AND ANSWER

ANSWER KEY

Right Triangle Ratios

HIGH SCHOOL · GDA.GM.J.35

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A right triangle has legs 9 and 12 and hypotenuse 15. Find the sine of the angle opposite 12.	**4/5**
2	A right triangle has a side adjacent to θ of length 5 and a hypotenuse of length 13. Find cos θ.	**5/13**
3	A right triangle has sides opposite and adjacent to θ of lengths 7 and 24. Find tan θ.	**7/24**
4	If sin θ = 7/25, find cos(90° - θ).	**7/25**

PART 2 · APPLY IT

1. **5/13** The missing side is 5 m because $5^2 + 12^2 = 13^2$. It is opposite θ, so sin θ = 5/13.
2. **21 in** The height is opposite θ, so height/28 = 3/4. The height is 21 in.

CHALLENGE

Both ratios are 20/29. The angle 90° - θ is complementary to θ, so its adjacent side is the side opposite θ.

Accept equivalent fractions for the ratios. For the ramp, require inches in the answer.