LESSON MAKER PRO

Right Triangle Ratios

Find sine, cosine, and tangent from right triangles.

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GDA.GM.J.35.b "Use similarity to explore and define basic trigonometric ratios, including sine ratio, cosine ratio, and tangent ratio."

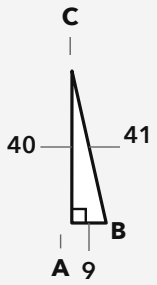
NAME _____ DATE _____

THE BIG IDEA

Choose 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 because their corresponding sides change by the same factor.

WORKED EXAMPLE

Use the triangle to find sin B and tan B.

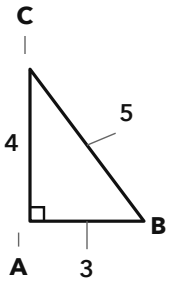


1. For angle B, AC is opposite and AB is adjacent.
2. BC is the hypotenuse, so sin B = AC/BC = 40/41.
3. tan B = AC/AB = 40/9.

Answer: sin B = 40/41; tan B = 40/9

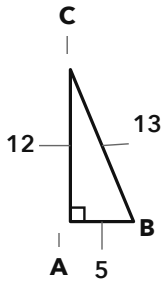
PRACTICE 6 problems

1 Use the triangle to find sin B.



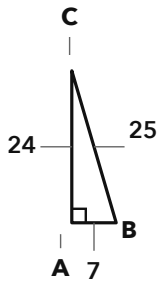
ANSWER _____

2 Use the triangle to find cos C.



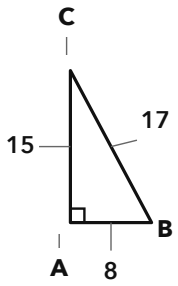
ANSWER _____

3 Use the triangle to find tan B.



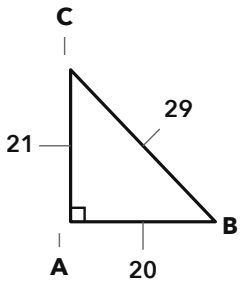
ANSWER _____

4 Use the triangle to find sin C.



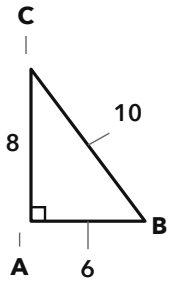
ANSWER _____

5 Use the triangle to find sin B and cos B.



ANSWER _____

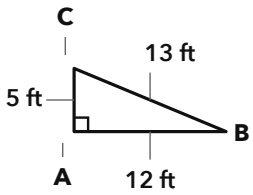
6 A second right triangle is similar to the one shown. Its hypotenuse is 30. Find the length of its side opposite the angle that matches B.



ANSWER _____

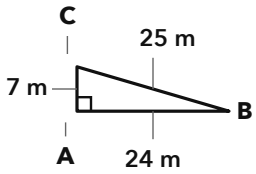
APPLY IT Show your work

1 A skateboard ramp is modeled by the triangle. Angle B is at the bottom of the ramp. Find tan B, the ramp's rise-to-run ratio.



ANSWER _____

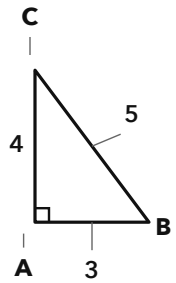
2 At a concert, a spotlight at B shines along BC to a point above A. AB is the horizontal distance to the stage. Find cos B, the horizontal-distance-to-beam-length ratio.



ANSWER _____

CHALLENGE One step up

A second right triangle is similar to the one shown. Its hypotenuse is 35, and the side corresponding to AB is 21. Find its side corresponding to AC. Then find tan B in the shown triangle and the tangent of the matching angle in the second triangle. Explain why the ratios match.



WORK SPACE AND ANSWER

ANSWER KEY

Right Triangle Ratios

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the triangle to find sin B.	**4/5**
2	Use the triangle to find cos C.	**12/13**
3	Use the triangle to find tan B.	**24/7**
4	Use the triangle to find sin C.	**8/17**
5	Use the triangle to find sin B and cos B.	**sin B = 21/29; cos B = 20/29**
6	A second right triangle is similar to the one shown. Its hypotenuse is 30. Find the length of its side opposite the angle that matches B.	**24**

PART 2 · APPLY IT

1. **5/12** For angle B, the rise is the opposite side, 5 ft, and the run is the adjacent side, 12 ft. Divide 5 by 12.
2. **24/25** AB is adjacent to angle B, and BC is the hypotenuse. Divide 24 by 25.

CHALLENGE

The side corresponding to AC is 28. Both tangent ratios are 4/3: 4/3 in the shown triangle and 28/21 = 4/3 in the second. Every side is multiplied by 7, so the ratio of opposite to adjacent stays the same.

Accept equivalent fractions and ratios. In the challenge, accept any explanation that corresponding sides of similar triangles have the same scale factor.