LESSON MAKER PRO

Triangle Ratio Trail

Use sine, cosine, and tangent in right triangles.

HIGH SCHOOL · HSG-SRT.C

CCSS.Math.Content.HSG-SRT.C "Define trigonometric ratios and solve problems involving right triangles"

NAME _____ DATE _____

CHOOSE THE RIGHT RATIO

For an acute angle in a right triangle, sin = opposite/hypotenuse, cos = adjacent/hypotenuse, and tan = opposite/adjacent. The hypotenuse is the side across from the right angle.

WORKED EXAMPLE

Use the right triangle. Find sin B.

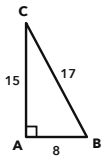


1. The right angle is at A, so BC is the hypotenuse.
2. For angle B, the opposite side is AC.
3. sin B = AC/BC = 12/13.

Answer: 12/13

PRACTICE 6 problems

1 Use the right triangle. Find cos B.



ANSWER _____

2 Use the right triangle. Find tan C.



ANSWER _____

3 In a right triangle, the side opposite acute angle x is 9 cm and the hypotenuse is 41 cm. Find sin x.

ANSWER _____

4 In a right triangle, cos x = 20/29. If the hypotenuse is 29 cm, find the length of the side adjacent to x.

ANSWER _____

5 In a right triangle, tan x = 3/4. If the side opposite x is 18 cm, find the length of the side adjacent to x.

ANSWER _____

6 A right triangle has a hypotenuse of 34 cm and a side opposite angle x of 16 cm. Find cos x in simplest form.

ANSWER _____

APPLY IT Show your work

1 A skateboarding ramp rises 9 ft over a horizontal run of 40 ft. What is the sine of the acute angle the ramp makes with the ground?

WORK SPACE

ANSWER _____

2 A student film crew attaches a 35-ft safety cable from the ground to the top of a vertical lighting tower that is 28 ft tall. What is the tangent of the acute angle the cable makes with the ground?

WORK SPACE

ANSWER _____

CHALLENGE One step up

For acute angles x and y in right triangles, tan x = 8/15 and cos y = 15/17. Are x and y equal? Explain your reasoning using trigonometric ratios.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the right triangle. Find cos B.	**8/17**
2	Use the right triangle. Find tan C.	**7/24**
3	In a right triangle, the side opposite acute angle x is 9 cm and the hypotenuse is 41 cm. Find sin x.	**9/41**
4	In a right triangle, cos x = 20/29. If the hypotenuse is 29 cm, find the length of the side adjacent to x.	**20 cm**
5	In a right triangle, tan x = 3/4. If the side opposite x is 18 cm, find the length of the side adjacent to x.	**24 cm**
6	A right triangle has a hypotenuse of 34 cm and a side opposite angle x of 16 cm. Find cos x in simplest form.	**15/17**

PART 2 · APPLY IT

1. **9/41** Find the ramp length: sqrt($9^2 + 40^2$) = 41 ft. Then sin of the ground angle is opposite/hypotenuse = 9/41.
2. **4/3** The horizontal distance is sqrt($35^2 - 28^2$) = 21 ft. Tangent is rise/run = 28/21 = 4/3.

CHALLENGE

Yes. Since cos y = 15/17, sin y = 8/17. Then tan y = (8/17)/(15/17) = 8/15, which equals tan x. Acute angles with the same tangent are equal.

Accept equivalent unsimplified ratios when they are mathematically equal, but require simplified form where requested. For the challenge, accept any valid explanation that establishes tan y = 8/15 and concludes that the acute angles are equal.