LESSON MAKER PRO

Complement Connections

Link sine and cosine through complementary angles.

HIGH SCHOOL · HSG-SRT.C.7

CCSS.Math.Content.HSG-SRT.C.7 "Explain and use the relationship between the sine and cosine of complementary angles."

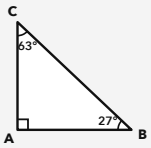
NAME _____ DATE _____

THE COMPLEMENT RULE

In a right triangle, the two acute angles add to 90°. The sine of one acute angle equals the cosine of its complementary angle. For example, sin 29° = cos 61°.

WORKED EXAMPLE

Use the figure. Explain why sin 27° = cos 63°.

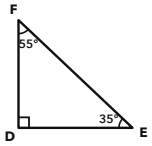


1. Angle A is 90°, so angles B and C are complementary.
2. The complement of 27° is 63°.
3. The sine of an angle equals the cosine of its complement.

Answer: sin 27° = cos 63°

PRACTICE 6 problems

1 Use the figure. Complete the equation: sin 35° = ___.



ANSWER _____

2 If cos 18° = 11/13, find sin 72°.

ANSWER _____

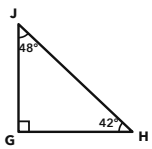
3 If sin x = 3/5 and x is acute, find cos(90° - x).

ANSWER _____

4 If cos x = 4/9 and x is acute, find sin(90° - x).

ANSWER _____

5 Use the figure. Write both true sine-cosine equalities for the two marked acute angles.



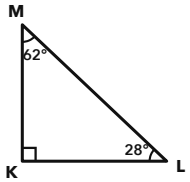
ANSWER _____

6 The acute angles x and 2x are complementary. If sin x = cos 2x, find x.

ANSWER _____

APPLY IT Show your work

1 At a skatepark, a ramp makes a 28° angle with the ground and a 62° angle with a vertical support, as shown. A sensor reports that sin 28° = 0.4695. Use complementary angles to find cos 62°.



ANSWER _____

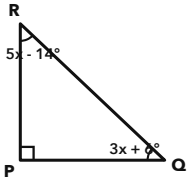
2 At a climbing gym, a safety cable makes a 36° angle with the floor and a 54° angle with the wall. A trainer measures cos 54° as 0.588. What is sin 36°?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Use the figure. Find x, then explain why sin(3x + 6°) = cos(5x - 14°).



WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the figure. Complete the equation: sin 35° = ___.	**cos 55°**
2	If cos 18° = 11/13, find sin 72°.	**11/13**
3	If sin x = 3/5 and x is acute, find cos(90° - x).	**3/5**
4	If cos x = 4/9 and x is acute, find sin(90° - x).	**4/9**
5	Use the figure. Write both true sine-cosine equalities for the two marked acute angles.	**sin 42° = cos 48°; sin 48° = cos 42°**
6	The acute angles x and 2x are complementary. If sin x = cos 2x, find x.	**30°**

PART 2 · APPLY IT

1. **0.4695** The angles 28° and 62° are complementary. Therefore, cos 62° = sin 28° = 0.4695.
2. **0.588** The floor and wall form a right angle, so 36° and 54° are complementary. Therefore, sin 36° = cos 54° = 0.588.

CHALLENGE

x = 49/4. The two acute angles are complementary, so (3x + 6°) + (5x - 14°) = 90°. The sine of one complementary angle equals the cosine of the other.

Accept equivalent spacing and notation for the trigonometric equalities. For the challenge, accept x = 12.25 and an explanation that identifies the two acute angles as complementary.