ALBERT

Name _____ Date _____

Pythagorean Identity Worksheet

Algebra 2 · Common Core HSF-TF.C.8

> Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.

Practice

Builds the skill step by step.

1. $\sin\theta = \frac{3}{5}$ and θ is in quadrant I. What is $\cos\theta$?

2. $\cos\theta = \frac{5}{13}$ and θ is in quadrant I. What is $\sin\theta$?

3. What is $\sin^2\theta + \cos^2\theta$ for any angle θ?

4. $\sin\theta = 0.6$. What is $\cos^2\theta$?

5. Which is the Pythagorean identity?

   A. $\sin\theta + \cos\theta = 1$

   B. $\sin^2\theta - \cos^2\theta = 1$

   C. $\tan^2\theta + 1 = \sin^2\theta$

   D. $\sin^2\theta + \cos^2\theta = 1$

6. $\cos\theta = 0.8$ and θ is in quadrant I. What is $\sin\theta$?

7. $\sin \theta = \frac{4}{5}$ and θ is in quadrant I. What is $\tan \theta$?

8. $\sin \theta = 1$. What is $\cos \theta$?

9. $\cos \theta = \frac{3}{5}$ and θ is in quadrant IV. What is $\sin \theta$?

10. What is $\sin^2(40°) + \cos^2(40°)$?

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On Level

Grade-level practice.

1. $\sin\theta = \frac{5}{13}$ and θ is in quadrant II. What is $\cos\theta$?

2. $\cos\theta = -\frac{3}{5}$ and θ is in quadrant III. What is $\sin\theta$?

3. $\cos\theta = -\frac{3}{5}$ and θ is in quadrant III. What is $\tan\theta$?

4. $\sin\theta = -\frac{8}{17}$ and θ is in quadrant IV. What is $\cos\theta$?

5. $\sin\theta = 0.6$ and $\tan\theta$ is negative. In which quadrant is θ?

   A. II

   B. I

   C. III

   D. IV

6. Prove the Pythagorean identity $\sin^2 \theta + \cos^2 \theta = 1$ using the unit circle.

7. $\sin \theta = \frac{1}{2}$ and θ is in quadrant II. $\cos \theta = -\sqrt{k} \div 2$. What is k?

8. $\cos \theta = 0.6$ and θ is in quadrant IV. What is $\tan \theta$?

9. $\cos \theta = 0.3$. What is $1 - \sin^2 \theta$?

10. $\tan \theta = \frac{3}{4}$ and θ is in quadrant I. What is $\sin \theta$?

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Challenge

Multi-step and word problems that stretch it.

1. $\tan\theta = -\frac{5}{12}$ and θ is in quadrant II. What is $\cos\theta$?

2. $\sin\theta = \frac{2}{3}$ and θ is in quadrant I. $\cos\theta = \sqrt{k} \div 3$. What is k?

3. $\tan\theta = 2$ and θ is in quadrant III. What is $\cos^2\theta$?

4. Which expression equals $(1 - \cos^2\theta) \div \sin\theta$ $(\sin\theta \neq 0)$?

   A. $\cos\theta$

   B. $\sin\theta$

   C. 1

   D. $\tan\theta$

5. $\sin\theta + \cos\theta = \frac{7}{5}$. What is $\sin\theta\cos\theta$?

6. Which equals $1 + \tan^2 \theta$?

   A. $\frac{1}{\sin^2 \theta}$

   B. $\sin^2 \theta$

   C. $\frac{1}{\cos^2 \theta}$

   D. 1

7. $\cos \theta = -0.28$ and θ is in quadrant III. What is $\sin \theta$?

8. Explain why knowing $\sin \theta$ is not enough to find $\cos \theta$, and what else you need.

9. $\sin \theta = -0.6$ and $\cos \theta$ is positive. What is $\tan \theta$?

10. $\sin \theta = 0.8$. What is $\sin^4 \theta - \cos^4 \theta$?