ALBERT

Name _____ Date _____

The Unit Circle Worksheet

Algebra 2 · Common Core HSF-TF.A.2

> Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

Practice

Builds the skill step by step.

1. What is cos 0?

2. What is $\sin(\frac{\pi}{2})$?

3. What is cos π?

4. What is sin π?

5. An angle θ in standard position meets the unit circle at a point. What are its coordinates?

   A. (sin θ, cos θ)

   B. (tan θ, 1)

   C. (cos θ, sin θ)

   D. (θ, 1)

6. What is $\sin(\frac{3\pi}{2})$?

7. What is $\cos(\frac{\pi}{3})$?

8. What is $\sin(\frac{\pi}{6})$?

9. In which quadrant is sin θ positive and cos θ negative?

   A. I

   B. III

   C. IV

   D. II

10. What is $\cos(2\pi)$?

ALBERT

Name _____ Date _____

The Unit Circle Worksheet

Algebra 2 · Common Core HSF-TF.A.2

On Level

Grade-level practice.

1. What is $\sin(\frac{5\pi}{6})$?

2. What is $\cos(\frac{2\pi}{3})$?

3. What is $\sin(\frac{7\pi}{6})$?

4. What is $\cos(-\frac{\pi}{3})$?

5. What is $\sin(-\frac{\pi}{2})$?

6. What is $\sin(\frac{\pi}{4})$?

   A. $\frac{\sqrt{2}}{2}$

   B. $\frac{1}{2}$

   C. $\frac{\sqrt{3}}{2}$

   D. 1

7. Which point on the unit circle corresponds to $\frac{5\pi}{4}$?

   A. $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

   B. $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$

   C. $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

   D. $(-1, 0)$

8. Explain how the unit circle gives a value for $\sin(\frac{13\pi}{6})$, even though $\frac{13\pi}{6}$ is more than a full turn.

9. What is $\cos(4\pi)$?

10. What is $\sin(\frac{11\pi}{6})$?

The Unit Circle Worksheet

Algebra 2 · Common Core HSF-TF.A.2

Challenge

Multi-step and word problems that stretch it.

1. What is $\sin(\frac{17\pi}{6})$?

2. What is $\cos(-\frac{7\pi}{4})$?

   A. $-\frac{\sqrt{2}}{2}$

   B. $\frac{1}{2}$

   C. $\frac{\sqrt{2}}{2}$

   D. $\frac{\sqrt{3}}{2}$

3. $\sin\theta = -\frac{1}{2}$ and θ is between π and $\frac{3\pi}{2}$. $\theta = k\pi$. What is k?

4. $\sin\theta = 0.6$. What is $\sin(\pi - \theta)$?

5. $\sin\theta = 0.6$. What is $\sin(-\theta)$?

6. Why does $\sin(\theta + 2\pi) = \sin\theta$ for every θ?

   A. Because sin is always positive.

   B. Because 2π equals 0.

   C. It is only true for small θ.

   D. Adding 2π makes a full turn back to the same point.

7. What is $\tan(\frac{\pi}{4})$?

8. Use the unit circle to explain why $\cos(\pi + \theta) = -\cos\theta$.

9. What is $\cos(100\pi)$?

10. How many angles θ with $0 \le \theta < 2\pi$ have $\sin\theta = \frac{1}{2}$?