AP Precalc

Write your questions and thoughts here!

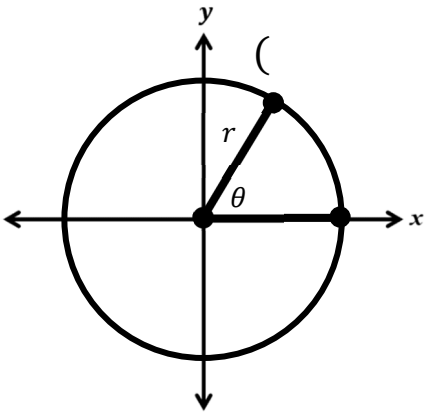
3.3B Sine and Cosine Function Values

3.3B Notes

Recall: $\cos\theta = \frac{x}{r}$ $\sin\theta = \frac{y}{r}$

If we manipulate these equations, we get

$x =$ $y =$



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This allows us to find any coordinate point if we know the angle in standard position, and the circle's radius (distance from the origin) where the terminal ray intersects the circle. For this lesson, we will focus on angles that are multiples of $\frac{\pi}{6}$ and $\frac{\pi}{4}$. This means we will not use a calculator, and you will need to have these angles and their coordinate points memorized.

For each problem, an angle in standard position in the xy-plane is given in radians. A circle is centered at the origin with the given radius. What are the coordinates of the point of intersection of the terminal ray of the angle and the circle?

1. $\theta = \frac{5\pi}{6}, r = 6$

2. $\theta = \frac{\pi}{3}, r = 7$

In the xy-plane, the terminal ray of angle θ in standard position intersects a circle of radius r at the given point. What are the values of θ and r?

3. $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

4. $\left(-\frac{3\sqrt{3}}{2}, -\frac{3}{2}\right)$

5. $\left(-2, 2\sqrt{3}\right)$

3.3B Sine and Cosine Function Values

AP Precalculus

3.3B Practice

For each problem, an angle in standard position in the xy-plane is given in radians. A circle is centered at the origin with the given radius. What are the coordinates of the point of intersection of the terminal ray of the angle and the circle?

1. $\theta = \frac{\pi}{6}, r = 4$
2. $\theta = \frac{3\pi}{2}, r = 7$
3. $\theta = \frac{7\pi}{6}, r = 6$
4. $\theta = \frac{7\pi}{4}, r = 5$
5. $\theta = \frac{2\pi}{3}, r = 12$
6. $\theta = \frac{5\pi}{3}, r = 3$
7. $\theta = \frac{4\pi}{3}, r = 8$
8. $\theta = \frac{\pi}{3}, r = 16$
9. $\theta = \pi, r = 9$

In the xy-plane, the terminal ray of angle θ in standard position intersects a circle of radius r at the given point. What are the values of θ and r?

10. $(0, -10)$
11. $(3\sqrt{2}, 3\sqrt{2})$
12. $\left(-\frac{3\sqrt{2}}{2}, \frac{3\sqrt{2}}{2}\right)$

13. $(-9\sqrt{3}, 9)$

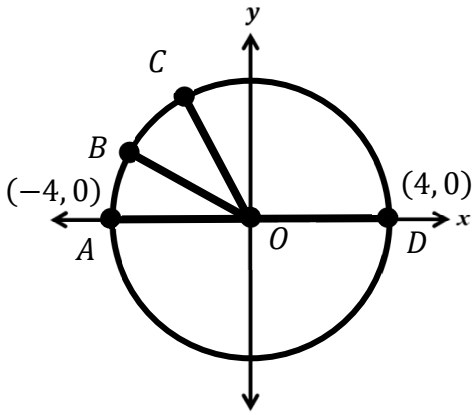
14. $(-15, -15\sqrt{3})$

15. $\left(\frac{7\sqrt{3}}{2}, -\frac{7}{2}\right)$

3.3B Sine and Cosine Function Values

3.3B Test Prep

16. The figure shows a circle of radius 4 along with five labeled points in the xy-plane.



The measure of angle DOC is $\frac{2\pi}{3}$. The measure of angle AOB is half of angle AOC. What are the coordinate points of point B?

(A) $\left(-4\cos\left(\frac{5\pi}{6}\right), 4\sin\left(\frac{5\pi}{6}\right)\right)$

(B) $\left(4\cos\left(\frac{5\pi}{6}\right), 4\sin\left(\frac{5\pi}{6}\right)\right)$

(C) $\left(-2\cos\left(\frac{5\pi}{6}\right), 2\sin\left(\frac{5\pi}{6}\right)\right)$

(D) $\left(2\cos\left(\frac{5\pi}{6}\right), 2\sin\left(\frac{5\pi}{6}\right)\right)$

17. Angles A and B are in standard position in the xy-plane. The measure of angle A is $\frac{\pi}{6}$ radians, and the measure of angle B is $\frac{11\pi}{6}$ radians. The terminal rays of both angles intersect a circle centered at the origin with radius 16. What is the distance between these two points of intersection: the circle and terminal ray of angle A, and the circle and terminal ray of angle B?

(A) $16\sin\frac{\pi}{6} - 16\sin\frac{11\pi}{6}$

(B) $8\sin\frac{\pi}{6} - 8\sin\frac{11\pi}{6}$

(C) $16\cos\frac{\pi}{6} - 16\cos\frac{11\pi}{6}$

(D) $8\cos\frac{\pi}{6} - 8\cos\frac{11\pi}{6}$

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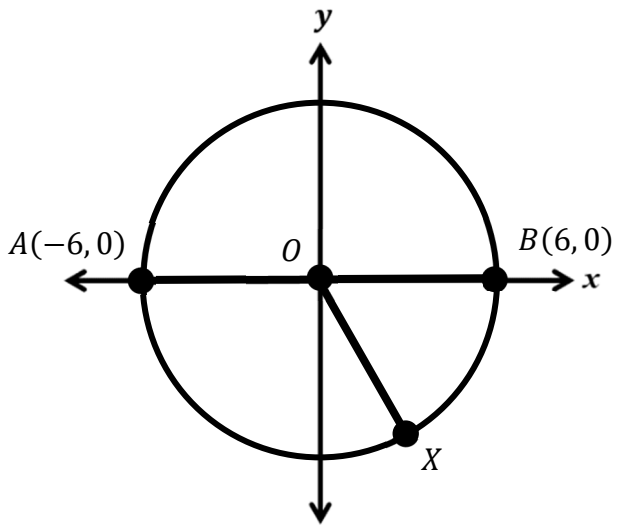
18. The figure shows a circle of radius 6 along with the origin and three labeled points in the xy-plane. If the coordinates of X are $\left(3, -3\sqrt{3}\right)$, what is the measurement of angle AOX?



(A) $\frac{\pi}{3}$ (B) $\frac{2\pi}{3}$ (C) $\frac{4\pi}{3}$ (D) $\frac{5\pi}{3}$