

13.3: Evaluating Trigonometric Functions

“I WILL...

Evaluate Trig functions of any angle.”

I. Definitions

A. For θ be an angle in standard position with any point (x, y)

1. $\text{SIN } \theta = \underline{\hspace{2cm}}$

2. $\text{COS } \theta = \underline{\hspace{2cm}}$

3. $\text{TAN } \theta = \underline{\hspace{2cm}}$

4. $\text{CSC } \theta = \underline{\hspace{2cm}}$

5. $\text{SEC } \theta = \underline{\hspace{2cm}}$

6. $\text{COT } \theta = \underline{\hspace{2cm}}$

B. To establish the radius, the equation is

C. Think of “ASTC: All Students Take Calculus”

1. A: All points are always positive in Quadrant I

2. S: Sine points are positive in Quadrant II

3. T: Tan points are positive in Quadrant III

4. C: Cosine points are positive in Quadrant IV

II. Steps in Evaluating Functions with a Given Point

A. Draw a picture from a coordinate plane

B. Identify and plot the point onto the coordinate plane

C. Determine the missing side using the radius equation

D. Use Trigonometric Functions to solve

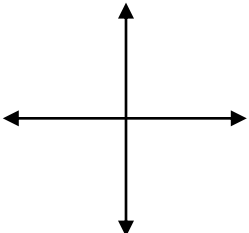
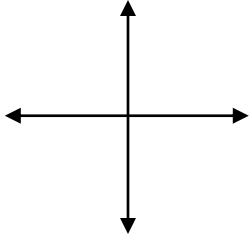
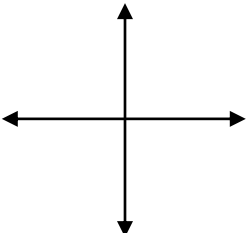
III. Reference Angles

A. Reference angle is a _____ angle formed by the _____ of θ and the _____-axis. They are viewed as linear pairs. (Think: *REFER*'s back to the _____-axis)

B. No reference trigonometric values of measure are greater than or equal to 90° or less than or equal to 0°

quadrant	β (reference angle)
I	$\beta = \theta$
II	$\beta = 180 - \theta$
III	$\beta = \theta - 180$
IV	$\beta = 360 - \theta$

IV. Model Problems

<p>Ex 1: Let $(3, 4)$ be a point on the terminal side of θ. Determine the value of the six trigonometric functions for θ.</p> 	<p>Ex 2: Let $(-3, 4)$ be a point on the terminal side of θ. Determine the value of the six trigonometric functions for θ.</p> 	
<p>Your Turn: Let $(1, -1)$ be a point on the terminal side of θ. Determine the value of the six trigonometric functions for θ.</p> 	<p>Ex 3: Given $\theta = 135^\circ$, determine the reference angle for each given angle.</p>	
<p>Ex 4: Given $\theta = -105^\circ$, determine the reference angle for each given angle.</p>	<p>Ex 5: Given $\theta = 88^\circ$, determine the reference angle for each given angle.</p>	<p>Your Turn: Given $\theta = 212^\circ$, determine the reference angle for each given angle.</p>

Page 870: 3-15 odd, 16-23 all

USING A POINT Use the given point on the terminal side of an angle θ in standard position to evaluate the six trigonometric functions of θ .

3. (8, 15) 4. (-9, 12) 5. (-7, -24) 6. (5, -12)
7. (2, -2) 8. (-6, 9) 9. (-3, -5) 10. (5, $-\sqrt{11}$)

11. **TAKS REASONING** Let $(-7, -4)$ be a point on the terminal side of an angle θ in standard position. What is the value of $\tan \theta$?

- (A) $-\frac{7}{4}$ (B) $-\frac{4}{7}$ (C) $\frac{4}{7}$ (D) $\frac{7}{4}$

QUADRANTAL ANGLES Evaluate the six trigonometric functions of θ .

12. $\theta = 0^\circ$ 13. $\theta = \frac{\pi}{2}$ 14. $\theta = 540^\circ$ 15. $\theta = \frac{7\pi}{2}$

FINDING REFERENCE ANGLES Sketch the angle. Then find its reference angle.

16. -100° 17. 150° 18. 320° 19. -370°
20. $-\frac{5\pi}{6}$ 21. $\frac{8\pi}{3}$ 22. $\frac{15\pi}{4}$ 23. $-\frac{13\pi}{6}$