

Precalculus, Section 6.3, #56  
Properties of the Trigonometric Functions

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Find the exact value of each of the remaining trigonometric functions of  $\theta$ .<sup>1</sup>

$$\cot(\theta) = \frac{4}{3} \quad \cos(\theta) < 0$$

Since  $\cot(\theta) = \frac{1}{\tan(\theta)}$ , we know  $\tan(\theta) = \frac{1}{\cot(\theta)} = \frac{1}{\frac{4}{3}} = \frac{3}{4}$ .

Now  $\tan(\theta) > 0$  but  $\cos(\theta) < 0$ , so the angle  $\theta$  must be in quadrant III.

Since  $\tan(\theta) = \frac{3}{4}$  and we know  $\theta$  must be in quadrant III, we can take  $x = -4$  and  $y = -3$ . Then

$$r = \sqrt{x^2 + y^2} = \sqrt{(-4)^2 + (-3)^2} = \sqrt{25} = 5$$

Knowing values for  $x$ ,  $y$ , and  $r$ , we can now write the other trig functions.

$$\cot(\theta) = \frac{4}{3}$$

$$\tan(\theta) = \frac{3}{4}$$

$$\cos(\theta) = \frac{-4}{5} = -\frac{4}{5}$$

$$\sin(\theta) = \frac{-3}{5} = -\frac{3}{5}$$

$$\csc(\theta) = \frac{5}{-3} = -\frac{5}{3}$$

$$\sec(\theta) = \frac{5}{-4} = -\frac{5}{4}$$

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<sup>1</sup>Sullivan, *Precalculus: Enhanced with Graphing Utilities*, p. 395, #56.