

Math 150 Quiz 4

You have 12 minutes to finish this quiz. There is ONE problem, which consists of TWO parts. Show all your work clearly TO RECEIVE FULL CREDITS.

Please write down your name and session (9:30 or 10:30) at the top of this page.

Given an angle θ satisfying: $\tan \theta = 3$, $\cos \theta < 0$.

a) Determine which quadrant θ is in.

$\tan \theta > 0 \Rightarrow \theta$ is in QI or QIII.

$\cos \theta < 0 \Rightarrow \theta$ is in QII or QIII.

So θ is in QIII (see Fig.1).

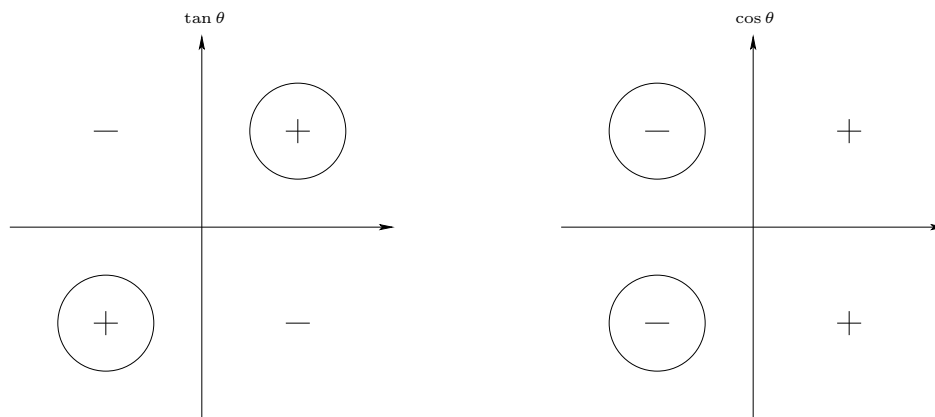


Figure 1: Determine the quadrant in which θ lies.

b) Find the EXACT values of the remaining five trigonometric functions at θ . (Calculator answers get no credit!)

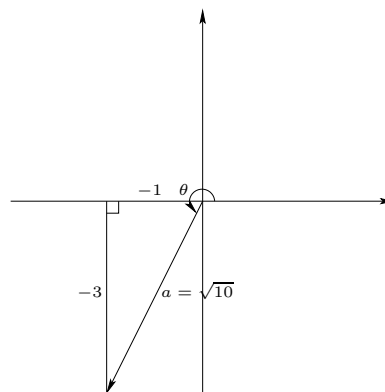


Figure 2: The right triangle associated with θ .

$\tan \theta = \frac{\text{opp.}}{\text{adj.}} = \frac{3}{1}$, and θ is in QIII, so we may assume that opp. = -3 , adj. = -1 .

For the hypotenuse a , we have, by Pythagorean theorem:

$$\begin{aligned}(-3)^2 + (-1)^2 &= a^2 \\9 + 1 &= a^2 \\a &= \sqrt{10}.\end{aligned}$$

So (see Fig.2)

$$\sin \theta = \frac{-3}{\sqrt{10}},$$

$$\cos \theta = \frac{-1}{\sqrt{10}},$$

$$\tan \theta = 3,$$

$$\csc \theta = \frac{\sqrt{10}}{-3},$$

$$\sec \theta = -\sqrt{10},$$

$$\cot \theta = \frac{1}{3}.$$