Name: Key

Math 151-01 Calculus I – Crawford

Quiz 2-B

03 October 2017

Books, notes (in any form), and calculators are not allowed. *Show all your work.* Good Luck!

1. (4 pts) Find *all* solutions to the following equation.

$\cos^2 x = \cos x$

$\cos^2 x - \cos x = 0$

$\cos x(\cos x - 1) = 0$

$\cos x = 0$ $\qquad$ $\cos x - 1 = 0$

$\cos x = 1$

$x = \frac{\pi}{2}, \frac{3\pi}{2}$ $\qquad$ $x = 0$

All Solutions

$x = \frac{\pi}{2} + 2n\pi$

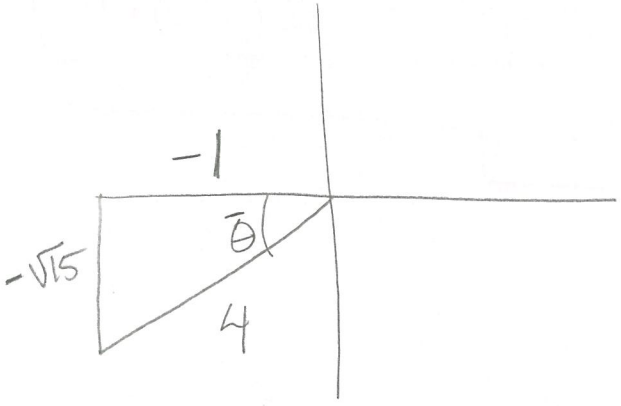
$x = \frac{3\pi}{2} + 2n\pi$ $\qquad$ for $n \in \mathbb{Z}$

$x = 0 + 2n\pi$

2. (3 pts) If $\sec\theta = -4$ and $\pi \le \theta \le \frac{3\pi}{2}$, use a right triangle to determine $\tan\theta$.

QIII

$\sec\theta = -\frac{4}{1} = \frac{\text{hyp}}{\text{adj}}$



$\Rightarrow \tan\theta = \frac{-\sqrt{15}}{-1} = \sqrt{15}$

$(-1)^2 + b^2 = (4)^2$

$b^2 = 16 - 1 = 15$ $\qquad$ QIII

$b = \pm\sqrt{15} \Rightarrow b = -\sqrt{15}$

3. (4 pts) Find an equation of the tangent line to $y = 3\cos x + 2\sin x$ at $\left(\frac{\pi}{2}, 2\right)$.

① pt ✓ $\left(\frac{\pi}{2}, 2\right)$

② slope: $y' = -3\sin x + 2\cos x$

$$y'\Big|_{x=\frac{\pi}{2}} = -3\sin\tfrac{\pi}{2} + 2\cos\tfrac{\pi}{2}$$
$$= -3(1) + 2(0)$$
$$= -3 = m$$

$$y - 2 = -3\left(x - \tfrac{\pi}{2}\right)$$

4. (4 pts) Differentiate the following. [Do not simplify.]

$$y = \left(\frac{4x^6 - 3x^2 + 2}{\tan(4x)}\right)^6$$

CR

$$\frac{dy}{dx} = 6\left(\frac{4x^6-3x^2+2}{\tan(4x)}\right)^5 \cdot \frac{d}{dx}\left[\frac{4x^6-3x^2+2}{\tan(4x)}\right]$$

CR

$$= 6\left(\frac{4x^6-3x^2+2}{\tan(4x)}\right)^5 \cdot \frac{\tan(4x)\cdot(24x^5-6x) - (4x^6-3x^2+2)\cdot \sec^2(4x)\cdot 4}{\tan^2(4x)}$$