

King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences
Semester(Term 041) MATH 101 (Quiz-V)

Name: _____ ID# _____

1. Find the value of $\sin^{-1}\left(\cot \frac{\pi}{4}\right)$.

$$\sin^{-1}\left(\cot \frac{\pi}{4}\right) = \sin^{-1}(1) = \frac{\pi}{2}$$

2. Find y' for each of the following:

(a) $x^3 - \sin^{-1} y = \ln x$.

Differentiating implicitly,

$$3x^2 - \frac{1}{\sqrt{1-y^2}} y' = \frac{1}{x}$$

$$y' = \left(3x^2 - \frac{1}{x}\right) \sqrt{1-y^2}$$

(b) $\cos^{-1}(xy) = y$.

$$\frac{-1}{\sqrt{1-x^2y^2}} (x y' + y) = y'$$

$$-(x y' + y) = y' \sqrt{1-x^2y^2} \Rightarrow y' (\sqrt{1-x^2y^2} + x) = -y$$

$$\Rightarrow y' = \frac{-y}{\sqrt{1-x^2y^2} + x}$$

(c) $y = e^{2x} \tan^{-1} 3x$.

$$y' = e^{2x} \cdot \frac{1}{1+9x^2} \cdot 3 + 2e^{2x} \tan^{-1} 3x = \frac{3e^{2x}}{1+9x^2} + 2e^{2x} \tan^{-1} 3x$$