King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 101 (161) Sec 05 - Quiz 4

Name: ID: Serial No.:

1. Find the slope of the tangent line to the curve $x^2 + x^2y^2 + \tan^{-1} y = 1$ at the point $(-1, 0)$

2. If $y = \dfrac{(x+2)^2(x-1)^3}{\sqrt{x+1}} + \ln \pi$, then find $y'(0)$

3. Calculate $\dfrac{d}{dx}\left[\lim_{n\to\infty}\left(1+\dfrac{x}{5n}\right)^n\right]$

4. The position function of a particle moving along a line is

$$s(t)=\cos\left(\frac{\pi}{2}t\right)+\sin\left(\frac{\pi}{2}t\right)$$

where t is measured in seconds and s in meters. The total distance traveled by the particle in the interval $[0,1]$ is

5. Find $f'(3)$ for $f(x) = (x+1)^{\sqrt{x+1}}$

6. One side of a rectangle is increasing at a rate of 3 cm/sec and the other side is decreasing at a rate of 4 cm/sec. How fast is the area of the rectangle changing when the increasing side is 12 cm long and the decreasing side is 10 cm long?

7. Using the differential (dy) to approximate (Δy) for the function $y = f(x) = \frac{x}{x^2+1}$ when x changes from $x = 2$ to $x = 1.95$. Find the value of the differential approximation.