Quiz 4 - Math 165

Name: _____

Show and justify all work to receive maximum credit for each problem. You may not use your book, notes, or a calculator on this quiz. Give exact answers, not decimal approximations. Do not give answers as mixed fractions. This quiz is worth 20 points.

1. Find $\dfrac{dy}{dx}$ if $y = \left(\dfrac{x^2+1}{x^2+2}\right)^3$

Solution: $\dfrac{dy}{dx} = 3\left(\dfrac{x^2+1}{x^2+2}\right)^2 \dfrac{2x(x^2+2) - 2x(x^2+1)}{(x^2+2)^2}$

2. Evaluate $\dfrac{d}{dx}\left(\sin^4(7x^2+1)\right)$

Solution: $\dfrac{d}{dx}\left(\sin^4(7x^2+1)\right) = 4(14x)\sin^3(7x^2+1)\cos(7x^2+1)$

3. Find $\dfrac{d^3y}{dx^3}$ if $y = 2x^4 - 3x^3 + 8x - 12$.

Solution: $\dfrac{d^3y}{dx^3} = 48x - 18$

4. An object moves along a coordinate axis with position $s(t) = t\sin(\pi t)$ at time t. Find the acceleration of the object at time $t = 2$.

Solution: $s''(t) = 2\pi\cos(\pi t) - t\pi^2\sin(\pi t) \Rightarrow a(2) = 2\pi$

5. Find all points c such that the tangent line to the curve $y = \sec(2x)$ at $x = c$ is horizontal.

Solution: $c = \dfrac{k\pi}{2}$ for any integer k