

Name: _____

Math 221 Section 16279

Practice Exam 2

October 19, 2009

Follow the instructions for each question and show enough of your work so that I can follow your thought process. If I can't read your work or answer, you will receive little or no credit!

For problems 1-4, find the derivatives of the following functions with respect to the indicated independent variable.

1. $g(\theta) = \sec(\theta) - \theta \tan(\theta)$

2. $f(x) = \cot(\sec(x))$

3. $y = \frac{\sin(5\theta)}{3 - \cos(5\theta)}$

4. $\tan(x) \cos(y) - 2x^2 = \sec^2(x) + y \cos(y)$, here the function is defined implicitly, so find $\frac{dy}{dx}$.

5. Let $y = -3 \cos(x) - \tan^2(x)$. Find the equation of the tangent line at the point $(0, -3)$.

6. A spotlight on the ground shines on a wall 12 m away. If a man 2 m tall walks from the spotlight toward the building at a speed of 1.6 m/s , how fast is the length of his shadow on the building decreasing when he is 4 m from the building?

7. Let $y = \sqrt{4x + 9}$, find dy , the differential of y , when $x = 0$ and $dx = 0.08$

8. Find the exact values of $\sec\left(\arccos\left(\frac{1}{\sqrt{2}}\right)\right)$ and $\sin\left(\arccos\left(\frac{1}{\sqrt{2}}\right)\right)$.

For problems 9 and 10, find the derivatives of the following functions with respect to the indicated independent variable.

9. $y = \tan^{-1}(5x - 3)$

10. $g(\theta) = \arccos(\tan(\theta))$

11. Let $f(x) = 3 + 4x + 6x^2 - 12x^3$, find the antiderivative, $F(x)$, of $f(x)$.

12. Use Newton's Method to find the 3^{rd} approximation to the root of $5x^3 + 5x^2 + 5x - 1 = 0$ in the interval $(.1, .5)$. (Hint: start at the left endpoint.)

13. Find all the roots (possibly complex) to the quartic $x^4 - x^2 + 1$.