MATH 229, Section 6 TEST II NAME _____

Prof. J. Beachy 10/27/2000 NO CALCULATORS! Show all necessary work.

1. (20 points) Find the derivative $f'(x)$ or $\frac{dy}{dx}$.

(a) (p157 #14) $f(x) = \sqrt{x} - \frac{1}{\sqrt{x}}$

(b) (p183 #17) $f(x) = (3x-2)^{10}(5x^2 - x + 1)^{12}$.

(c) (p215 #31) $y = \sin(\tan(\sqrt{1+x^3}))$

(d) (p187 Ex 2) $x^3 + y^3 = 6xy$

2. (5 points; p197 #17) Find the second derivative $f''(x)$ for $f(x) = \tan(3x)$.

3. (6 points; p176 #40) $\lim_{x \to 0} \dfrac{\tan x}{4x} =$

4. (7 points; p157 #64) Find the equations of the tangent lines to the curve $y = \dfrac{x-1}{x+1}$ that are parallel to the line $x - 2y = 2$.

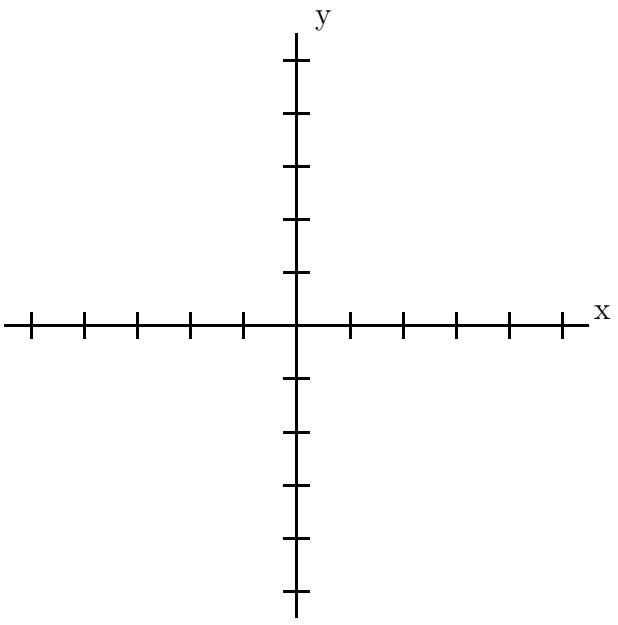
5. (6 points; p211 #24) For $y = \sqrt{1-x}$, find the differential dy and evaluate dy for $x = 0$ and $dx = 0.02$.

6. (6 points; p217 #79) A window has the shape of a square surmounted by a semicircle. The base of the window is measured as having width $60cm$, with a possible error of $0.1cm$. Use differentials to estimate the maximum error possible in computing the area of the window.

7. (8 pts; p167 #8) If a ball is thrown vertically upward with a velocity of 80 ft/sec, then its height after t seconds is $s = 80t - 16t^2$.
(a) What is the maximum height reached by the ball?

(b) What is the velocity of the ball when it is 96 ft above the ground on the way up?

8. (17 pts; p248 #11) For $f(x) = x^3 - 12x + 1$, graph the function after finding
(a) the intervals on which f is increasing or decreasing;
(b) the local maximum and minimum values of f;
(c) the intervals of concavity and the inflection points.



9. (13 points; p248 #32) For the function $f(x) = (x^2 - 1)^3$, find
(a) the intervals on which f is increasing or decreasing;
(b) the local maximum and minimum values of f;
(c) the intervals of concavity and the inflection points.

10. (12 points; p201 Ex 3) A water tank has the shape of an inverted circular cone with a base radius $2m$ and height $4m$. If water is being pumped into the tank at a rate of $2m^3$/min, find the rate at which the water level is rising when the water is $3m$ deep.
Hint: The volume of a cone is $V = \frac{1}{3}\pi r^2 h$.

page 1	/ 25
page 2	/ 25
page 3	/ 25
page 4	/ 25
Total	/100
Grade	