

MATH 211, Section C TEST I NAME _____
Prof. J. Beachy 2/14/03 Circle recitation time: T 10:00 T 11:00 Th 10:00
No calculators! You don't need to simplify your answers, but do show all necessary work.

1. (20 pts) Find the following derivatives, using the formulas we have studied.

(a) $f(x) = x^4 - 5x^3 + 2x + 11$

$$f'(x) =$$

(b) $f(x) = 10\sqrt[5]{x} + 4x^{3/4} - \frac{2}{x^4}$

$$f'(x) =$$

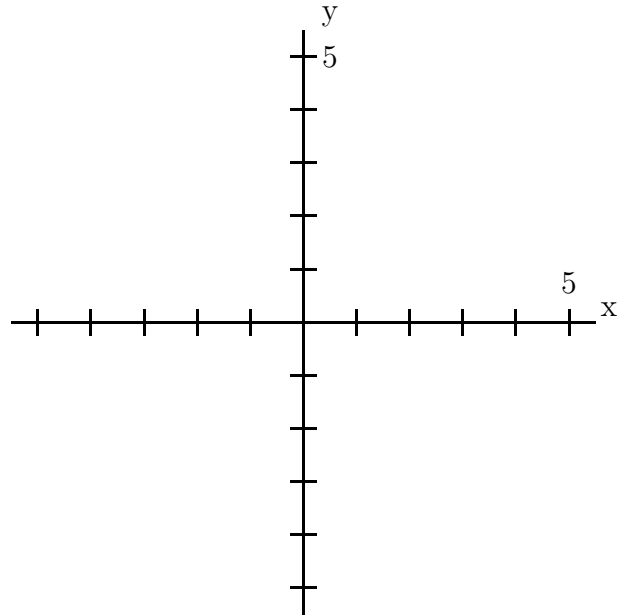
(c) $f(x) = (4\sqrt{x} - 6)(x^3 - 1)^7$

$$f'(x) =$$

(d) $\frac{d}{dx} \left(\frac{3x^4 - 5x}{x^2 - 1} \right) =$

2. (5 pts) Find the points on the graph of $y = x^3 - 3x + 2$ at which the tangent line is horizontal.

3. (10 pts) On the axes below, graph $y = \frac{2}{x-1}$.



4. (15 pts) Find an equation of the tangent line to the graph of $y = \frac{2}{x-1}$ at the point $(0, -2)$. Repeat this for the point $(3, 1)$. Graph the tangent lines on the axes given above.

5. (10 pts) Find these limits (using the algebraic method).

$$\lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x^2 - 4x + 3} =$$

$$\lim_{x \rightarrow -2} \frac{x^2 - 9}{x^2 + 9} =$$

6. (7 pts) Given the cost function $C(x) = 0.01x^2 + 1.2x + 60$ and revenue function $R(x) = 5x$, find the profit function $P(x)$. Find the marginal profit when $x = 100$.

7. (8 pts) Given the distance function $s(t) = t + t^4$, find the velocity $v(t)$ and the acceleration $a(t)$. Find the velocity and acceleration when $t = 2$.

8. (25 pts)

(a) Complete the limit definition of the derivative of a function $f(x)$:

$$f'(x) = \lim_{h \rightarrow 0}$$

(b) **Use the limit definition** of the derivative of a function to find $f'(x)$, for the function

$$f(x) = x^2 - 2x.$$

(c) **Use the limit definition** of the derivative of a function to find $f'(x)$, for the function

$$f(x) = \frac{x}{1+x}. \quad \text{Check your answer using by using the quotient rule.}$$

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Total	/100
Grade	