HOMEWORK 2 - MATH 112 DUE DATE: Monday, January 24 INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Use the limit definition to find the derivatives.

(a)
$$f(x) = x^2 - 4$$

- (b) $f(x) = \frac{1}{x+2}$
- 2. Find the equation of the tangent line to the graph of f at the indicated point.

(a)
$$f(x) = x^3 + 2x$$
 at (1,3)

(b)
$$f(x) = \sqrt[3]{x} + \sqrt[5]{x}$$
 at (1,2)

- 3. Find the derivatives of the functions
 - (a) $f(x) = x^3 2x + 4$ (b) $f(x) = 4x^{-2} + 2x^2$
- 4. Find the value of the derivative of the function at the indicated point

(a)
$$f(x) = -\frac{1}{2} + \frac{7}{5}x^3$$
 at $(0, -\frac{1}{2})$
(b) $f(x) = (2x+1)^2$ at $(0, 1)$

5. Find f'(x)

(a)
$$f(x) = (x+4)(2x^2-1)$$

- (b) $f(x) = \frac{2x^3 4x^2 + 3}{x^2}$
- 6. The revenue in dollars from renting x apartments can be modeled by $R = 2x(900 + 32x x^2)$.
 - (a) Find the additional revenue when the number of rentals is increased from 14 to 15.
 - (b) Find the marginal revenue when x = 14.
- 7. Find the derivatives of the functions
 - (a) $f(x) = (2x^2 3)(4 x^2 x^4)$ (b) $f(x) = \sqrt[3]{x}(\sqrt{x} + 3)$ (c) $f(x) = \frac{3x-2}{2x-3}$ (d) $f(x) = \frac{5}{x^2+2x+2}$.
- 8. Find the equation of the tangent line to $f(x) = \frac{x+5}{x-1} \cdot (2x+1)$ at (0,-5).