

## MA 121 ASSIGNMENT 1

Please show all of your work in answering the following:

1. Solve for  $x$ :  $5x - x^2 = -x$
2. Use rules of exponents to find the exact value of  $16^{\frac{-3}{4}}$
3. Find an equation of the line that contains the points  $(1, -3)$  and  $(-1, 5)$ .
4. Sketch the function  $f(x) = \begin{cases} -x + 1 & x < 0 \\ -3 & x = 0 \\ x^2 - 4x + 3 & x > 0 \end{cases}$
5. Suppose that \$5000 is invested at 8% compounded monthly. How much money is in your account at the end of 3 years?
6. Compute the following limits:
  - a)  $\lim_{x \rightarrow 3} \frac{x^2 + x - 12}{x - 3}$
  - b)  $\lim_{x \rightarrow 0} \frac{x^2 + x - 12}{x - 3}$
  - c)  $\lim_{x \rightarrow 1} \frac{x^3 - 5x + 6}{5x^2 - 3}$
7. Decide whether  $f(x) = \frac{x^2 + x - 12}{x - 3}$  is continuous at  $x = 0$ . Verify your answer.
8. Use the **definition** of derivative to find  $f'(x)$  when  $f(x) = x^2 - 5x + 1$
9. Find  $y'$  when
  - a)  $y = 3x^4 + x^2 - 6x^{\frac{2}{3}}$
  - b)  $y = (x^3 + 5x)(x^5 + 3x^3 - 2)^7$
  - c)  $y = \frac{x^3 + 2}{2x^2 - 5x}$
  - d)  $y = \left( \frac{x^2 - 1}{x} \right)^4$
  - e)  $y = 2x^3 \sqrt{3x + 7}$
  - f)  $y = \frac{x^3 + 4\sqrt{x}}{(x - 2)^5}$

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10. Find  $y'''$  when  $y = \frac{-3}{x}$
11. Find an equation of the line tangent to the curve  $y = \frac{4x}{1+x^2}$  at the point  $(0, 0)$ .
12. Given a distance function  $s(t) = t^4 + t^{\frac{2}{3}}$  Find the velocity and acceleration at  $t = 1$ .
13. Given a cost function  $C(x) = 600\sqrt{x^3 + 2}$  and a revenue function  $R(x) = 500\sqrt{x^2 + 3}$ , find the marginal profit function.