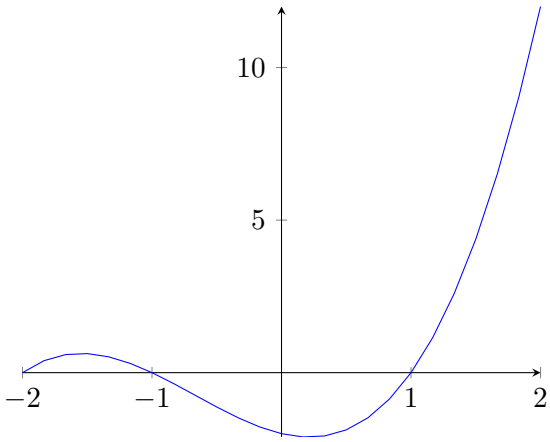
AP Calculus AB **Name (Print):** _____
2016-2017
Problem Set 2
Time Limit: 40 Minutes (Suggested)

This set contains 8 pages (including this cover) and 7 problems. These problems correspond to the topics taught in §2: Derivatives. The problems included here are similar to those that will be asked on the AP Test. All answers should be completed to the best of your ability with *all* work shown.

1. (15 points) The derivative shown gives the slope of a function for any generic x for some generic function $f(x)$. Write the simplest limit to find the derivative of a generic function $f(x)$ at a specific point $x = c$. Hint: when $x = c$, $f(x) = f(c)$.

2. (5 points) Estimate the derivative at $x = 0$ and $x = 1$



3. (15 points) Calculate the derivative:

   (a) (5 points) $f(x) = \ln(x^2)$

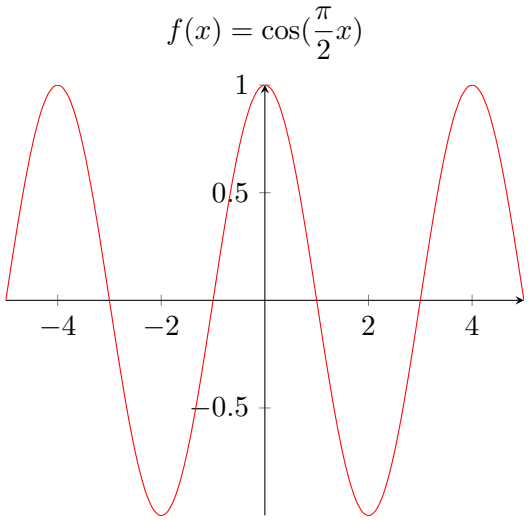
   (b) (5 points) $g(x) = \sin(x) * e^{2x}$.

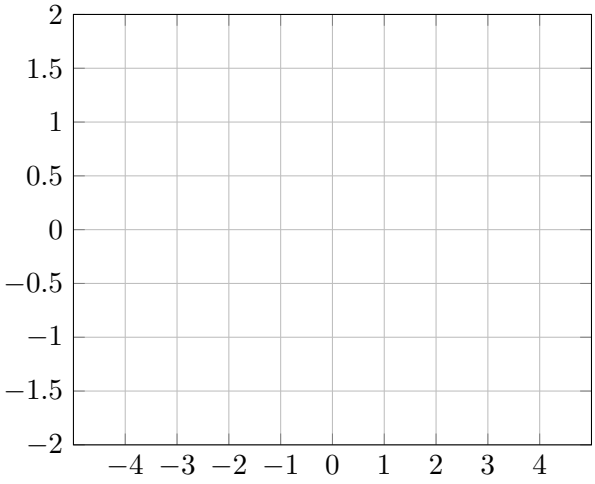
   (c) (5 points) $\dfrac{5\sqrt{x}}{x^3 + 5x^2 - 1}$

4. (10 points) Find the derivative of $(x-3)^2+(y-2)^2=9$ using implicit differentiation

5. (20 points) Find the local maximums and minimums of $f(x) = x^3 + 1.5x^2 - 6x + 5$ on the inverval [-5,2]. Also, find the intervals where $f(x)$ is concave up and concave down.

6. (10 points) Graph the derivative of the function given on the blank graph below:





7. (10 points) Is the function

$$f(x) = \begin{cases} -x & x \leq -1 \\ x^3 + 2x^2 & x > 1 \end{cases}$$

differentiable everywhere?