

Problem Set 3

NAME

DATE

Due at the beginning of class on Day 8.

1. Summation

- (a) $\sum_{n=1}^7 3$
- (b) $\sum_{n=0}^4 2n + 8$

2. Limits and Continuity

- (a) Graph $x^2 + 2$ and plot the tangent line at $x = 0$.
- (b) What is a limit?
- (c) Why do we care about limits and tangents?
- (d) What is a continuous function?

3. Derivative Foundations

- (a) What is a derivative? Why might we find it useful?
- (b) Give an example of a derivative we might care about (think about the education and salary graphs from lecture)

4. Derivatives by hand : Compute manually, using the formula for a derivative (i.e. $\lim_{h \rightarrow 0} \frac{f(x+h)-f(x)}{h}$).

- (a) $f(x) = x^3$
- (b) $f(x) = 2x^2 + 4$
- (c) $f(x) = x - 9x^2$

5. Derivatives using the formulas: Compute these using the rules from class.

- (a) $f(x) = 2x^2 + 7x + 9$
- (b) $f(x) = 3x^2$
- (c) $f(x) = x^3$

- (d) $f(x) = 2x^2 + 4$
- (e) $f(x) = x - 9x^2$
- (f) $f(x) = \ln(x)$
- (g) $f(x) = e^{3x}$
- (h) $f(x) = 2e^{-2x} - x^{0.5}$
- (i) $f(x) = (3x^4 - 6x + 2)(x^2 - 4)$
- (j) $f(x) = \ln(e^x)$
- (k) $f(x) = (3x^4 - 6x + 2)(x^2 - 4)^{-1}$

6. Partial Derivatives: Calculate each derivative first with respect to x , then with respect to y .

- (a) $f(x, y) = x^2 + 3xy - 4$
- (b) $f(x, y) = x^3y^2 - x - y$

7. Topics and Questions

- (a) List three things you struggled with on today's assignment.
- (b) What is your plan for improving the items listed above?
- (c) What percent of the material was new to you today?
- (d) What is one new concept you learned today?
- (e) What question do you still have about the material?

FYI: you will be getting a survey about math camp that will ask you to consider how well math camp functioned, how well it helped you prepare for the fall quarter, and what we can do to improve the overall experience. It will be helpful if you are as specific as possible, so take some time to think things over.