

Name: Solutions

Section: _____

Point distribution is only suggested. Graders of each page should agree on grading scheme.

Page 1: Xudong, Cecil, Teplyaev, Wu,

Page 2: Mullen, Ratzkin, Steinhurst, Savkar

Page 3: C Miller, Blei, Sze, Sang

Page 4: Bella, Tollefson, Cavanaugh, Jura

Page 5: Ge, J Miller, Bourla, Khamsemanan

IMPORTANT: All answers must include either supporting work or an explanation of your reasoning. These elements are considered part of the answer and will be graded.

1. (15 pts) (a) (6 PTS) Evaluate using properties of limits and algebra: $\lim_{x \rightarrow -3} \frac{2x^2 - 18}{x + 3}$

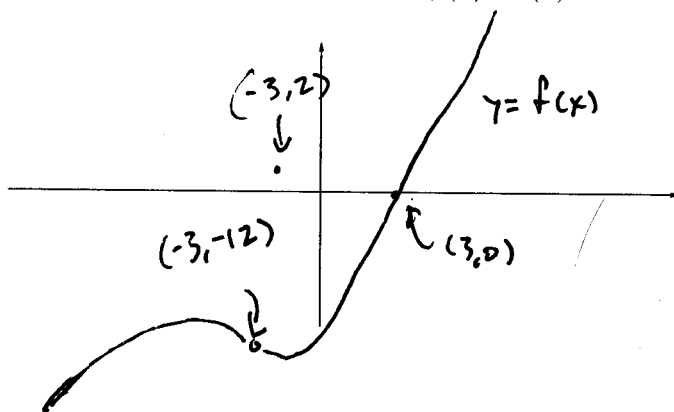
$$\lim_{x \rightarrow -3} \left[\frac{2x^2 - 18}{x + 3} \right] = \lim_{x \rightarrow -3} \left[\frac{2(x-3)(x+3)}{x+3} \right] = \lim_{x \rightarrow -3} (2(x-3)) = -12$$

- (b) (4 PTS) Is it possible to choose k so that the following function is continuous? Explain your reasoning.

$$f(x) = \begin{cases} \frac{2x^2 - 18}{x + 3}, & \text{if } x \neq -3; \\ k, & \text{if } x = -3. \end{cases}$$

yes if you choose $k = -12$ then
 $f(-3) = \lim_{x \rightarrow -3} f(x)$. at other pts f is a
 rational function w/ nonzero denominator,
 so it's continuous.

- (c) (3 PTS) Sketch the graph of $f(x)$ in (b) with $k = 2$.



- (d) (2 PTS) Can one choose k so that the above function is differentiable at $x = -3$? Explain.

yes choose $k = -12$ again, same reasoning