

Math 135, Section 1 – Midterm Exam 2
Friday, October 25

Name: _____

Instructions Please write your answers in the spaces provided, and show work on the test itself. Use the back of the preceding page if you need more space for scratch work.

Please do not write in the space below

Problem	Points/Poss
1	/ 15
2	/ 35
3	/ 30
4	/ 20
Total	/100

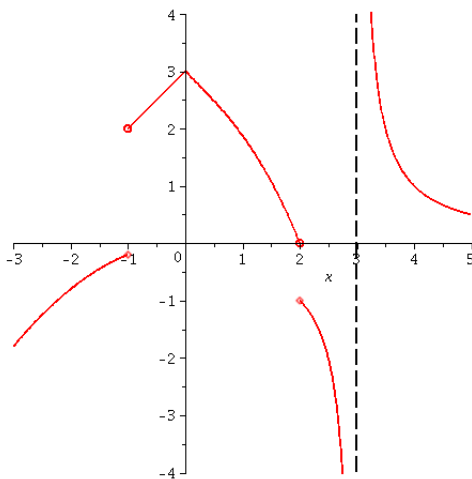
1. Compute the indicated limits. Show all work for full credit.

(a) (5) $\lim_{x \rightarrow 1} \frac{5x^2 - 3x - 2}{x^2 - 7x + 6}$

(b) (5) $\lim_{x \rightarrow 2} \frac{5x^2 - 3x - 2}{x^2 - 7x + 6}$

(c) (5) $\lim_{x \rightarrow \infty} \frac{5x^2 - 3x - 2}{x^2 - 7x + 6}$

2. The graph of a function f with $f(-1) = -2$ and $f(2) = -1$ is shown below.



(a) (10) What are $\lim_{x \rightarrow 2^-} f(x)$ and $\lim_{x \rightarrow 2^+} f(x)$?

(b) (15) Find all x in $(-3, 5)$ where f is discontinuous. Explain.

(c) (10) Given that $f(x) = x + 3$ for $-1 < x < 0$ and $f(x) = 3 - x - \frac{x^3}{8}$ for $0 \leq x < 2$, is f differentiable at $a = 0$? Why or why not?

3. Use the sum, product, and/or quotient rules to compute the following derivatives. You may use any correct method, but must show work and simplify your answers for full credit.

(a) (5) $\frac{d}{dx} \left(\frac{5}{\sqrt{x}} - e^x + 3 \right)$

(b) (10) $\frac{d}{du} (u^{5/3} e^u)$

(c) (10) $\frac{d}{dv} \left(\frac{v^3 - 2v}{v^2 + 5v + 1} \right)$

(d) (5) $\frac{d}{dx} \left(\frac{e^\pi + \pi^e - x^\pi}{4} \right)$

4. Do not use the differentiation rules from Chapter 3 in this question.

(a) (5) State the limit definition of the derivative $f'(x)$.

(b) (10) Use the definition to compute the derivative function of $f(x) = \sqrt{x+1}$.

(c) (5) Find the equation of the line tangent to the graph $y = \sqrt{x+1}$ at $x = 8$.