Name: ______ Math 151-01, Calculus I – Crawford

Exam 1-C 19 September 2017

Score	
1	/8
2	/12
3	/8
4	/24
5	/16
6	/16
7	/6
8	/6
9	/6
Total	/100

- Calculators, books, notes (in any form), cell phones, and any unauthorized sources are \underline{not} allowed.
- Clearly indicate your answers.
- Show all your work partial credit may be given for written work.
- Problems #1 & 2 will be used to determine extra-credit for Homework Check 1.
- Good luck!

1. (8 pts). Find the domain of $f(x) = \frac{\sqrt{4x-3}}{x-5}$.

2. (12 pts). Solve the following inequality for x.

$$x^3 - 10x^2 + 25x \ge 0$$

3. (8 pts). Given the graphs of f and g below, determine the following limits. Clearly indicate $+\infty$ or $-\infty$ in the case of an infinite limit.





(a). $\lim_{x \to 4} \frac{9-2x}{x-4}$

(b).
$$\lim_{x \to -2} \frac{x^2 + 2x}{x^2 + 6x + 8}$$

(c).
$$\lim_{x \to 8} \frac{\sqrt{2x} - 4}{x - 8}$$

5. (16 pts). Let $f(x) = 3 - 2x^2$.

(a). <u>Use the limit definition</u> $f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ to show that the derivative is f'(x) = -4x.

You must use the limit definition and you must show all of your work.

(b). Find an equation of the tangent line to the graph at x = 2.

- **6.** (16 pts). The position of a particle at time t seconds is given by $s(t) = \frac{1}{2t}$ cm.
- (a). Find the average velocity of the particle over the time interval [1,2]. [Simplify your answer and include units.]

(b). Use the limit definition $v(a) = \lim_{t \to a} \frac{s(t) - s(a)}{t - a}$ to find the instantaneous velocity when t = 2. [Include units in your answer.]

[Note: $s'(t) = v(t) = -\frac{1}{2t^2}$, if you want to check your answer.]



8. (6 pts). The graph of f is given below. For which values of x is f not differentiable?



9. (6 pts). True or False. Clearly indicate whether the following statements are true or false.

- T F If f(-2) = 8 and f(3) = -4 and f is a continuous function, then the Intermediate Value Theorem guarantees that f(x) will go through y = 6 for some value of x in the interval (-2, 3).
- T F If the graph of a function y = f(x) is given below, then the derivative f'(1) = 0.



T F Given the graph of y = f(x) below left, its derivative is given by the graph below it.

