This Worksheet will be collected at the end of your recitation section on **Thursday, Oct 27th**.

4.4. Mean Value Theorem

1. Suppose that f and g are differentiable and that $f'(x) = g'(x)$ on the interval $[a, b]$. Use the Mean Value Theorem to show that

$$f(x) = g(x) + C$$

for a constant C and for all $x \in [a, b]$.

2. Find all values of k so that the polynomial

$$g(x) = 2x^3 - 7x + k$$

has exactly one root on $[-1, 1]$. *(Hint: use the Mean Value Theorem to show that this polynomial always has AT MOST one root. Then, use the Intermediate Value Theorem to find values of k where there's AT LEAST one root).*

3. Let f be continuous on the interval $[a, b]$ and differentiable on (a, b). In class, we used the Mean Value Theorem to prove the following:

a) If $f'(x) > 0$ for $x \in (a, b)$ then f is increasing on $[a, b]$.

Mimic the proof given in lecture to show the following:

b) If $f'(x) < 0$ for $x \in (a, b)$ then f is decreasing on $[a, b]$.

Questionnaire:

Below are a few questions which are completely optional, and are meant to benefit you. Please only fill out what you feel comfortable with.

1. Is there anyone in class that you'd like to be grouped with next week?

2. Did you feel you worked well with your group this week?

3. Any other comments?

Grading Rubric:

Attendance: /20

Participation: /20

Completeness: /60