

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Pd: \_\_\_\_\_

**Show all your work and do not use a calculator.** Time will be an issue, so don't waste too much time crunching numbers. Classworks are open book, open notes, and you may discuss it among each other as well. Make a table when necessary and box your final answers.

1. Given:  $f(x) = 3x\sqrt{2x-1}$ .

- a) Find  $f'(x)$ .
- b) Find the critical numbers for  $f(x)$ .

2. Find all critical points of  $r(x) = 5x^3 - 27x^2 + 27x + 19$ .

3. Find the minimum of  $p(x) = -4x^3 - 3x^2 + 18x + 19$  over  $[-2, 2]$ .

4. Given:  $h(x) = \frac{x^2}{3x-1}$  over  $[3, 5]$ .

- a) Find the Critical Numbers.
- b) Find the maximum over the given interval.

5. Determine whether or not  $g(x) = x^3 - x^2 - 5x - 3$  over  $[-1, 3]$  satisfies Rolle's Theorem. If so, then find all numbers  $c$  in the open interval  $(a, b)$  such that  $f'(c) = 0$ .

6. Determine if  $y(x) = \cos x$  over  $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$  satisfies Rolle's Theorem. If so, find all numbers  $c$  on the open interval  $(a, b)$  such that  $f'(c) = 0$

7. Determine whether or not  $f(x) = x^2 - 3x$  over  $[0, 1]$  satisfies the Mean Value Theorem. If so, then find all numbers  $c$  in the open interval  $(a, b)$  that satisfies the conclusion of the Mean Value Theorem.