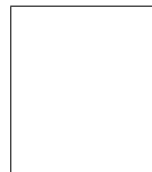




Quiz # 4  
 Math 101-Section 01 Calculus I  
 2 March, 2018, Friday  
 Instructor: Ali Sinan Sertöz  
**Solution Key**



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**Q-1)**

(i) Find a linearization of  $f(x) = \sqrt{25 - x^2}$  at  $x = 4$ , and using that approximate  $f(4.01)$ .

(ii) Find the absolute min/max of  $f(x) = 2x^3 - 9x^2 + 12x$  on  $[0, 3]$ .

**Answer:**

**(i)**

$$L(x) = f'(4)(x - 4) + f(4)$$

$$f'(x) = -x/\sqrt{25 - x^2}, f'(4) = -4/3, f(4) = 3 \text{ Hence}$$

$$L(x) = -\frac{4}{3}(x - 4) + 3 = \frac{25 - 4x}{3}. \text{ And finally}$$

$$L(4.01) = \frac{9 - 0.04}{3} = \frac{900 - 4}{300} = \frac{896}{300} \approx 2.9866. \text{ (Actual value is } f(4.01) = 2.986620163\dots)$$

**(ii)**

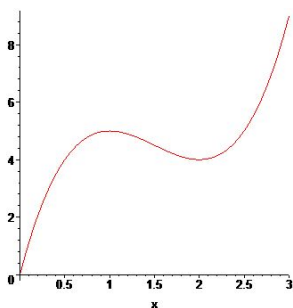
$$f'(x) = 6x^2 - 18x + 12 = 6(x - 1)(x - 2) = 0, \text{ so the critical points are } x = 1 \text{ and } x = 2.$$

The end points are  $x = 0$  and  $x = 3$ .

We evaluate the function at these points.

$$f(0) = 0, \quad f(1) = 5, \quad f(2) = 4 \quad f(3) = 9.$$

Hence the absolute minimum is 0 and the absolute maximum is 9.



Here is the graph