

Math 1121

Homework #16

# 15, 17

#15  $f(x) = \frac{2}{3}x^3 - x^2 - 24x - 4$

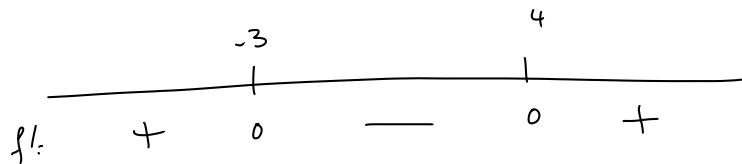
$$f'(x) = 2x^2 - 2x - 24$$

$$= 2(x^2 - x - 12)$$

$$= 2(x-4)(x+3)$$

$$f'(x) = 0: \quad x-4=0, \quad x+3=0$$

$$x=4, \quad x=-3$$



$$f'(-4) = 2(-4-4)(-4+3) = +$$

+   -   -

$$f'(0) = 2(0-4)(0+3) = -$$

+   -   +

$$f'(5) = 2(5-4)(5+3) = +$$

+   +   +

inc:  $(-\infty, -3) \cup (4, \infty)$

dec:  $(-3, 4)$

#17  $f(x) = 4x^3 - 15x^2 - 72x + 5$

$$f'(x) = 12x^2 - 30x - 72$$

$$= 6(2x^2 - 5x - 12)$$

$$= 6(2x + 3)(x - 4)$$

$$f'(x) = 0: \quad 2x + 3 = 0 \quad x - 4 = 0$$

$$x = -3/2 \quad x = 4$$



$$f'(-2) = 6 \cdot (2 \cdot -2 + 3) \cdot (-2 - 4)$$

$$= + \cdot - \cdot - = +$$

$$f'(0) = 6 \cdot (2 \cdot 0 + 3) \cdot (0 - 4) = -$$

+      +      -

$$f'(5) = 6 \cdot (2 \cdot 5 + 3) \cdot (5 - 4) = +$$

+      +      +

$$\text{inc: } (-\infty, -3/2) \ \& \ (4, \infty)$$

$$\text{dec: } (-3/2, 4)$$