

Math 1121

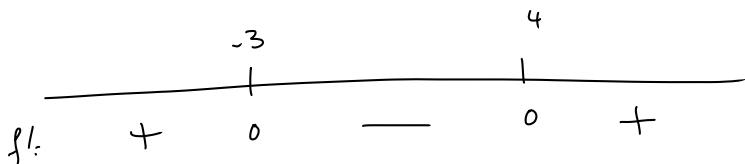
Homework #16

# 15, 17

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

$$\begin{aligned}f'(x) &= 2x^2 - 2x - 24 \\&= 2(x^2 - x - 12) \\&= 2(x-4)(x+3)\end{aligned}$$

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



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

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

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

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

dec:  $(-3, 4)$

$$\underline{\#17} \quad f(x) = 4x^3 - 15x^2 - 72x + 5$$

$$\begin{aligned}f'(x) &= 12x^2 - 30x - 72 \\&= 6(2x^2 - 5x - 12) \\&= 6(2x + 3)(x - 4)\end{aligned}$$

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



$$\begin{aligned}f'(-2) &= 6 \cdot (2 \cdot -2 + 3) (-2 - 4) \\&= + \cdot - \cdot - = +\end{aligned}$$

$$\begin{aligned}f'(0) &= 6 \cdot (2 \cdot 0 + 3) (0 - 4) = - \\&+ \quad + \quad -\end{aligned}$$

$$\begin{aligned}f'(5) &= 6 \cdot (2 \cdot 5 + 3) (5 - 4) = + \\&+ \quad + \quad +\end{aligned}$$

inc:  $(-\infty, -\frac{3}{2}) \cup (4, \infty)$

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