

Math 1121

HW # 18

#14, 19

#14

$$f(x) = x^2 + 8x + 5$$

$$f'(x) = 2x + 8$$

$$f' = 0: \quad 2x + 8 = 0$$

$$2x = -8$$

$$x = -4$$

$$\begin{array}{c} -4 \\ \hline f' \quad - \quad 0 \quad + \end{array}$$

$$f'(-5) = 2 \cdot (-5) + 8 = -2$$

$$f'(0) = 2 \cdot 0 + 8 = 8$$

$x = -4$ is a rel. min.

#19

$$f(x) = x^4 - 18x^2 - 4$$

$$f'(x) = 4x^3 - 36x$$

$$= 4x(x^2 - 9)$$

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

$$f' = 0: \quad x = 0, 3, -3$$

$$\begin{array}{c} -3 \quad \quad 0 \quad \quad 3 \\ \hline f' \quad - \quad 0 \quad + \quad 0 \quad - \quad 0 \quad + \end{array}$$

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

$$f'(-1) = 4(-1)(-1-3)(-1+3) = +$$

$$f'(1) = 4(1)(1-3)(1+3) = -$$

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

$x = -3$ & 3 are rel. min,
 $x = 0$ is rel. max