

NOV 1/07

QUADRATIC, RATIONAL INEQUALITIES

SKETCH $y \geq x^2 - 2x - 8$

$$x = \frac{-b}{2a} = \frac{2}{2(1)} = 1$$

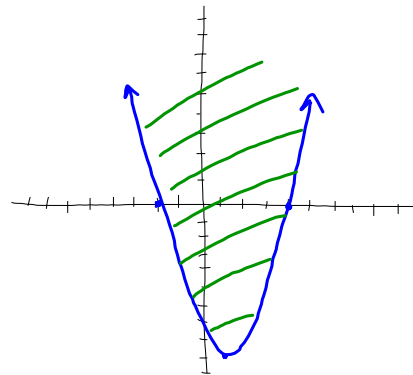
$$y = x^2 - 2x - 8 \quad \text{VERTEX}$$

$$y = (1)^2 - 2(1) - 8 \quad (1, -9)$$

$$y = -9$$

$$y = x^2 - 2x - 8$$
$$= (x-4)(x+2)$$

$$x\text{-INT } 4 \text{ and } -2$$



TEST POINT
(0, 0)

$$y \geq x^2 - 2x - 8$$

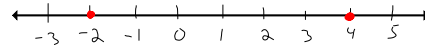
$$0 \geq 0 - 2(0) - 8$$

$$0 \geq -8 \quad \text{TRUE}$$

$$\text{Ex } x^2 - 2x - 8 \geq 0$$

$$(x - 4)(x + 2) \geq 0$$

ZEROS 4 & -2



$$x \leq -2 \quad \text{TEST } x = -3$$

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

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

- -

+ TRUE

$$-2 \leq x \leq 4 \quad \text{TEST } x = 0$$

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

$$(0 - 4)(0 + 2)$$

- +

- FALSE

$$x \geq 4 \quad \text{TEST } x = 5$$

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

$$(5 - 4)(5 + 2)$$

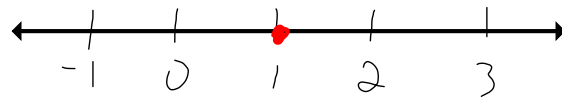
+ +

+ TRUE

$$\text{SOLN } (-\infty, -2] \cup [4, \infty)$$

$$\text{EX SOLVE } (x-1)^2 \geq 0$$

CRITICAL NUMBER $x=1$



$$x \leq 1 \quad \text{TEST } x=0$$

+ve TRUE

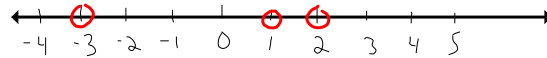
$$x \geq 1 \quad \text{TEST } x=2$$

+ve TRUE

$$\text{SOLN } (-\infty, 1] \cup [1, \infty)$$

$$\text{Ex } \frac{x-1}{(x-2)(x+3)} < 0$$

CRITICAL $1, 2, -3$



① $x < -3$ TEST $x = -4$

$$(x+3)(x-1)(x-2)$$

$- \quad - \quad - \quad \} \text{ -ve TRUE}$

② $-3 < x < 1$ TEST $x = 0$

$+ \quad - \quad - \quad \} \text{ +ve FALSE}$

③ $1 < x < 2$ TEST $x = 1\frac{1}{2}$

$+ \quad + \quad - \quad \} \text{ -ve TRUE}$

④ $x > 2$ TEST $x = 3$

$+ \quad + \quad + \quad \} \text{ +ve FALSE}$

$$\text{SOLN } (-\infty, -3) \cup (1, 2)$$