

R2.7

PR145

$$21. \quad \frac{1}{x} > x^{-x}$$

$$\frac{1}{x} - x > 0$$

$$\frac{1}{x} - \frac{x^2}{x} > 0$$

$$\frac{3}{4} = \frac{2}{1} \quad \frac{1-x^2}{x} > 0 \quad \frac{(1+x)(1-x)}{x} > 0$$

positive



$$x < -1 \quad 0 < x < 1$$

$$(-\infty, -1) \cup (0, 1)$$

$$53. R - C = P$$

$$x(50 - .0002x) - (12x + 150,000) \geq 1,650,000$$

$$50x - .0002x^2 - 12x - 150,000 \geq 1,650,000$$

$$.0002x^2 - 38x + 1,800,000 \leq 0$$

$$x = \frac{38 \pm \sqrt{38^2 - 4(.0002)(1,800,000)}}{2(.0002)}$$

$$x = \frac{38 \pm \sqrt{4}}{.0004}$$

$$x = 100,000 \quad x = 90,000$$

$$90,000 \leq x \leq 100,000$$

$$b. p = 50 - .0002(90,000)$$

$$p = 32$$

$$p = 50 - .0002(100,000)$$

$$p = 30$$

$$\$ 30 \leq p \leq \$ 32$$

$$c. R < C$$

$$x(50 - .0002x) < 12x + 150,000$$

$$50x - .0002x^2 < 12x + 150,000$$

$$.0002x^2 - 38x + 150,000 < 0$$

$$x = \frac{+38 \pm \sqrt{38^2 - 4(.0002)(150,000)}}{2(.0002)}$$

$$x = 185,967.03$$

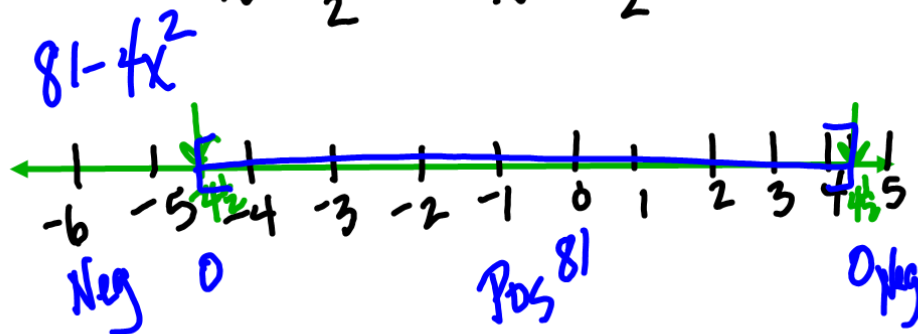
$$33. \sqrt{81-4x^2}$$

$$81-4x^2 \geq 0$$

$$(9-2x)(9+2x) = 0$$

$$9-2x=0 \quad 9+2x=0$$

$$x = \frac{9}{2} \quad x = -\frac{9}{2}$$



$$\left[-\frac{9}{2}, \frac{9}{2}\right]$$

$$37. (-\infty, \infty) \text{ All Reals}$$

29. pR145

$$\frac{1}{x-3} \leq \frac{9}{4x+3}$$

$$\frac{1}{x-3} - \frac{9}{4x+3} \leq 0$$

$$\frac{4x+3}{(x-3)(4x+3)} - \frac{9(x-3)}{(x-3)(4x+3)} \leq 0$$

$$\frac{4x+3}{(x-3)(4x+3)} - \frac{9x-27}{(x-3)(4x+3)} \leq 0$$

$$\frac{-5x+30}{(x-3)(4x+3)} \leq 0$$

Critical
Values

$$-5x+30=0$$

$$x=6$$

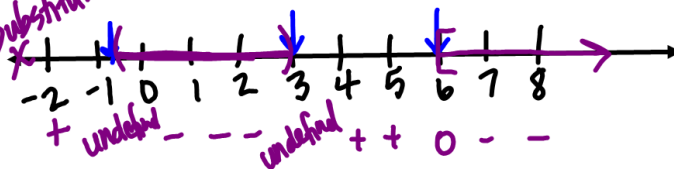
$$x-3=0$$

$$x=3$$

$$4x+3=0$$

$$x=-\frac{3}{4}$$

Substitute



$$\frac{-5x+30}{(x-3)(4x+3)} \leq 0 \text{ negative}$$

Solution $(-\frac{3}{4}, 3) \cup [6, \infty)$