

Other Types of Equations

Example 2 Using the Algebraic Definition of Absolute ValueSolve $|x + 4| = 5x - 2$ by using the algebraic definition of absolute value.

$$x+4 = 5x-2 \quad \text{or} \quad x+4 = -5x+2$$

$$x = \frac{3}{2} \quad \quad \quad x = -\frac{1}{3}$$

Example 3 Solving an Absolute Value EquationSolve $|x^2 + 4x - 3| = 2$.

$$x^2 + 4x - 3 = 2 \quad \text{or} \quad x^2 + 4x - 3 = -2$$

$$x^2 + 4x - 5 = 0 \quad \quad \quad x^2 + 4x - 1 = 0$$

$$(x+5)(x-1) = 0 \quad \quad \quad x = -2 \pm \sqrt{5}$$

$$x = -5, 1$$

Example 4 Solving a Radical EquationSolve $5 + \sqrt{3x - 11} = x$

$$(\sqrt{3x-11})^2 = (x-5)^2$$

$$\cancel{x=4} \quad x=9$$

Example 5 Using the Power Principle TwiceSolve $\sqrt{2x-3} - \sqrt{x+7} = 2$.

$$(\sqrt{2x-3})^2 = (2 + \sqrt{x+7})^2$$

$$x=2 \quad x=42$$

Example 7 Solving a Fractional EquationSolve $\frac{6x^2 - x - 1}{2x^2 + 9x - 5} = 0$.

$$y_1 = 6x^2 - x - 1$$

$$-\frac{1}{3}$$

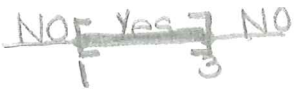
$$\cancel{x=5}$$

Solve the inequality. Find exact solutions when possible, and approximate them otherwise.

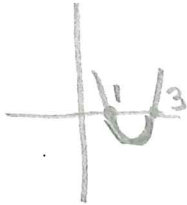
41. $x^2 - 4x + 3 \leq 0$

$$(x-3)(x-1) \leq 0$$

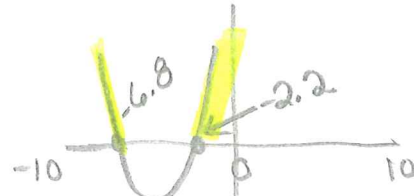
$$x=3 \quad x=1$$



$$[1, 3]$$

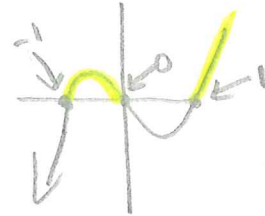


43. $x^2 + 9x + 15 \geq 0$



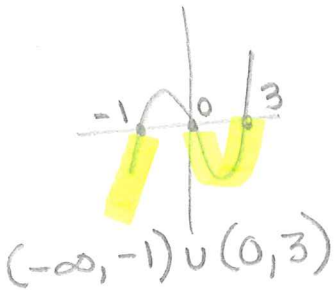
$$(-\infty, -6.8] \cup [-2.2, \infty)$$

47. $x^3 - x \geq 0$



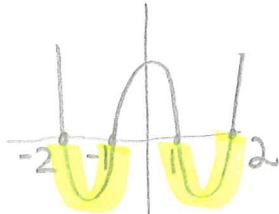
$$[-1, 0] \cup [0, 1]$$

49. $x^3 - 2x^2 - 3x < 0$



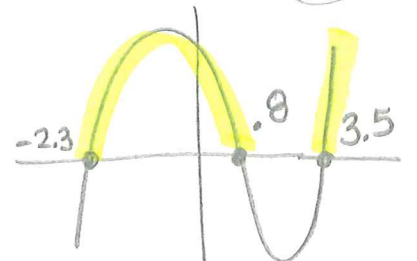
$$(-\infty, -1) \cup (0, 3)$$

51. $x^4 - 5x^2 + 4 < 0$



$$(-2, -1) \cup (1, 2)$$

53. $x^3 - 2x^2 - 5x + 7 \geq 2x + 1$



$$[-2.3, 0.8] \cup [3.5, \infty)$$

55. $2x^4 + 3x^3 < 2x^2 + 4x - 2$



$$(0.5, 0.8)$$