

Name \_\_\_\_\_

Honors Algebra 2

Unit 4B Polynomials

WS - Solving Quadratic Inequalities

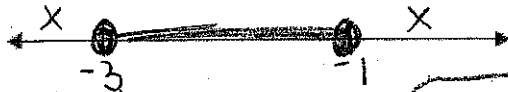
Solve the following quadratic inequalities, write the solution in interval notation, and graph the solutions on a number line.

1.  $x^2 + 4x + 3 \leq 0$

$$(x+3)(x+1) = 0$$

$$x = -3, -1$$

$$\boxed{[-3, -1]}$$



2.  $5x^2 + 10 \geq 27x$

$$5x^2 - 27x + 10 \geq 0$$

$$x^2 - 27x + 50 = 0$$

$$(x - 25)(x - 2) \Rightarrow (x - 5)(5x - 2) = 0$$

$$x = 5, \frac{2}{5}$$

$$\boxed{(-\infty, \frac{2}{5}] \cup [5, \infty)}$$

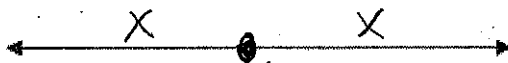


3.  $9x^2 + 6x + 1 \leq 0$

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

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

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



4.  $9x^2 + 31x \leq -12$

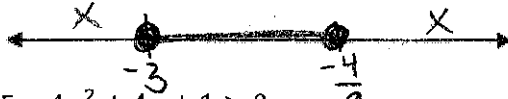
$$9x^2 + 31x + 12 \leq 0$$

$$x^2 + 31x + 108 = 0$$

$$(x + \frac{27}{9})(x + \frac{4}{9}) \Rightarrow (x+3)(9x+4) = 0$$

$$x = -3, -\frac{4}{9}$$

$$\boxed{[-3, -\frac{4}{9}]}$$

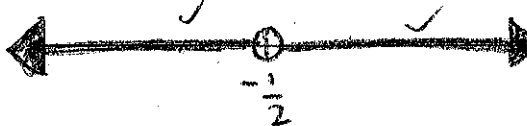


5.  $4x^2 + 4x + 1 > 0$

$$(2x+1)(2x+1) > 0$$

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

$$\boxed{(-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, \infty)}$$



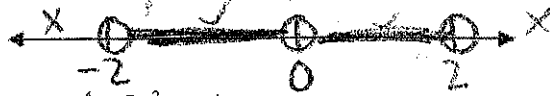
$$6. x^4 < 4x^2$$

$$x^4 - 4x^2 < 0$$

$$x^2(x^2 - 4) = 0$$

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

$$x = 0, 2, -2$$



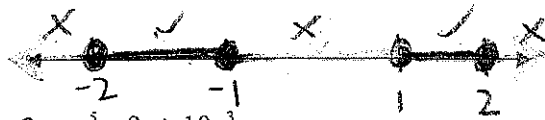
$$(-2, 0) \cup (0, 2)$$

$$7. x^4 - 5x^2 + 4 \leq 0$$

$$x^4 - 5x^2 + 4 \leq 0$$

$$(x^2 - 4)(x^2 - 1) = 0$$

$$x = \pm 2, \pm 1$$



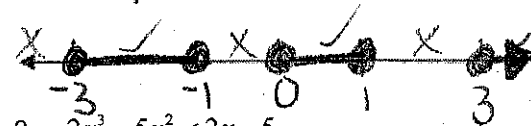
$$[-2, -1] \cup [1, 2]$$

$$8. x^5 - 10x^3 + 9x \geq 0$$

$$x^5 - 10x^3 + 9x \geq 0$$

$$x(x^2 - 9)(x^2 - 1) = 0$$

$$x = 0, \pm 3, \pm 1$$



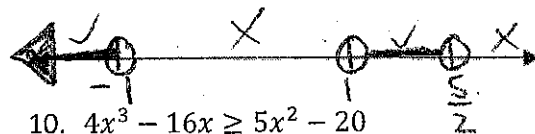
$$[-3, -1] \cup [0, 1] \cup [3, \infty)$$

$$9. 2x^3 - 5x^2 < 2x - 5$$

$$2x^3 - 5x^2 - 2x + 5 < 0$$

$$(x^2 - 1)(2x - 5) = 0$$

$$x = \pm 1, \frac{5}{2}$$



$$(-\infty, -1) \cup (1, \frac{5}{2})$$

$$10. 4x^3 - 16x \geq 5x^2 - 20$$

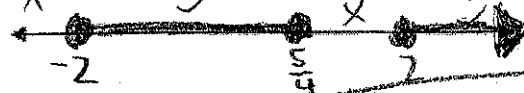
$$4x^3 - 5x^2 - 16x + 20 \geq 0$$

$$(x-2)(4x^2+3x-10) = 0$$

$$x^2 + 3x - 10$$

$$(x+5)(x-2) \Rightarrow (x+2)(4x-5)$$

$$x = 2, -2, \frac{5}{4}$$



$$[-2, \frac{5}{4}] \cup [2, \infty)$$

$$\begin{array}{r|rrrr} 1) & 4 & -5 & -16 & +20 \\ & & 4 & -1 & -17 \\ \hline & 4 & -1 & -17 & [3] \end{array}$$

$$\begin{array}{r|rrrr} 2) & 4 & -5 & -16 & +20 \\ & & 8 & 6 & -20 \\ \hline & 4 & 3 & -10 & [0] \end{array}$$