

Algebra 2CP Worksheet 5-3: Solving Polynomial Inequalities by Factoring

Solve by factoring and testing the regions:

Graph your solution. Then write it in interval notation.

1. $4x^2 - 8x + 3 < 0$

$$4x^2 - 6x - 2x + 3 < 0$$

$$2x(2x-3) - 1(2x-3) < 0$$

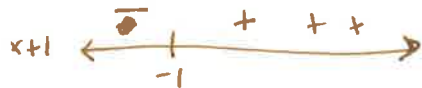
$$(2x-1)(2x-3) < 0$$

critical points: $\frac{1}{2}, \frac{3}{2}$



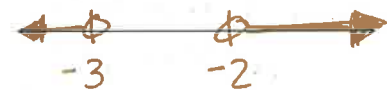
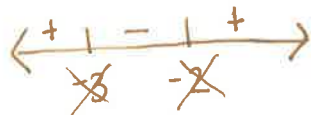
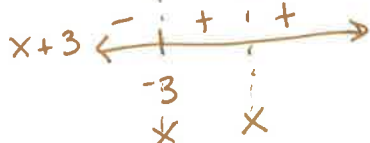
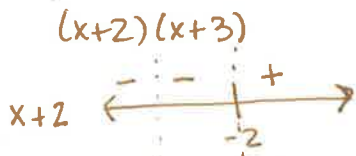
$$\left(\frac{1}{2}, \frac{3}{2}\right)$$

2. $(x+1)(x-3) > 0$



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

3. $x^2 + 5x + 6 > 0$



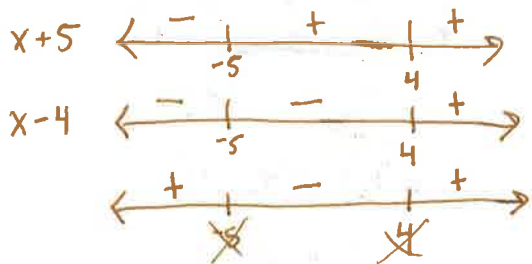
$$(-\infty, -3) \cup (-2, \infty)$$

Name Key

Algebra 2CP Worksheet 5-3: Solving Polynomial Inequalities by Factoring

4. $x^2 + x - 20 < 0$

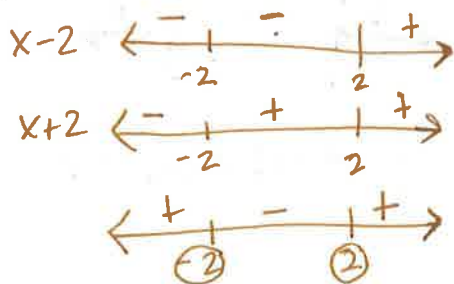
$$(x+5)(x-4) < 0$$



$$(-5, 4)$$

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

$$(x-2)(x+2) \leq 0$$



$$[-2, 2]$$

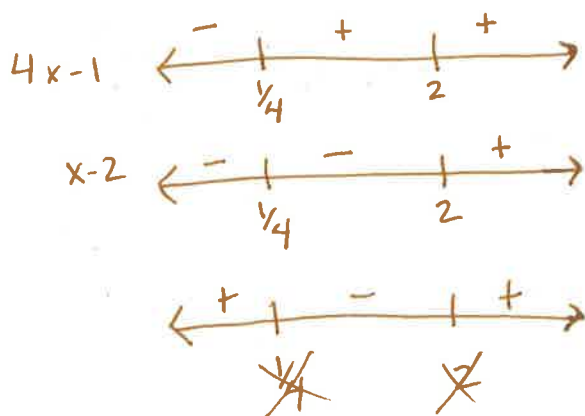
6. $4x^2 - 9x + 2 < 0$

$$\frac{8}{-8-1}$$

$$4x^2 - 8x - 1x + 2 < 0$$

$$4x(x-2) - 1(x-2) < 0$$

$$(4x-1)(x-2) < 0$$

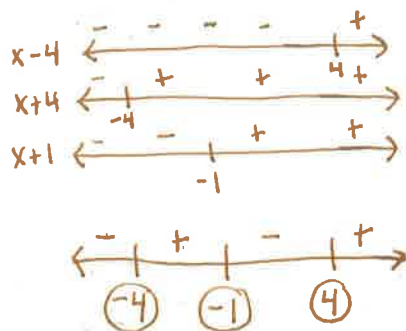


$$(\frac{1}{4}, 2)$$

U6 D7: Worksheet

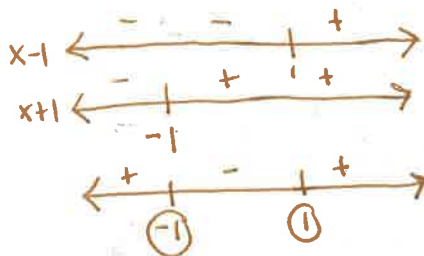
Directions: Solve each polynomial inequality algebraically on the number line. Check your solution graphically. Remember you do not need to find imaginary roots because they are not on the number line. Real answers only!!

1. $x^3 + x^2 - 16x - 16 \geq 0$
 $x^2(x+1) - 16(x+1) \geq 0$
 $(x^2 - 16)(x+1) \geq 0$
 $(x-4)(x+4)(x+1) \geq 0$



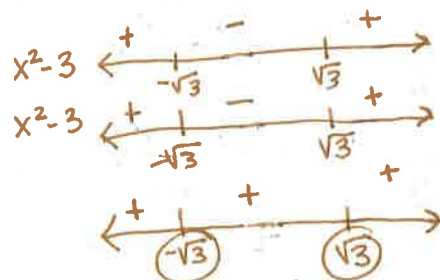
$[-4, -1] \cup [4, \infty)$

2. $x^4 + 35x^2 - 36 \geq 0$
 $(x^2 - 1)(x^2 + 36) \geq 0$
 $(x-1)(x+1)(x^2 + 36) \geq 0$
 ↑
 imaginary



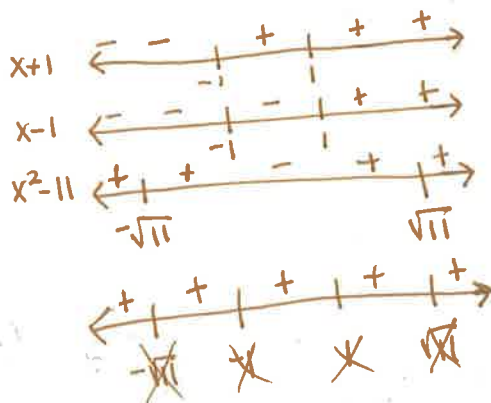
$(-\infty, -1] \cup [1, \infty)$

3. $x^4 - 6x^2 + 9 \leq 0$
 $(x^2 - 3)(x^2 - 3) \leq 0$
 $x^2 = 3$
 $x = \pm\sqrt{3}$



$\{-\sqrt{3}, \sqrt{3}\}$

4. $x^4 - 12x^2 + 11 < 0$
 $(x^2 - 1)(x^2 - 11) < 0$
 $(x+1)(x-1)(x^2 - 11) < 0$



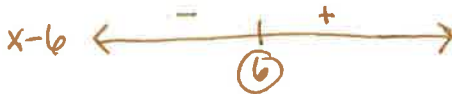
No Solution

5. $x^3 - 216 \geq 0$

$(x-6)(x^2+6x+36) \geq 0$

$x^2+6x+36 \geq 0$

$\frac{-6 \pm \sqrt{36-4(1)(36)}}{2(1)}$ imaginary

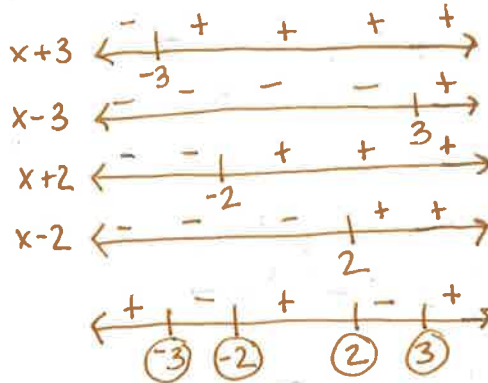


$[6, \infty)$

6. $x^4 - 13x^2 + 36 \leq 0$

$(x^2-9)(x^2-4) \leq 0$

$(x+3)(x-3)(x+2)(x-2) \leq 0$



$[-3, -2] \cup [2, 3]$

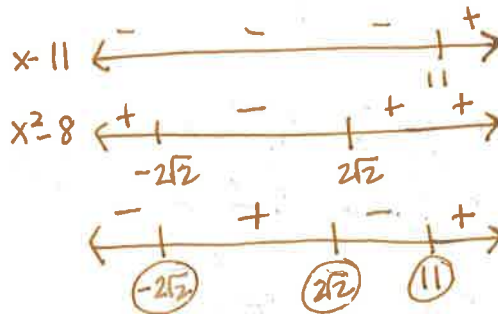
7. $x^3 - 11x^2 - 8x + 88 \geq 0$

$x^2(x-11) - 8(x-11) \geq 0$

$(x^2-8)(x-11) \geq 0$

$x^2=8$

$x = \pm\sqrt{8} = \pm 2\sqrt{2}$



$[-2\sqrt{2}, 2\sqrt{2}] \cup [11, \infty)$

8. $x^3 + 1000 < 0$

$(x+10)(x^2-10x+100)$

$x^2-10x+100$

$\frac{10 \pm \sqrt{100-4(1)(100)}}{2(1)}$ imaginary



$(-\infty, -10)$

9. $64x^4 - 81 > 0$

$(8x^2-9)(8x^2+9) > 0$

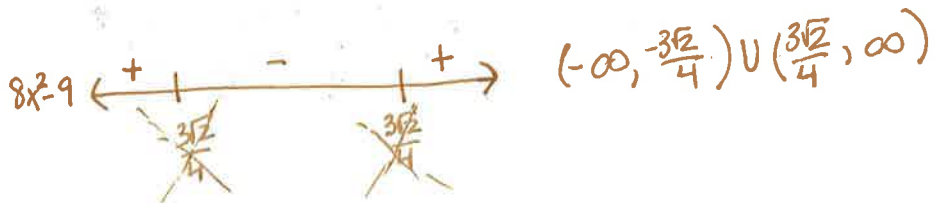
$8x^2=9$

$x^2 = \frac{9}{8}$

$x = \pm\sqrt{\frac{9}{8}} =$

$\pm \frac{3}{\sqrt{8}} \cdot \frac{\sqrt{8}}{\sqrt{8}} = \frac{3\sqrt{8}}{8} = \frac{6\sqrt{2}}{8} = \frac{3\sqrt{2}}{4}$

↑
imaginary
 $8x^2 = -9$
 $x^2 = -\frac{9}{8}$



$(-\infty, -\frac{3\sqrt{2}}{4}) \cup (\frac{3\sqrt{2}}{4}, \infty)$

Name _____

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2. $(x + 1)(x - 3) > 0$



3. $x^2 + 5x + 6 > 0$



Name _____

Algebra 2CP Worksheet 5-3: Solving Polynomial Inequalities by Factoring

4. $x^2 + x - 20 < 0$



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



6. $4x^2 - 9x + 2 < 0$



U6 D7: Worksheet

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2. $x^4 + 35x^2 - 36 \geq 0$

3. $x^4 - 6x^2 + 9 \leq 0$

4. $x^4 - 12x^2 + 11 < 0$

5. $x^3 - 216 \geq 0$

6. $x^4 - 13x^2 + 36 \leq 0$

7. $x^3 - 11x^2 - 8x + 88 \geq 0$

8. $x^3 + 1000 < 0$

9. $64x^4 - 81 > 0$