Math 3 | Unit 6 – Inequalities | Day 7 - Practice

Name: KM | Date: _____

Solving Polynomial Inequalities

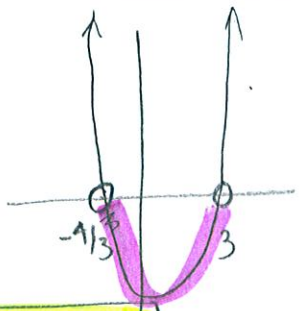
1. $3x^2 - 5x - 12 < 0$

$x^2 - 5x - 36$

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

$(x-3)(3x+4) = 0$

$x = 3 \quad x = -4/3$



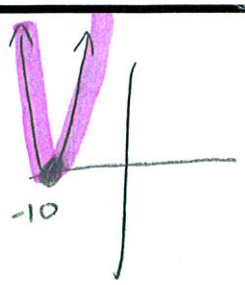
$(-4/3, 3)$

2. $x^2 + 20x + 100 \geq 0$

$(x+10)(x+10) = 0$

$x = -10 \quad x = -10$

(Bounce)

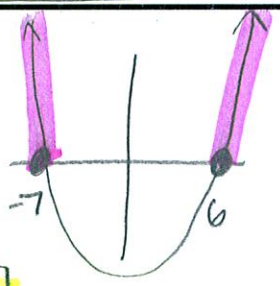


$(-\infty, \infty)$

3. $x^2 + x - 42 \geq 0$

$(x-6)(x+7) = 0$

$x = 6 \quad x = -7$



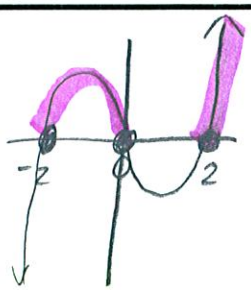
$(-\infty, -7] \cup [6, \infty)$

4. $x^3 - 4x \geq 0$

$x(x^2 - 4)$

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

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



$[-2, 0] \cup [2, \infty)$

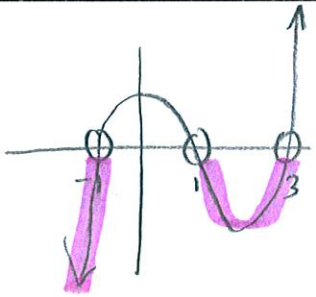
5. $(x^3 - 3x^2)(-x + 3) < 0$

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

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

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

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



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

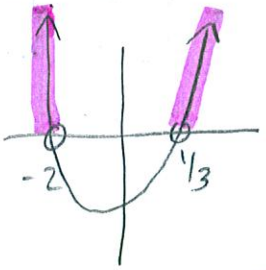
6. $3x^2 + 5x - 2 > 0$

$x^2 + 5x - 6$

$(x + \frac{6}{3})(x - \frac{1}{3})$

$(x+2)(3x-1) = 0$

$x = -2 \quad x = 1/3$

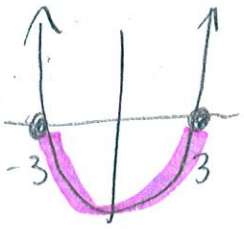


$(-\infty, -2) \cup (1/3, \infty)$

7. $x^2 - 9 \leq 0$

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

$x = -3 \quad x = 3$

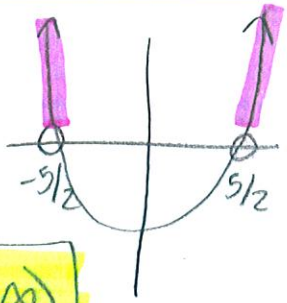


$[-3, 3]$

8. $4x^2 - 25 > 0$

$(2x+5)(2x-5) = 0$

$x = -5/2 \quad x = 5/2$

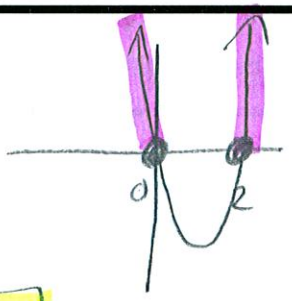


$(-\infty, -5/2) \cup (5/2, \infty)$

9. $3x^2 - 6x \geq 0$

$3x(x-2) = 0$

$x=0 \quad x=2$



$(-\infty, 0] \cup [2, \infty)$

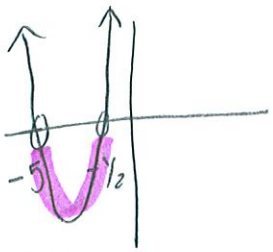
10. $2x^2 + 11x + 5 < 0$

$x^2 + 11x + 10$

$(x + \frac{10}{2})(x + \frac{1}{2})$

$(x+5)(2x+1) = 0$

$x=-5 \quad x=-1/2$



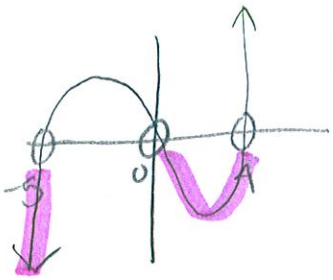
$(-5, -1/2)$

11. $x^3 + x^2 - 20x < 0$

$x(x^2 + x - 20)$

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

$x=0 \quad x=-5 \quad x=4$

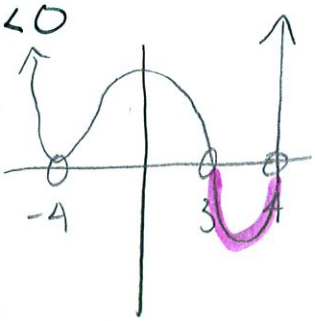


$(-\infty, -5) \cap (0, 4)$

12. $(x+4)^2(x-4)(x-3) < 0$

$x=-4 \quad x=-4 \quad x=4 \quad x=3$

(bounce)

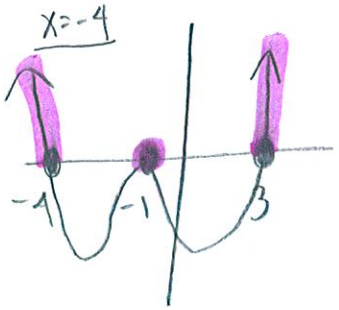


$(3, 4)$

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

$x=3 \quad x=-1 \quad x=-1 \quad x=-4$

bounce



$(-\infty, -4] \cup [-1] \cup [3, \infty)$

14. $x^3 - 5x^2 \leq 24x$

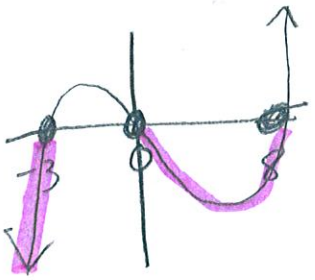
$-24x \quad -24x$

$x^3 - 5x^2 - 24x \leq 0$

$x(x^2 - 5x - 24) \leq 0$

$x(x-8)(x+3) = 0$

$x=0 \quad x=8 \quad x=-3$



$(-\infty, -3] \cap [0, 8]$

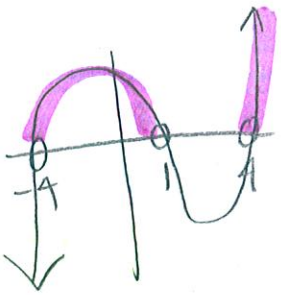
15. $(x^3 - x^2)(-16x + 16) > 0$

$x^2(x-1) - 16(x-1)$

$(x^2 - 16)(x-1)$

$(x+4)(x-4)(x-1) = 0$

$x=-4 \quad x=4 \quad x=1$



$(-4, 1) \cup (4, \infty)$

16. $(x^3 + 2x^2)(-4x - 8) \leq 0$

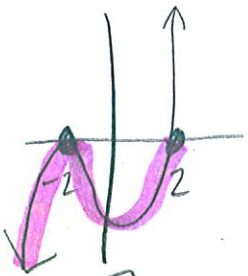
$x^2(x+2) - 4(x+2)$

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

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

$x=-2 \quad x=2 \quad x=-2$

bounce



$(-\infty, 2]$