

More Quadratic Inequalities

Solve Graphically:

$$2x^2 - 12x > -10$$

$$2x^2 - 12x + 10 > 0$$

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

$$(x-3)^2 - 9 + 5 > 0$$

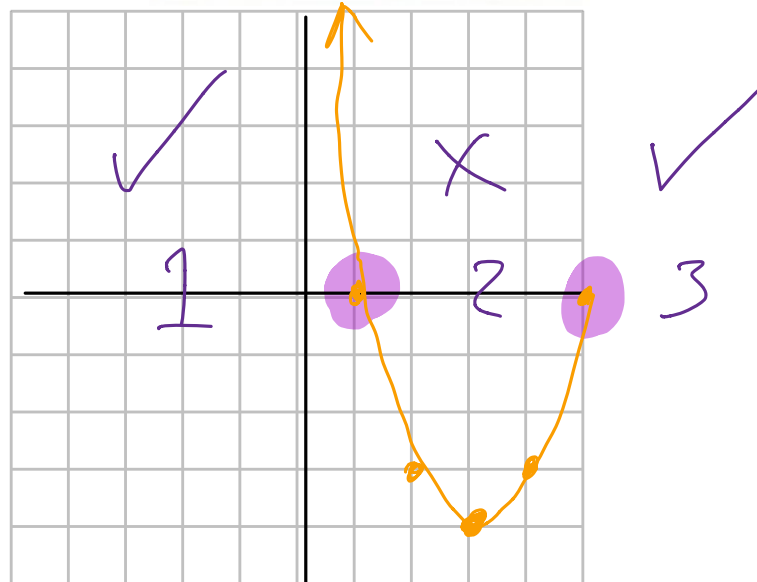
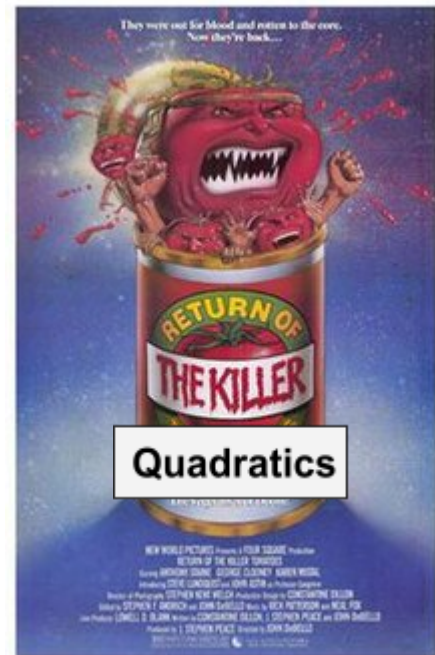
$$1(x-3)^2 - 4 > 0$$

set $\{x \mid x < 1, x > 5, x \in \mathbb{R}\}$

$$\{x \mid -\infty < x < 1, 5 < x < \infty, x \in \mathbb{R}\}$$

interval

$$(-\infty, 1) \cup (5, \infty)$$



Solve algebraically:

$$2x^2 - 12x > -10$$

$$2x^2 - 12x + 10 > 0$$

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



$$x^2 - 5x - x + 5 > 0$$

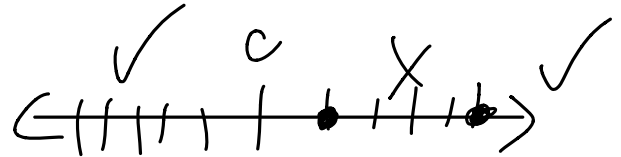
$$x(x-5) - (x-5) > 0$$

$$(x-5)(x-1) > 0$$

$$m \Rightarrow 5$$

$$a \Rightarrow -6$$

$$(-5, -1) \quad \checkmark$$



See above.

Let's put this into practice:

A stuntman will jump off of a 20 m building. A high speed camera is ready to film him between 15m and 10m above the ground.

When should they start the high speed camera?

$$\rightarrow x = x_0 + v_0 t + \frac{at^2}{2}$$

For our question: $\therefore d = 20 - 5t^2$

And we make our quadratic:

$$\frac{10}{2} < 20 - 5t^2 < \frac{15}{2}$$

$$2 < 4 - t^2 < 3$$

$$2 - 4 < -t^2 < 3 - 4$$

$$-2 < -t^2 < -1$$

$$\sqrt{2} > \sqrt{t^2} > \sqrt{1}$$

$$\{t \mid 1 < t < \sqrt{2}, t \in \mathbb{R}\}$$

They should film between 1 & 1.41 s.

Solve each quadratic inequality, and graph the solution on a number line.

1. $y^2 - 17y + 70 < 0$
2. $x^2 + 9x + 13 > -7$
3. $x(x+1) > 112 - 5x$
4. $a^2 + 3a + 2 < -3(a+2)$
5. $2x^2 \leq 5x - 2$
6. $10 - 9y \geq -2y^2$
7. $b(b+3) \geq -2$
8. $a^2 \leq 4(2a - 3)$
9. $y^2 - 17y + 70 < 0$
10. $x^2 + 9x + 13 > -7$
11. $x(x+1) > 112 - 5x$
12. $a^2 + 25 < 10a$
13. $2d^2 + 5d \leq 12$
14. $a^2 + 3a + 2 \geq -3(a+2)$
15. $10 - 9y \geq -2y^2$
16. $2x^2 \leq 5x - 2$
17. $c(c+4) < 3+3(9+c)$
18. $2a(a+6) > 5-a(a+2)$
19. $b(b+3) > -2$
20. $a^2 < 4(2a - 3)$
21. $(x+3)^2 \leq 6(x+15)$
22. $2x^2 + 7 \geq 9x$
23. $7x^2 \geq 4(1+3x)$
24. $3x^2 + 7x \leq -2$
25. $-8 < 4(x - x^2)$
26. $x^2 - x - 2 > 0$
27. $2k^2 + 3k - 2 > 0$
28. $t^2 + 2t - 3 < 0$
29. $4x^2 + 8 \leq 33x$
30. $x^2 \geq 4(x - 5)$
31. $x^2 + 4 \geq 2x^2 - 3x$
32. $10 - 3x \leq x^2$
33. $4 < 13x - 3x^2$
34. $6(x^2 + 1) > -13$
35. $6x - x^2 > 8$
36. $20a^2 < 1 - a$
37. $8x \leq -3(1 - x^2)$
38. $y^2 \geq 25$
39. $t^2 + 18 \geq 11t$
40. $3x(x+1) \leq x(x+5)$
41. $x^2 < 8$
42. $x^2 + 3x > 12$
43. $2t^2 > 9t + 18$
44. $4x^2 - 9x + 2 < 0$

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|--|---|--|
| 1. $7 < y < 10$ | 2. $x < -5$ or $x > -4$ | 3. $x < -14$ or $x > 8$ |
| 4. $-4 < a < -2$ | 5. $\frac{1}{2} \leq x \leq 2$ | 6. $y \leq 2$ or $y \geq \frac{5}{2}$ |
| 7. $b \leq -2$ or $b \geq -1$ | 8. $2 \leq a \leq 6$ | 9. $7 < y < 10$ |
| 10. $x < -5$ or $x > -$ | 11. $x < -14$ or $x > 8$ | 12. no solution |
| 13. $-4 \leq d \leq \frac{3}{2}$ | 14. $x \leq -4$ or $x \geq -2$ | 15. $y \leq 2$ or $y \geq \frac{5}{2}$ |
| 16. $\frac{1}{2} \leq x \leq 2$ | 17. $-6 < c < 5$ | 18. $a < -5$ or $a > \frac{1}{3}$ |
| 19. $b \leq -2$ or $b \geq -1$ | 20. $2 < a < 6$ | 21. $-9 \leq x \leq 9$ |
| 22. $x < 1$ or $x \geq \frac{7}{2}$ | 23. $x \leq -\frac{2}{7}$ or $x \geq 2$ | 24. $-2 \leq x \leq -\frac{1}{3}$ |
| 25. $-1 < x < 2$ | 26. $x < -1$ or $x > 2$ | 27. $k < -2$ or $k > \frac{1}{2}$ |
| 28. $-3 < t < 1$ | 29. $\frac{1}{4} \leq x \leq 8$ | 30. all real numbers |
| 31. $-1 < x < 4$ | 32. $x \leq -5$ or $x \geq 2$ | 33. $\frac{1}{3} < x < 4$ |
| 34. no real solutions | 35. $2 < x < 4$ | 36. $-\frac{1}{4} < x < \frac{1}{5}$ |
| 37. $x \leq -\frac{1}{3}$ or $x \geq 3$ | 38. $x \leq -5$ or $x \geq 5$ | 39. $t \leq 2$ or $t \geq 9$ |
| 40. $0 \leq x \leq 1$ | 41. $-2\sqrt{2} < x < 2\sqrt{2}$ | |
| 42. $x < \frac{-3-\sqrt{57}}{2}$ or $x > \frac{-3+\sqrt{57}}{2}$ | | |
| 43. $t < -\frac{3}{2}$ or $t > 6$ | 44. $\frac{1}{4} < x < 2$ | |