Algebra 2 4.8

Graph quadratic inequalities (functions)

Solve quadratic inequalities (equations) graphically

Solve quadratic inequalities (equations) algebraically

graph

solve

related function

vertex form

factored form

whiteboards

Quiz Mon. 4.7-4.8

$0 \leq 0^2 + 2 \cdot 0 + 4$

$0 \leq 4$

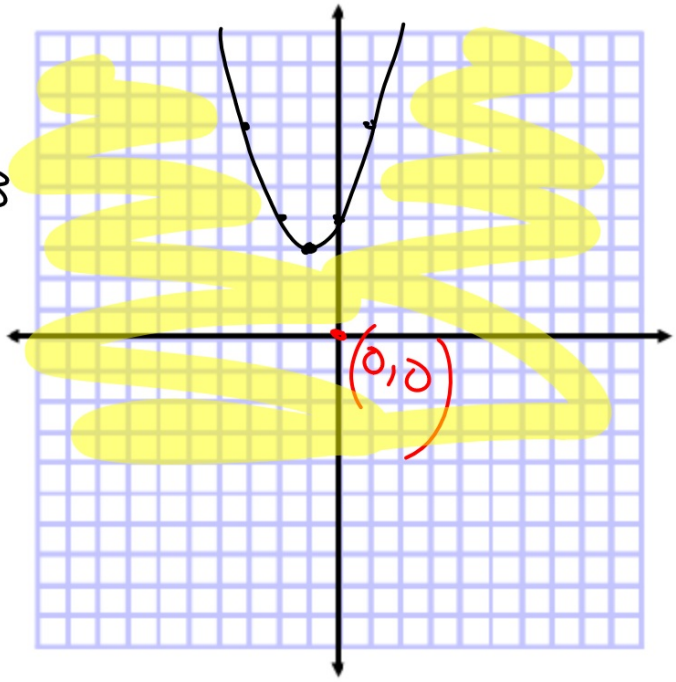
Graph each inequality.

1A. $y \leq x^2 + 2x + 4$ $-y$

$+$
$-y \quad y \leq x^2 + 2x + 1$

$y - 3 = (x+1)^2 + 3$
$+3$

$y = (x+1)^2 + 3$



Solve graphically
We need to know crossing points...how can we find them?
For which value(s) of x is the graph rreater (higher) than zero?

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

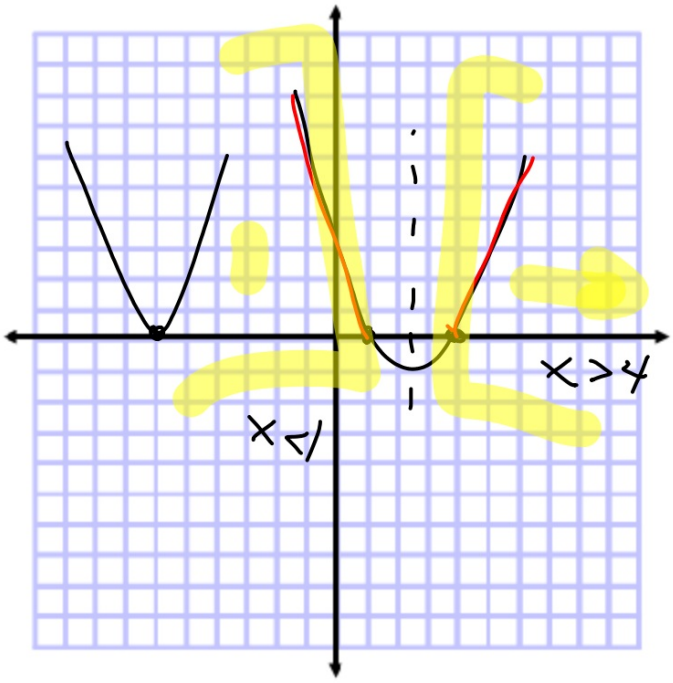
$x^2 - 5x + 4 > 0$ ← pos.

$y = x^2 - 5x + 4$

$-4 \times -1 = 4$, $-4 + -1 = -5$

$(x-4)(x-1)$

$x = 4$ $x = 1$



For which value(s) of x is the graph lower than zero?

5. $x^2 + 8x + 15 \leq 0$ neg

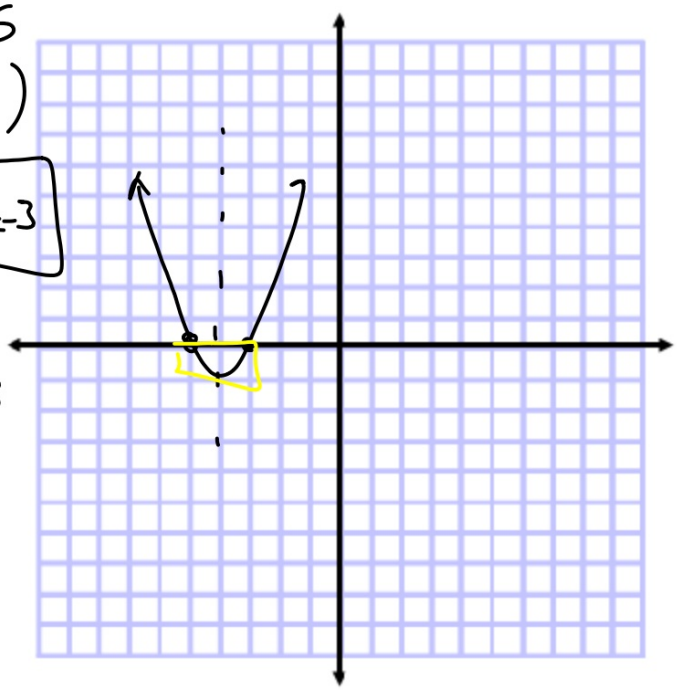
$y = x^2 + 8x + 15$

$(x+5)(x+3)$

15, 8

$x = -5$ $x = -3$

$-5 \leq x \leq -3$



Solve algebraically (another method):

Solve related equation

(Divides number line into zones)

Test a point from each zone

Answers are the same as if solved graphically

$$x^2+8x+15<0$$

$$x^2+8x+15=0$$

15 = 5 · 3, 8 = 5 + 3

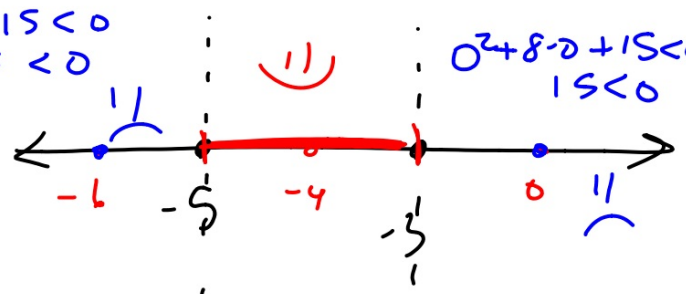
$$(x+5)(x+3)=0$$

$x=-5$ $x=-3$

$-6\cdot-6+8\cdot-6+15<0$

$36-48+15<0$

$-3<0$



$0^2+8\cdot0+15<0$

$15<0$

$-4\cdot-4+8\cdot-4+15<0$

$16+-32+15<0$

$-1<0$

$-5<x<-3$

Example 5 Solve a Quadratic Inequality Algebraically

Solve $x^2 - 3x \leq 18$ algebraically.

$-3 \leq x < 6$

$x^2 - 3x - 18 \leq 0$

$(x-6)(x+3) = 0$

-18

$-6 \quad 3$

-3

$x = 6 \qquad x = -3$

$-5 \cdot -5 - 3 \cdot -5 \leq 18$

$25 + 15 \leq 18$

$40 \leq 18$

$0^2 - 0 \leq 18$

$10^2 - 3 \cdot 10 \leq 18$

$100 - 30 \leq 18$

$70 \leq 18$

WB 4.8 prac.

GuidedPractice odds +20

Solve each inequality algebraically.

5A. $x^2 + 5x < -6$

$x^2+5x+6=0$

6: 3, 2; 5

$(x+3)(x+2)$

$-3 < x < -2$.

$-5 \cdot -5 + 5 \cdot -5 < -6$

$25 - 15 < -6$

$0^2 + 0 < -6$

$0 < -6$

$6.25 - 12.5 < -6$

$-6.25 < -6$

5B. $x^2 + 11x + 30 \geq 0$