

Graphing and Solving Quadratic Inequalities

Focus: Rows Pair Up...Take 10 minutes to...

1) Without the use of a calculator, graph the following quadratic: $y = x^2 + 6x + 8$

$$y = x^2 + 6x + 8$$

$$x = \frac{-b}{2a} = -3$$

$$0 = (x+2)(x+4)$$

$$x = -2, x = -4$$

$$v(-3, -1)$$

$$y = (-3)^2 + 6(-3) + 8$$

$$y = 9 - 18 + 8$$

$$y = -1$$

OR:

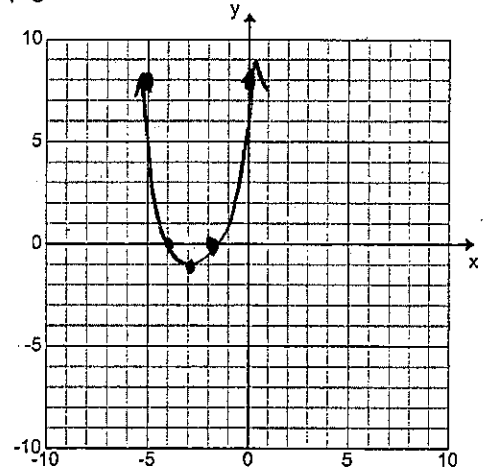
$$y - 8 = x^2 + 6x$$

$$y - 8 + 9 = x^2 + 6x + 9$$

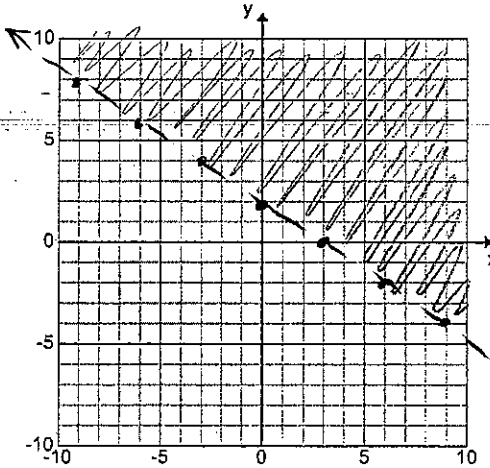
$$y + 1 = (x + 3)^2$$

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

$$y \text{ int: } (0, 8)$$



2) Graph the following inequality: $2x + 3y > 6$



$$3y > -2x + 6$$

$$y > -\frac{2}{3}x + 2$$

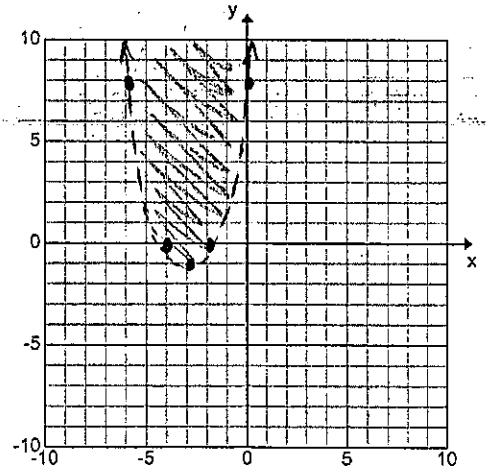
dotted line

<, >

solid line

≤, ≥

3) Graph the quadratic inequality: $y > x^2 + 6x + 8$



$$\text{Test apt: } (-3, 0)$$

$$0 > (-3)^2 + 6(-3) + 8$$

4) Create... Guidelines for Graphing Quadratic Inequalities

5) Test your guidelines...

1) Graph the Quadratic
(vertex, zeros, yint)

\geq
 \leq } solid curve

$>$
 $<$ } dotted curve

2) shade... "y" on the left
or test a point

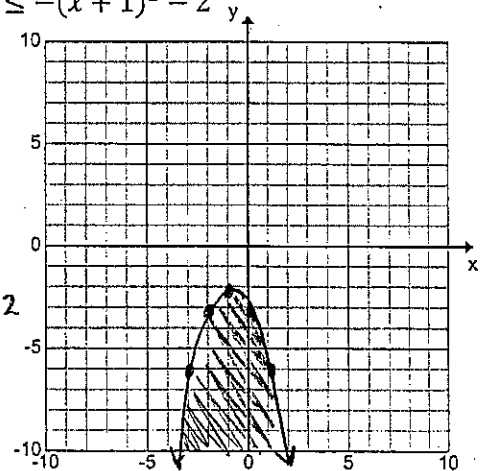
$$\text{Graph: } y \leq -(x+1)^2 - 2$$

$$\text{Test apt: } (0, -5)$$

$$-5 \leq -(0+1)^2 - 2$$

$$-5 \leq -1 - 2$$

$$-5 \leq -3 \checkmark$$



Solving Quadratics...methods??

★1) Quadratic Formula ↴

★2) Factoring $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

3) SQ Root

ex. Solve: $6x^2 + 29x = 42$

$$6x^2 + 29x - 42 = 0$$

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

$$x = \frac{7}{6}, x = -6$$

Solving Quadratic Inequalities...

1) zero on one side

2) Find the zeros... Factor or QF

3) Draw a number line

- put the zeros on the # line

- test the intervals

sign chart

- open/closed circles

- test for the sign of each interval

4) shade the sign chart → Look at the inequality in the factored form

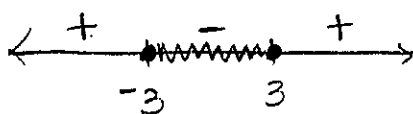
5) Interval Notation

You try: Solve $x^2 \leq 9$

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

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

$$x = 3, x = -3$$



$$[-3, 3]$$

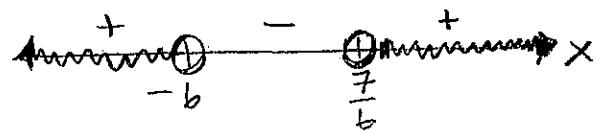
HW: Pg. 370...13-25 (odd), 35,36, 48-50

ex. Solve: $6x^2 + 29x > 42$

$$6x^2 + 29x - 42 > 0$$

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

$$x = \frac{7}{6}, x = -6$$



$$(-\infty, -6), (\frac{7}{6}, \infty)$$

ex: $(x-2)(x+11) \geq 2$

$$x^2 + 11x - 2x - 22 \geq 2$$

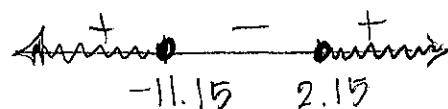
$$x^2 + 9x - 24 \geq 2$$

$$x^2 + 9x - 24 \geq 0$$

Q.F. $x = \frac{-9 \pm \sqrt{(9)^2 - 4(1)(-24)}}{2(1)}$

$$x = \frac{-9 \pm \sqrt{81 + 96}}{2}$$

$$x = \frac{-9 \pm \sqrt{177}}{2}$$



$$(-\infty, -11.15], [2.15, \infty)$$

$$x = 2.15$$

$$x = -11.15$$