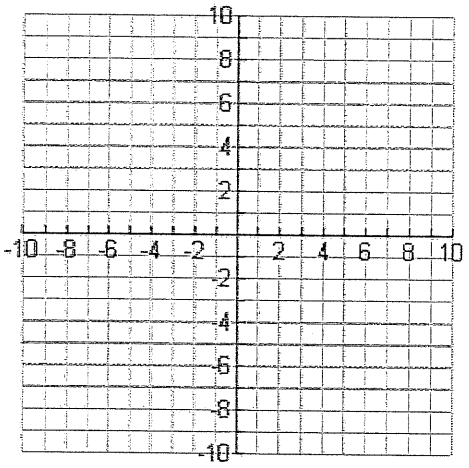
CCGPS Analytic Geometry **Quadratic Inequalities** **February 10, 2015 (Tues)**

Review: A quadratic equation is an equation that can be written in the form _____ where a, b and c are real numbers and a cannot equal zero.

Review:

Ex. 1. Graph $y = x^2 - 6x + 8$ Form: _____



Vertex: _____ x – intercept(s): _____

Positive: _____ Negative: _____

Notes:

a) $f(x) > 0$ is everything ***above*** the x-axis, ***not including*** the intercepts (use parenthesis)

b) $f(x) < 0$ is everything ***below*** the x-axis, ***not including*** the intercepts (use parenthesis)

c) $f(x) \geq 0$ is everything ***above*** the x-axis, ***including*** the intercepts (use brackets)

d) $f(x) \leq 0$ is everything ***below*** the x-axis, ***including*** the intercepts (use brackets)

Ex. 2 Find solution for: $x^2 - 6x + 8 < 0$

Steps:

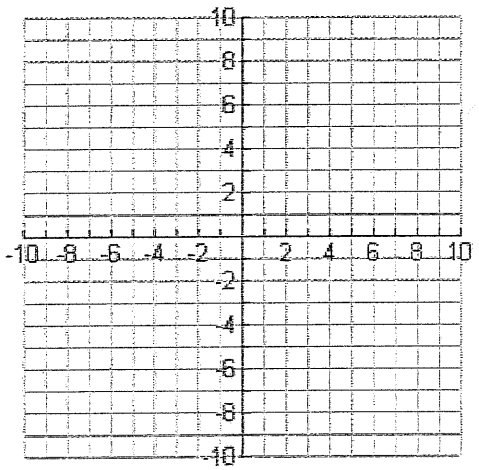
1) Confirm standard (or intercept) form
2) Find x-intercepts
3) Sketch graph of function
4) Determine solution in interval notation

Ex. 3: $x^2 - 6x + 8 \geq 0$

Ex. 4: $x^2 - 6x + 8 \leq 0$

Review:

Ex. 5. Graph $y = 3(x + 1)(x - 3)$ Form: _____



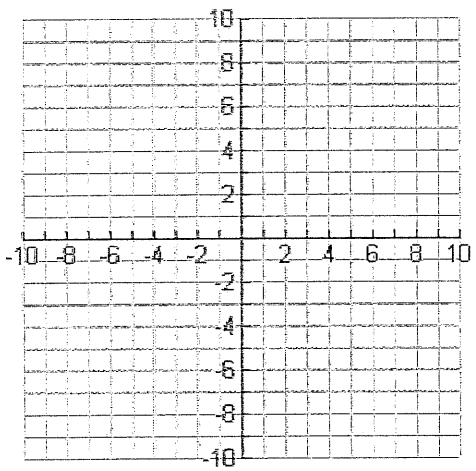
Vertex: _____ x – intercept(s): _____

Positive: _____ Negative: _____

Ex. 6: $3(x + 1)(x - 3) > 0$ _____

Ex. 7: $3(x + 1)(x - 3) \leq 0$ _____

Ex. 8. Graph $y = -x^2 + 4x - 3$ Form: _____



Vertex: _____ x – intercept(s): _____

Positive: _____ Negative: _____

Ex. 9: $-x^2 + 4x - 3 > 0$ _____

Ex. 10: $-x^2 + 4x - 3 \geq 0$ _____

CCGPS Analytic Geometry Quadratic Inequalities Homework February 10, 2015 (Tues)

Reminder Steps: 1) Confirm standard (or intercept) form 2) Find x-intercepts 3) Sketch graph of function 4) Determine solution in interval notation

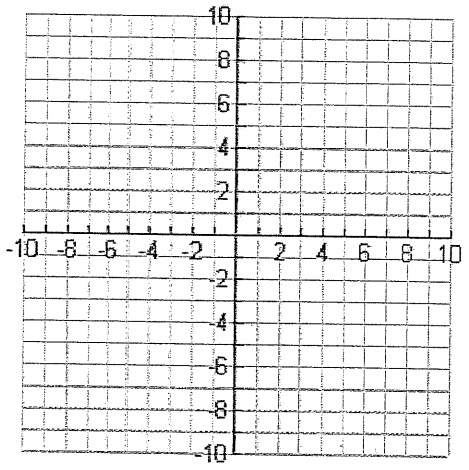
a) $f(x) > 0$ is everything ***above*** the x-axis, ***not including*** the intercepts (use parenthesis)

b) $f(x) < 0$ is everything ***below*** the x-axis, ***not including*** the intercepts (use parenthesis)

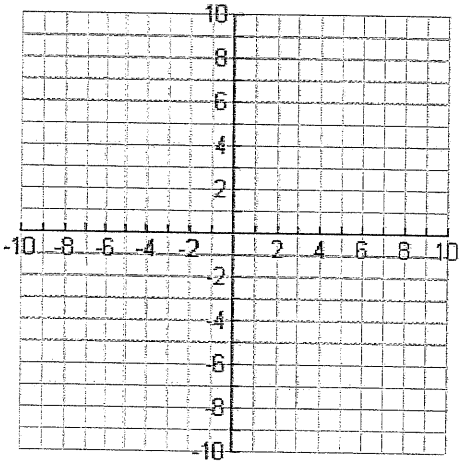
c) $f(x) \geq 0$ is everything ***above*** the x-axis, ***including*** the intercepts (use brackets)

d) $f(x) \leq 0$ is everything ***below*** the x-axis, ***including*** the intercepts (use brackets)

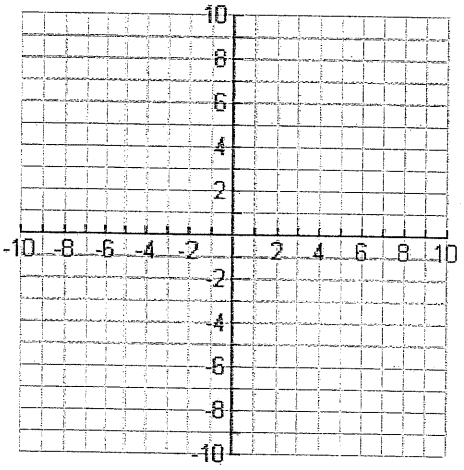
1. $x(x-4) > 0$



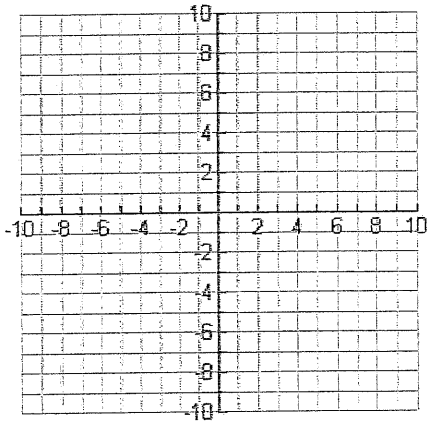
2. $x^2 + 9x \leq -18$



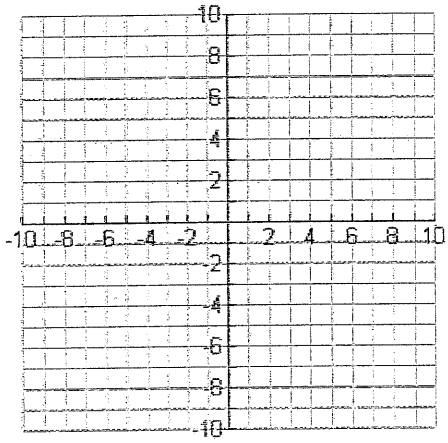
3. $x^2 + 2x \geq 8$



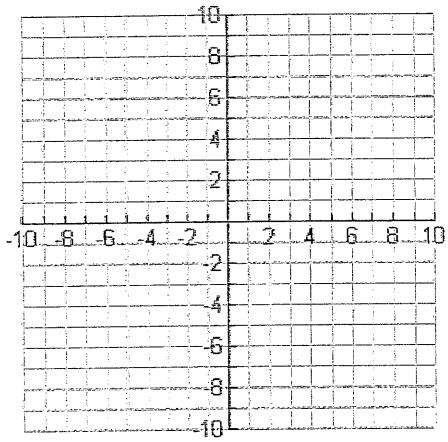
4. $(x-5)(x+1) \leq 0$ _____



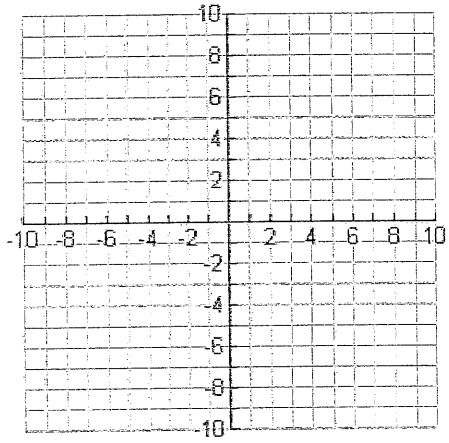
5. $x^2 + x > 2$ _____



6. $-2x(x-4) \leq 0$ _____



7. $x^2 \geq 5x - 4$ _____



CCGPS Analytic Geometry **Quadratic Inequalities** **February 10, 2015 (Tues)** Key

Review: A quadratic equation is an equation that can be written in the form $ax^2+bx+c=0$ where a, b and c are real numbers and a cannot equal zero.

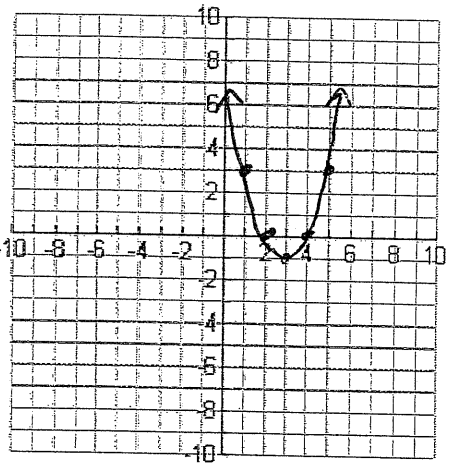
Review:

Ex. 1. Graph $y = x^2 - 6x + 8$ Form: Standard

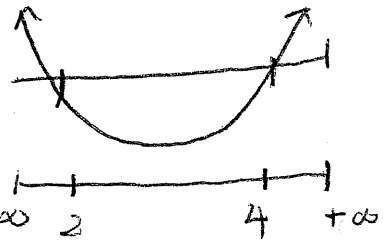
$\frac{-b}{2a} = \frac{6}{2(1)} = \frac{6}{2} = 3$

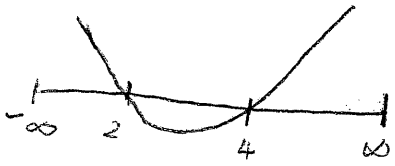
Vertex: (3, __) x – intercept(s): (2,0) (4,0)

x	y
1	3
2	0
3	-1
4	0
5	3



Positive: $(-\infty, 2) \cup (4, \infty)$ Negative: $(2, 4)$





Notes:

a) $f(x) > 0$ is everything ***above*** the x-axis, ***not including*** the intercepts (use parenthesis)

b) $f(x) < 0$ is everything ***below*** the x-axis, ***not including*** the intercepts (use parenthesis)

c) $f(x) \geq 0$ is everything ***above*** the x-axis, ***including*** the intercepts (use brackets)

d) $f(x) \leq 0$ is everything ***below*** the x-axis, ***including*** the intercepts (use brackets)

Ex. 2 Find solution for: $x^2 - 6x + 8 < 0$

(2, 4)

Steps:

1) Confirm standard (or intercept) form
2) Find x-intercepts
3) Sketch graph of function
4) Determine solution in interval notation

Ex. 3: $x^2 - 6x + 8 \geq 0$ $(-\infty, 2] \cup [4, \infty)$

brackets (positive)

Ex. 4: $x^2 - 6x + 8 \leq 0$ $[2, 4]$

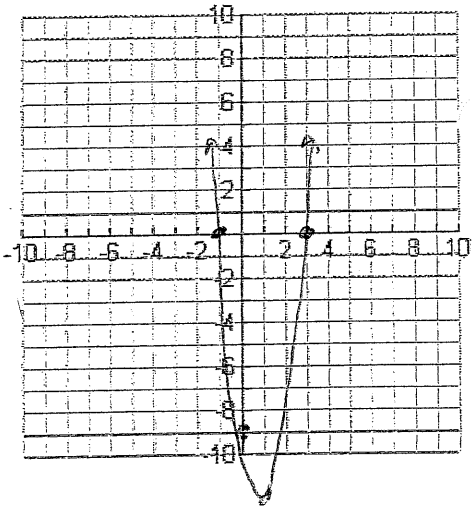
brackets

negative, brackets

Review:

Ex. 5. Graph $y = 3(x+1)(x-3)$ Form: Intercept

x	y
-1	0
0	-9
1	-12
2	-9
3	0

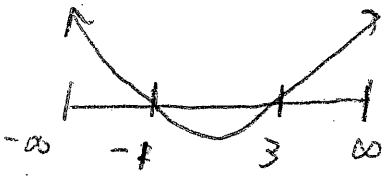


Vertex: $(1, -12)$ x – intercept(s): $(-1,0)$ $(3,0)$

Positive: $(-\infty, -1) \cup (3, \infty)$ Negative: $(-1, 3)$

Ex. 6: $3(x+1)(x-3) > 0$ $(-\infty, -1) \cup (3, \infty)$

positive, parentheses



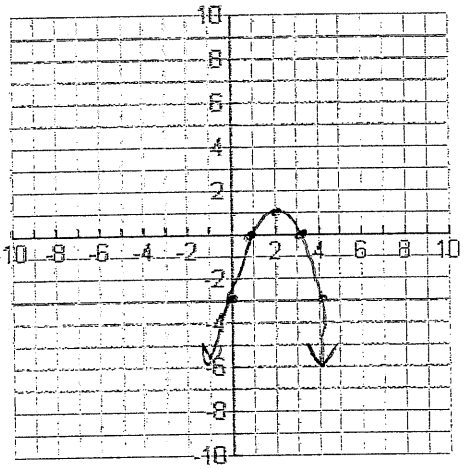
Ex. 7: $3(x+1)(x-3) \leq 0$ $[-1, 3]$

negative, brackets

Ex. 8. Graph $y = -x^2 + 4x - 3$ Form: standard

$$x = \frac{-4}{2(-1)} = 2$$

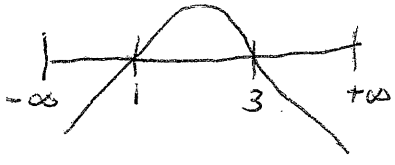
x	y
0	-3
1	0
2	1
3	0
4	-3



Vertex: $(2, 1)$ x – intercept(s): $(1,0)$ $(3,0)$

Positive: $(1, 3)$ Negative: $(-\infty, 1) \cup (3, \infty)$

Ex. 9: $-x^2 + 4x - 3 > 0$ $(1, 3)$



Ex. 10: $-x^2 + 4x - 3 \geq 0$ $[1, 3]$

CCGPS Analytic Geometry Quadratic Inequalities Homework February 10, 2015 (Tues)

Reminder Steps: 1) Confirm standard (or intercept) form 2) Find x-intercepts 3) Sketch graph of function 4) Determine solution in interval notation

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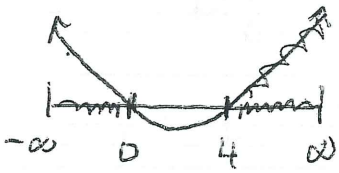
c) $f(x) \geq 0$ is everything ***above*** the x-axis, ***including*** the intercepts (use brackets)	d) $f(x) \leq 0$ is everything ***below*** the x-axis, ***including*** the intercepts (use brackets)

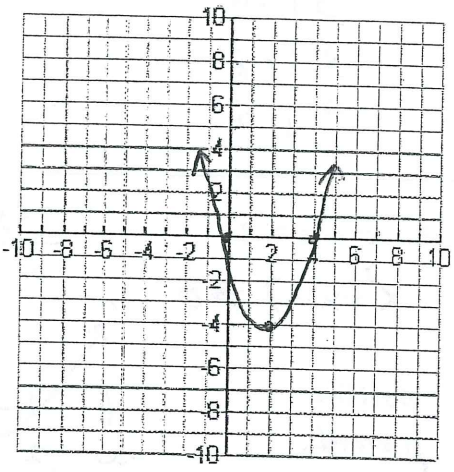
1. $x(x-4) > 0$

$(-\infty, 0) \cup (4, \infty)$



positive
parentheses

x	y
0	0
1	-3
2	-4
3	-3
4	0



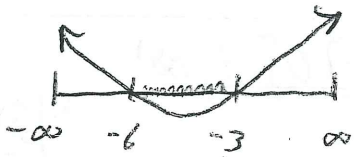
2. $x^2 + 9x \leq -18$

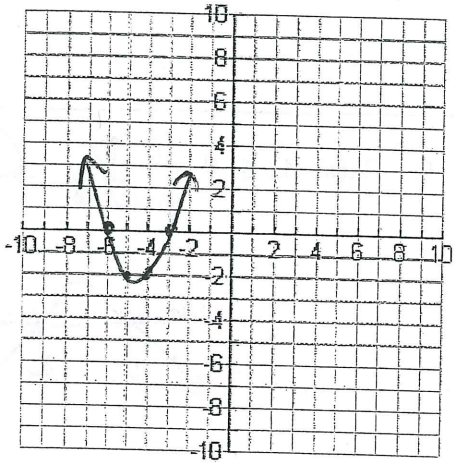
$x^2 + 9x + 18 \leq 0$

negative, brackets $[-6, -3]$

$\frac{-9}{2(1)} = -4.5$

x	y
-6	0
-5	-2
-4.5	
-4	-2
-3	0





3. $x^2 + 2x \geq 8$

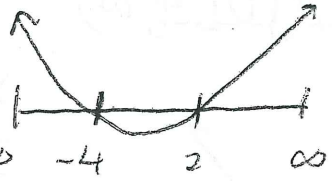
$x^2 + 2x - 8 \geq 0$

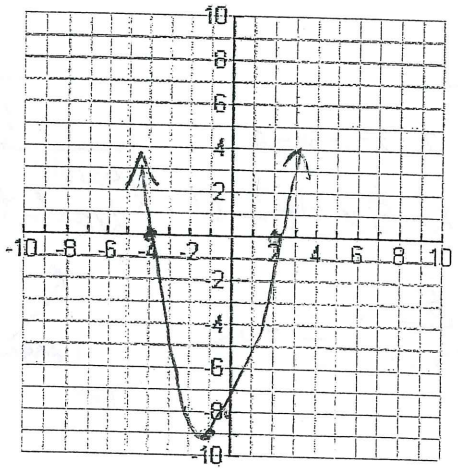
positive, bracket $(-\infty, -4] \cup [2, \infty)$

$\frac{-2}{2(1)} = -1$

x	y
-3	-5
-2	-8
-1	-9
0	-8
1	-5
-4	0
2	0

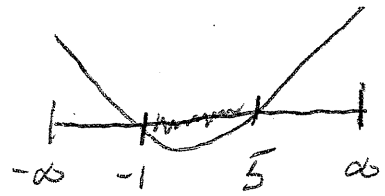
pos [ ] neg [ ]

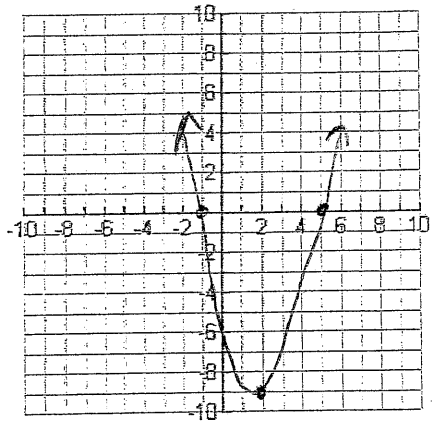




4. $(x-5)(x+1) \leq 0$ negative bracket $[-1, 5]$

x	y
0	-5
1	-8
2	-9
3	-8
4	-5

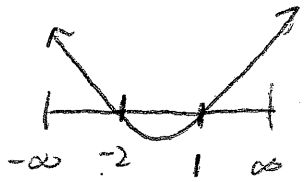




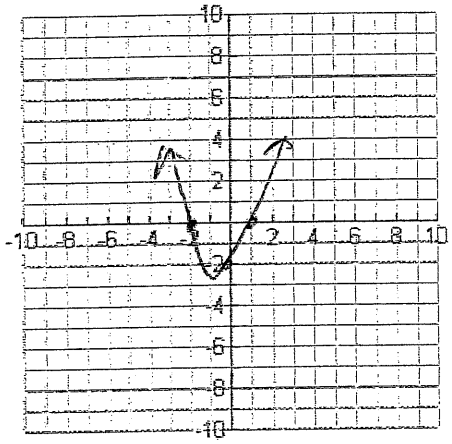
5. $x^2 + x > 2$ $(-\infty, -2) \cup (1, \infty)$

$x^2 + x - 2 > 0$

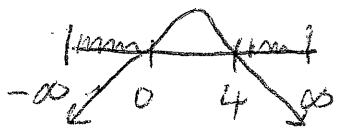
positive, parenth.



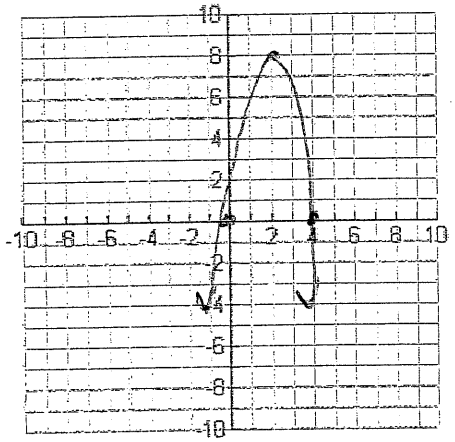
x	y
-2	0
-1	-2
-0.5	-2.25
0	-2
1	0



6. $-2x(x-4) \leq 0$ neg, bracket $(-\infty, 0] \cup [4, \infty)$



x	y
0	0
1	6
2	8
3	6
4	0

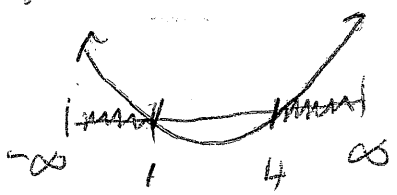


7. $x^2 \geq 5x - 4$ $(-\infty, 1] \cup [4, \infty)$

$x^2 - 5x + 4 \geq 0$

positive bracket

$\frac{5}{2(1)} = \frac{5}{2} = 2.5$



x	y
0	4
1	0
2	-2
2.5	-2.25
3	-2
4	0
0	4