MAC 1105 *Instr: Jamieson*

Quadratic Inequalities

Rockswold 3.3 *Last updated 2/6/2012*

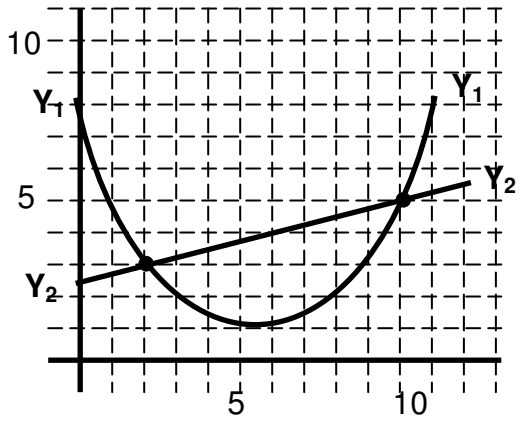
For each inequality in #1 – 8 the associated equation has zeros -7 and 2. From a – d, choose the correct solution.

1. $x^2 + 5x - 14 > 0$
2. $x^2 + 5x - 14 \geq 0$
3. $x^2 + 5x - 14 < 0$
4. $x^2 + 5x - 14 \leq 0$
5. $-x^2 - 5x + 14 > 0$
6. $-x^2 - 5x + 14 \geq 0$
7. $-x^2 - 5x + 14 < 0$
8. $-x^2 - 5x + 14 \leq 0$

a. $(-\infty,-7] \cup [2,\infty)$ **b**. $(-\infty,-7) \cup (2,\infty)$ **c**. [-7,2] **d**. (-7,2)

9. Suppose $Y_1(x)$ is the quadratic function graphed at the right, and $Y_2(x)$ is the linear function. Find the x-values satisfying each of the inequalities below. Choose your answer from a – d, ae – de.

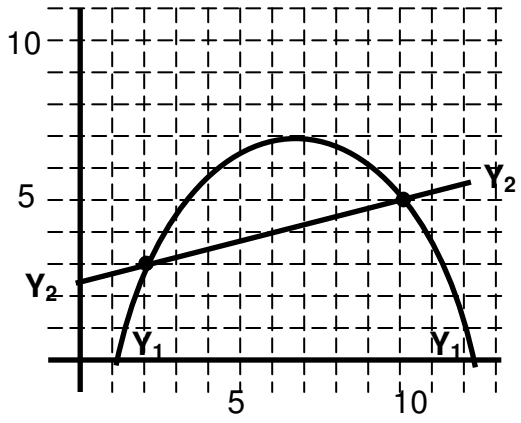
i. $Y_1 > Y_2$
ii. $Y_1 < Y_2$
iii. $Y_1 \geq Y_2$
iv. $Y_1 \leq Y_2$



a. $(-\infty,2] \cup [10,\infty)$ **b**. $(-\infty,2) \cup (10,\infty)$ **c**. [2,10] **d**. (2,10)
ae. $(-\infty,3] \cup [5,\infty)$ **be**. $(-\infty,3) \cup (5,\infty)$ **ce**. [3,5] **de**. (3,5)

10. Suppose $Y_1(x)$ is the quadratic function graphed at the right, and $Y_2(x)$ is the linear function. Find the x-values satisfying each of the inequalities below. Choose your answer from a – d, ae – de.

i. $Y_1 > Y_2$
ii. $Y_1 < Y_2$
iii. $Y_1 \geq Y_2$
iv. $Y_1 \leq Y_2$



a. $(-\infty,2] \cup [10,\infty)$ **b**. $(-\infty,2) \cup (10,\infty)$ **c**. [2,10] **d**. (2,10)
ae. $(-\infty,3] \cup [5,\infty)$ **be**. $(-\infty,3) \cup (5,\infty)$ **ce**. [3,5] **de**. (3,5)

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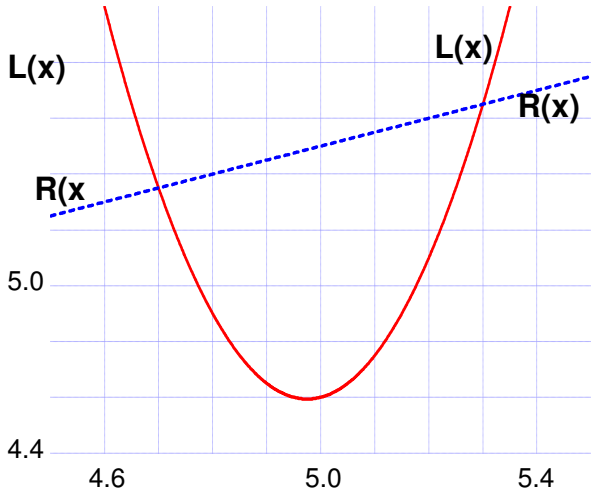
11. In the graph at the right,
$L(x) = 10x^2 - 99.5x + 252.1$, the left side of each inequality below, and
$R(x) = 0.5x + 3$, the right side of each inequality below.
Solve each inequality. Use answers **a** – **d**, **ae** – **de**.



i. $10x^2 - 99.5x + 252.1 \geq 0.5x + 3$
ii. $10x^2 - 99.5x + 252.1 \leq 0.5x + 3$
iii. $10x^2 - 99.5x + 252.1 > 0.5x + 3$
iv. $10x^2 - 99.5x + 252.1 < 0.5x + 3$

a. $(-\infty,4.7] \cup [5.3,\infty)$ **b**. $(-\infty,4.7) \cup (5.3,\infty)$ **c**. [4.7,5.3] **d**. (4.7,5.3)
ae. $(-\infty,5.35] \cup [5.65,\infty)$ **be**. $(-\infty,5.35) \cup (5.65,\infty)$ **ce**. [5.35,5.65] **de**. (5.35,5.65)

12. In the table below, $L(x) = 10x^2 - 99.5x + 252.1$, the left side of each inequality below, and $R(x) = 0.5x + 3$, the right side of each inequality below. Solve each inequality. Use answers **a** – **d**, **ae** – **de**.

X	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
L(x)	6.85	6.0	5.35	4.9	4.65	4.6	4.75	5.1	5.65	6.4	7.35
R(x)	5.25	5.3	5.35	5.4	5.45	5.5	5.55	5.6	5.65	5.7	5.75

a. $(-\infty,4.7] \cup [5.3,\infty)$ **b**. $(-\infty,4.7) \cup (5.3,\infty)$ **c**. [4.7,5.3] **d**. (4.7,5.3)
ae. $(-\infty,5.35] \cup [5.65,\infty)$ **be**. $(-\infty,5.35) \cup (5.65,\infty)$ **ce**. [5.35,5.65] **de**. (5.35,5.65)

i. $10x^2 - 99.5x + 252.1 \geq 0.5x + 3$
ii. $10x^2 - 99.5x + 252.1 \leq 0.5x + 3$
iii. $10x^2 - 99.5x + 252.1 > 0.5x + 3$
iv. $10x^2 - 99.5x + 252.1 < 0.5x + 3$

13. Use the given table to find the x-values satisfying each of the given inequalities. L(x) is linear and R(x) is quadratic.

x	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
L(x)	38	32	26	20	14	8	2	-4	-10	-16	-22	-28	-34	-40
R(x)	50	37	26	17	10	5	2	1	2	5	10	17	26	37

i. $L(x) > R(x)$
ii. $L(x) < R(x)$
iii. $L(x) \geq R(x)$
iv. $L(x) \leq R(x)$

Quadratic Inequalities

Rockswold 3.3

Last updated 2/6/2012

Answers:

1. b
2. a
3. d
4. c
5. d
6. c
7. b
8. a
9.
i. b
ii. d
iii. a
iv. c
10.
i. d
ii. b
iii. c
iv. a
11.
i. a
ii. c
iii. b
iv. d
12.
i. a
ii. c
iii. b
iv. d
13.
i. $(-2,2)$
ii. $(-\infty,-2) \cup (2,\infty)$
iii. $[-2,2]$
iv. $(-\infty,-2] \cup [2,\infty)$