

College of the Redwoods
Mathematics Department

Intermediate Algebra— Math 120
Review Notes — Exam #1

Multiple Choice Questions

Instructions: For each of the following questions, select the “best” answer and darken the corresponding oval on your scantron. Good luck!

1. Use interval notation to describe the set

$$\{x : x < 3 \text{ or } x < 5\}.$$

- (a) $(-\infty, 5)$ (b) $(-\infty, 3)$ (c) $(3, \infty)$
 (d) $(5, \infty)$ (e) None of these

2. Use interval notation to describe the set

$$\{x : x \leq -1 \text{ and } x < -2\}.$$

- (a) $(-\infty, -1)$ (b) $(-\infty, -2)$ (c) $(-\infty, -1]$
 (d) $(-\infty, -2]$ (e) None of these

3. The relation

$$\{(0, 0), (1, 2), (1, 3), (4, 2)\}$$

is a function.

- (a) True (b) False

4. Define the function f by

$$f : x \longrightarrow 3x + 5.$$

Then $f : -3 \longrightarrow ?$

- (a) -3 (b) -1 (c) 0
 (d) $-9x - 15$ (e) None of these

5. Given $f(x) = 3x + 2$ and $g(x) = 5 - x$, what is $g(7)$?

- (a) 23 (b) -2 (c) $35 - 7x$
 (d) -9 (e) None of these

6. Given $f(x) = 3x + 2$ and $g(x) = 5 - x$, what is $g(f(2))$?

- (a) 2 (b) -2 (c) -3
 (d) -7 (e) None of these

7. Given $f(x) = 5x - 9$, what is $f(a + 2)$?

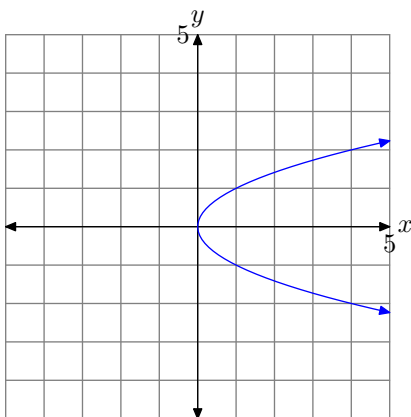
- (a) $a + 2$ (b) $3 - 5a$ (c) $(5x - 9)(a + 2)$
 (d) $5a + 1$ (e) None of these

8. Use interval notation to describe the domain of the function defined by

$$f(x) = \sqrt{9 - x}.$$

- (a) $[9, \infty)$ (b) $(9, \infty)$ (c) $(-\infty, 9)$
 (d) $(-\infty, 9]$ (e) None of these

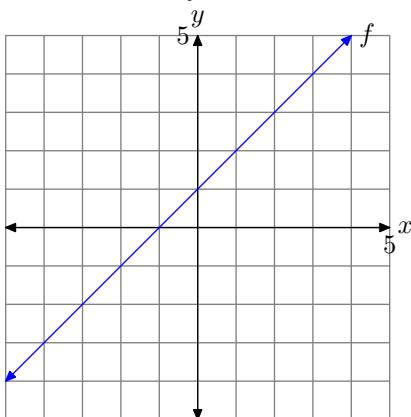
9. Consider the graph of the relation that follows.



The graph pictured above is the graph of a function.

- (a) True (b) False

10. Consider the following graph of the function f .



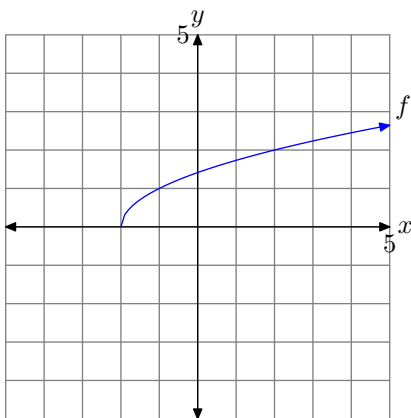
Use the graph of f to determine the value of $f(-3)$.

- (a) -4 (b) -3 (c) -2
 (d) -1 (e) None of these

11. Use the graph of the function in Exercise 10 to determine a solution of $f(x) = 3$.

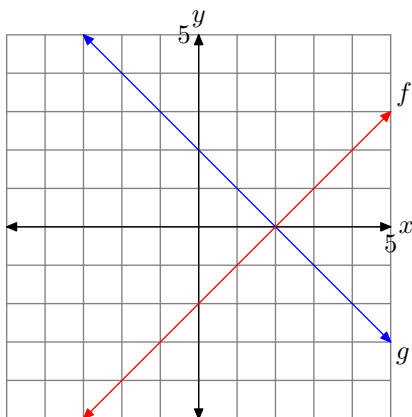
- (a) 4 (b) 3 (c) 2
 (d) 1 (e) None of these

12. Determine the range of the function pictured below.



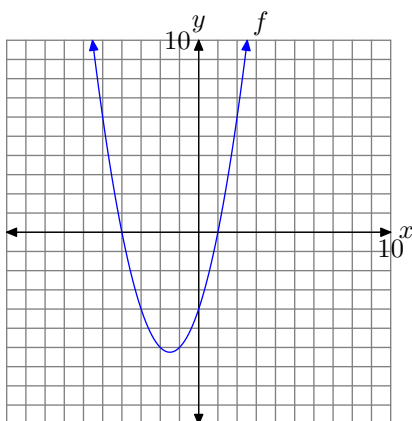
- (a) $(-\infty, -2]$ (b) $[-2, \infty)$ (c) $(-\infty, 0]$
 (d) $[0, \infty)$ (e) None of these

13. Given the graphs of f and g below, use interval notation to describe the solution of $f(x) \leq g(x)$.



- (a) $(-\infty, 2]$ (b) $[2, \infty)$ (c) $(-\infty, 0]$
 (d) $[0, \infty)$ (e) None of these

14. Given the graph of f below, use interval notation to describe the solution of $f(x) \leq 0$.



- (a) $(-\infty, -4] \cup [1, \infty)$ (b) $[-4, 1]$ (c) $(-\infty, -4) \cup (1, \infty)$
 (d) $(-4, 1)$ (e) None of these

Instructions. Please place the solution of each of the following questions on your own paper. You must show all supporting work to receive credit for your solution. If you are asked to write a response, grammar, spelling, punctuation, and style are important.

EXERCISE 1.

Using hand calculations only, solve the equation

$$Ax + By = C$$

for y . You may assume that A , B , and C are nonzero.

EXERCISE 2. Using hand calculations only, solve each of the following inequalities for x . Sketch your solution on a number line, then use both set-builder and interval notation to describe your solution set.

(a) $3 - 2x < 5$ or $2x + 1 \leq 6$ (b) $-3 \leq x - \frac{x-1}{2} < 5$

EXERCISE 3. Consider the inequality

$$1.2x^2 - 2.56 \geq 11.2 - 1.25x. \quad (1)$$

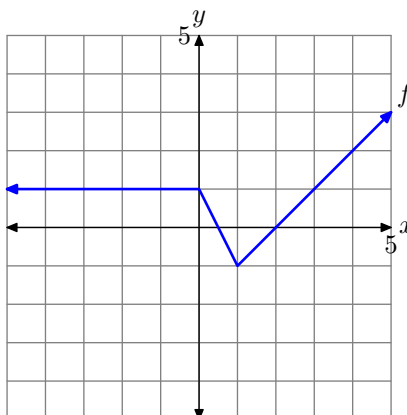
- Load each side of the inequality into your graphing calculator. Adjust the viewing window so that all points of intersection are visible in the viewing window. Make a reasonable copy of this final viewing window on your examination paper. Label and scale each axis with x_{\min} , x_{\max} , y_{\min} , and y_{\max} . Label each graph with its equation.
- Use the **intersect** utility in the **CALC** menu to determine the points of intersection. Drop dashed vertical lines through each point of intersection, then shade and label the solution of the inequality (1) on the x -axis of your plot.
- Use set-builder notation to describe your solution set.

EXERCISE 4. Consider the inequality

$$15.56 - 12.3x - 1.25x^2 > 0. \quad (2)$$

- Load the left-hand side of the inequality into your graphing calculator. Adjust the viewing window so that the “turning point” of the parabola is visible in the viewing window as well as both x -intercepts. Make a reasonable copy of this final viewing window on your examination paper. Label and scale each axis with x_{\min} , x_{\max} , y_{\min} , and y_{\max} . Label the graph with its equation.
- Use the **zero** utility in the **CALC** menu to determine the x -intercepts of the graph of the function. Drop dashed vertical lines through each x -intercept, then shade and label the solution of the inequality (2) on the x -axis of your plot.
- Use both set-builder and interval notation to describe your solution set.

EXERCISE 5. Consider the graph of f given below.



For the questions that follow, label and scale each axis, and make sure that all “key points” are accurately plotted. You may use tables if you wish, but they are not required.

- Set up a coordinate system on a sheet of graph paper and sketch the graph of $y = 2f(x)$.
- Set up a second coordinate system on a sheet of graph paper and sketch the graph of $y = -f(x)$.

Solutions to Exercises**Exercise 1.**

$$\begin{aligned} Ax + By &= C \\ By &= -Ax + C \\ y &= \frac{-Ax + C}{B} \end{aligned}$$

Alternatively, you can use the distributive property to divide both of these by B to get

$$y = -\frac{A}{B}x + \frac{C}{B}.$$

Exercise 1

Exercise 2(a)

$$\begin{array}{ll} 3 - 2x < 5 & \text{or} \quad 2x + 1 \leq 6 \\ -2x < 2 & \quad \quad 2x \leq 5 \\ x > -1 & \quad \quad x \leq 5/2 \end{array}$$



Thus, the solution is

$$\mathbb{R} = (-\infty, \infty).$$

□

Exercise 2(b)

$$\begin{aligned} -3 &\leq x - \frac{x-1}{2} < 5 \\ -6 &\leq 2x - (x-1) < 10 \\ -6 &\leq 2x - x + 1 < 10 \\ -6 &\leq x + 1 < 10 \\ -7 &\leq x < 9 \end{aligned}$$

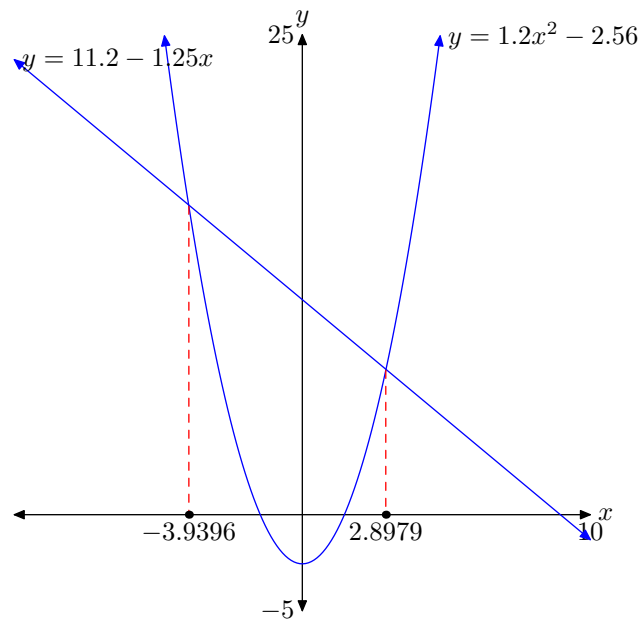


The solution is

$$[-7, 9) = \{x : -7 \leq x < 9\}.$$

□

Exercise 3(b)

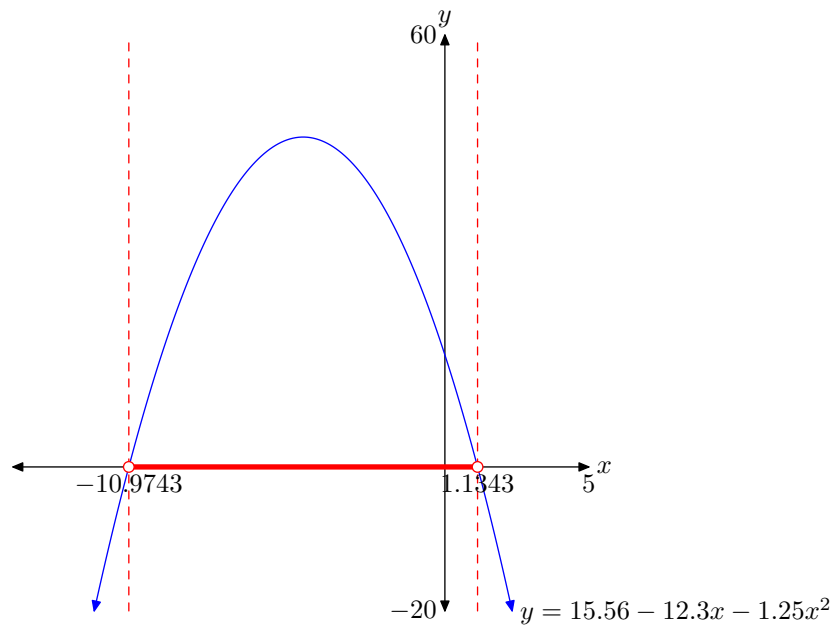


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Exercise 3(c)

$$\{x : x = -3.9396, 2.8979\}$$

□

Exercise 4(b)

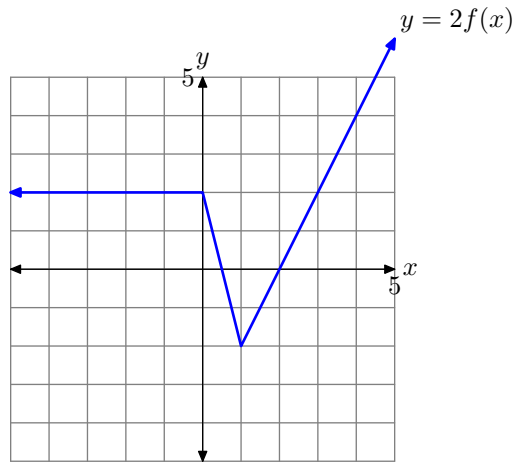
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Exercise 4(c) The solution is

$$(-10.9743, 1.1343) = \{x : -10.9743 < x < 1.1343\}.$$

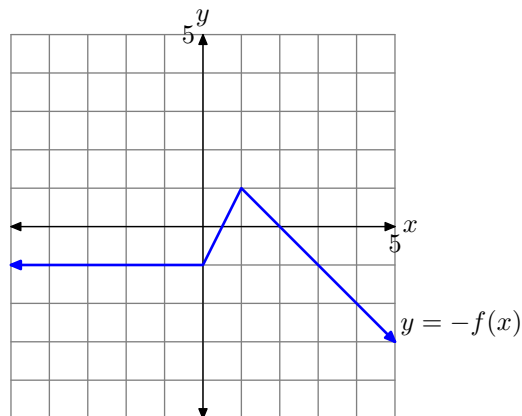
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Exercise 5(a) To obtain the graph of $y = 2f(x)$ from the graph of $y = f(x)$, double each value of y .



□

Exercise 5(b) To obtain the graph of $y = -f(x)$ from the graph of $y = f(x)$, reflect the graph of $y = f(x)$ across the x -axis.



□

Solutions to Multiple Choice Questions**Solution to Question 1:** $(-\infty, 5)$ **Solution to Question 2:** $(-\infty, -2)$ **Solution to Question 3:** False.**Solution to Question 4:** None of these.**Solution to Question 5:** -2 **Solution to Question 6:** -3 **Solution to Question 7:** $5a + 1$ **Solution to Question 8:** $(-\infty, 9]$ **Solution to Question 9:** False.**Solution to Question 10:** -2 **Solution to Question 11:** 2 **Solution to Question 12:** $[0, \infty)$ **Solution to Question 13:** $(-\infty, 2]$ **Solution to Question 14:** $[-4, 1]$