

College of the Redwoods
Mathematics Department

Intermediate Algebra— Math 120
Exam #4B

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. If

$$f(x) = \begin{cases} 4 - x, & \text{if } x < 0 \\ 3, & \text{if } x \geq 0, \end{cases}$$

evaluate $f(2)$.

(a) 0 (b) 7 (c) -2

(d) 3 (e) None of these

2. If f is the piecewise function of Exercise 1, evaluate $f(-3)$.

(a) 0 (b) 7 (c) -2

(d) 3 (e) None of these

3. If $x < 2$, then $|2x - 4|$ equals

(a) $-2x + 4$ (b) $2x + 4$ (c) $2x - 4$

(d) $-2x - 4$ (e) None of these

4. Which of the following best describes the solution of $|x| < 2$?

(a) $(-2, 2)$ (b) $(-\infty, -2) \cup (2, \infty)$ (c) $[-2, 2]$

(d) $(-\infty, -2] \cup [2, \infty)$ (e) None of these

5. Which of the following best describes the solution of $|x| > 2$?

(a) $(-2, 2)$ (b) $(-\infty, -2) \cup (2, \infty)$ (c) $[-2, 2]$

(d) $(-\infty, -2] \cup [2, \infty)$ (e) None of these

6. One of the solutions of $x^2 - 6x = 6$ is

(a) $(6 + \sqrt{60})/4$ (b) $(-6 - \sqrt{60})/2$ (c) $(6 + \sqrt{60})/2$

(d) $(-6 + \sqrt{60})/2$ (e) None of these

7. What is the equation of the axis of symmetry of $y = 2x^2 - 3x - 9$?

(a) $x = 3/2$ (b) $x = 3/4$ (c) $x = -3/2$

(d) $x = -3/4$ (e) None of these

8. Find all values of k so that the parabola $y = kx^2 - 5x - 6$ has two x -intercepts.

(a) $k = -25/4$ (b) $k < -25/24$ (c) $k > -25/24$

(d) $k < -24/25$ (e) None of these

9. One factor of $x^2 - 18x - 40$ is

(a) $x - 4$ (b) $x + 5$ (c) $x - 10$

(d) $x - 20$ (e) None of these

10. One factor of $2x^2 - 23x - 12$ is

(a) $2x + 3$ (b) $2x + 1$ (c) $x + 6$

(d) $x - 4$ (e) None of these

11. What is the maximum value of the function $f(x) = 12 - 2x - x^2$?

(a) 11 (b) 12 (c) 13

(d) 1 (e) None of these

Instructions. Please place the solution of each of the following questions on graph paper. You must show all supporting work to receive credit for your solution.

EXERCISE 1. Sketch the piecewise function

$$f(x) = \begin{cases} -2, & \text{if } x < -2 \\ 2, & \text{if } -2 \leq x < 2 \\ 4, & \text{if } x \geq 2 \end{cases}$$

on graph paper. Label and scale each axis appropriately. Draw all lines with a ruler.

EXERCISE 2. For the inequality

$$|5 - 2x| \geq 7 + \frac{1}{2}x,$$

perform each of the following tasks.

- Load each side of the inequality into your graphing calculator and sketch their graphs. Copy the result onto graph paper and label each graph with its equation. Use a ruler to draw all lines.
- Use the **intersect** utility on your calculator to determine the points of intersection. Shade and label the solution of the inequality on the x -axis of your graph.

EXERCISE 3. Solve each of the following inequalities algebraically.

(a) $3 + 7|x - 5| > 5|x - 5| + 9$

(b) $\left|x - \frac{x + 4}{9}\right| \leq 2$

EXERCISE 4. For the quadratic function

$$f(x) = x^2 - 4x - 14,$$

perform each of the following tasks.

- Complete the square to place the function in vertex form. On graph paper, plot the vertex and label it with its coordinates. Use a ruler to draw the axis of symmetry and label it with its equation.
- Plot the y -intercept on your plot and label it with its coordinates.
- Use the quadratic formula to find the zeros of the given function. Approximate each to the nearest tenth. Plot the x -intercepts of the function, then label them with their **exact** coordinates.
- Draw the parabola. Use interval notation to describe the domain and range of the parabola.

EXERCISE 5. Find two numbers that differ by 6 so that their product is a minimum. Note: To receive credit for this exercise, you must perform each of the following tasks.

- Let x and y represent the numbers. Write an equation that models the fact that their difference is 6.

- Let P represent the product of the two numbers. Write P as function of x and y .
- Use the first equation to eliminate one of the variables in the expression for P , then use the shortcut for finding the vertex to find the value that minimizes P .
- Find the second number.

Solutions to Multiple Choice Questions**Solution to Question 1:** 3**Solution to Question 2:** 7**Solution to Question 3:** $-2x + 4$ **Solution to Question 4:** $(-2, 2)$ **Solution to Question 5:** $(-\infty, -2) \cup (2, \infty)$ **Solution to Question 6:** $(6 + \sqrt{60})/2$ **Solution to Question 7:** $x = 3/4$ **Solution to Question 8:** $k > -25/24$ **Solution to Question 9:** $x - 20$ **Solution to Question 10:** $2x + 1$ **Solution to Question 11:** 13