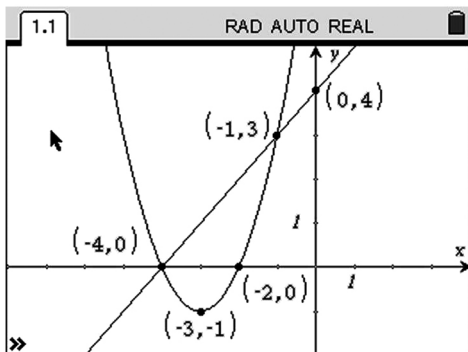


# Unit 4 Test

## Multiple Choice

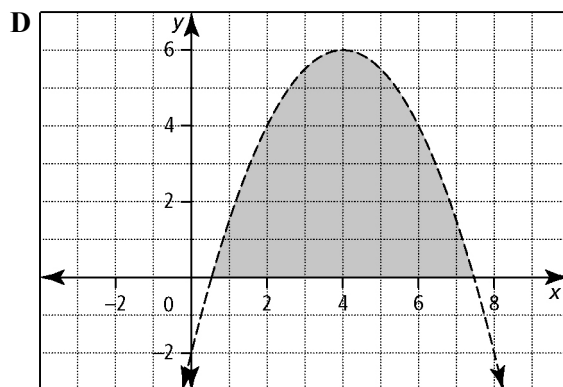
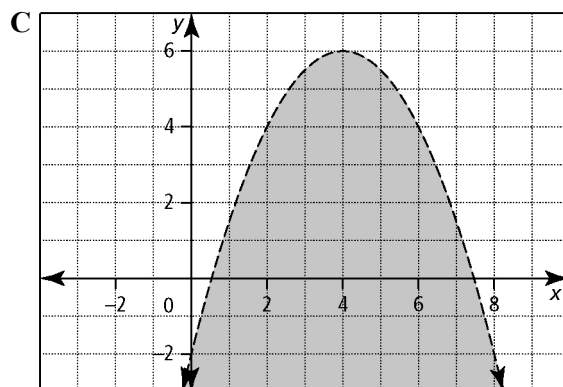
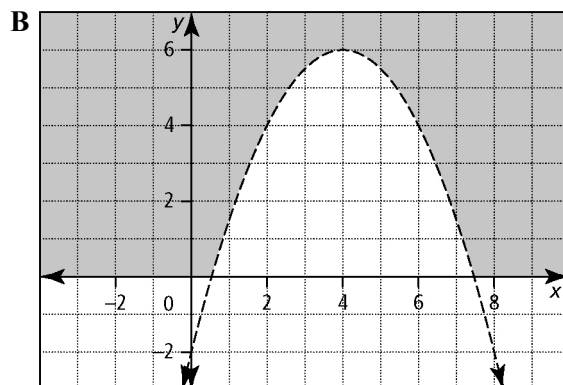
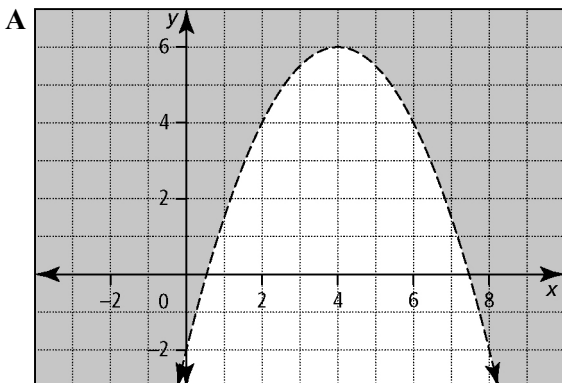
For #1 to 5, choose the best answer.

1. The solution to the system of linear-quadratic equations shown on the graph is

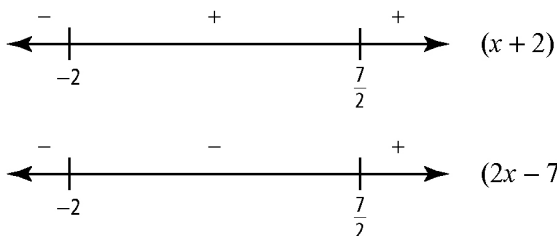


- A  $(-1, 3)$       B  $(-3, -1)$   
 C  $(-4, 0)$  or  $(-1, 3)$       D  $(-4, 0)$  or  $(-2, 0)$
2. How many solutions are there for the following system of equations?
- $$y = 2(x - 5)^2 - 2$$
- $$y = 2(x - 4)^2 - 3$$
- A zero    B one    C two    D an infinite number
3. Which test point should not be used to determine the solution region for the linear inequality  $y < -\frac{1}{3}x + 2$ ?

- A  $(0, 0)$     B  $(1, 1)$     C  $(3, 1)$     D  $(-2, 1)$
4. Which graph represents the inequality  $y > -\frac{1}{2}x^2 + 4x - 2$ ?



5. A student uses sign analysis to determine the solution set for the inequality  $2x^2 - 3x - 16 \geq -2$ . The partial solution is shown.



The solution set for the inequality  $2x^2 - 3x - 16 \geq -2$  is

- A  $\left\{x \mid -2 \leq x \leq \frac{7}{2}, x \in \mathbb{R}\right\}$   
 B  $\left\{x \mid x \leq -2 \text{ or } x \geq \frac{7}{2}, x \in \mathbb{R}\right\}$   
 C  $\{x \mid x \geq -2, x \in \mathbb{R}\}$   
 D  $\left\{x \mid x \geq \frac{7}{2}, x \in \mathbb{R}\right\}$

### Numerical Response

Complete the statements in #6 to 8.

6. The solutions to a system of linear-quadratic equations can be represented by ordered pairs in the form  $(a, b)$ . The largest value of  $b$ , to the nearest tenth, for the following system of equations is  $\square$ .

$$x + 2y - 5 = 0$$

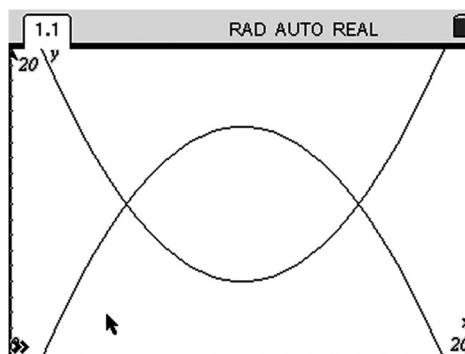
$$2x^2 - 5x + y - 1 = 0$$

7. For the quadratic-quadratic system of equations shown, the value of  $k$  that would result in an infinite number of solutions is  $\square$ .

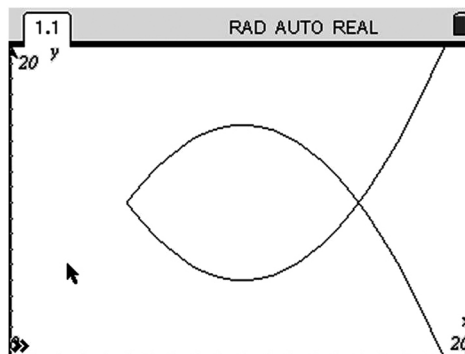
$$3x^2 - 5x + ky - 10 = 0$$

$$12x^2 - 20x + 5y - 40 = 0$$

8. You can use a graphing calculator to create parabolic art. You can draw a fish by graphing  $y = 0.2(x - 10)^2 + 5$  and  $-0.2(x - 10)^2 + 15$ , using window settings of 0 to 20 for both axes. You get the following results.



To graph only the fish, as shown below, the domain of the graphs is restricted to  $\{x \mid x \geq a, a \in \mathbb{R}\}$ , where  $a = \square$ .

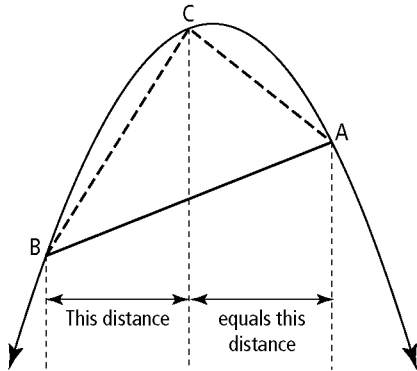


### Written Response

9. Joseph has a budget of \$40 each month for movies and video games. Renting a movie costs \$5 and renting a video game costs \$8.
- Write an inequality to represent the number of movies and games that Joseph can rent within his budget. State what your variables represent.
  - Graph the solution.
  - Explain how the solution to the inequality relates to the situation.



- 10.** The Greek mathematician Archimedes used a method of decomposing a portion of a parabola into triangles to determine the area under the parabola. The parabola shown can be modelled by the equation  $y = -2x^2 + 15x - 21$ , and the solid line can be modelled by  $x - y - 1 = 0$ .



- 11.** Demonstrate one of the strategies to solve the inequality  $6x^2 - 19x + 15 < 5$ . You may wish to use case analysis, roots and test points, or sign analysis.

- Determine the points of intersection of the line and the parabola.
- Explain in words how you could determine the coordinates of vertex C of the triangle.

