Chapter 8 Test

Multiple Choice

For#1 to #5, select the best answer.

1. The sum of two integers is −5. When 10 times the larger number is subtracted from the square of the smaller number, the result is 34. Which system of equations could be used to determine the two integers?
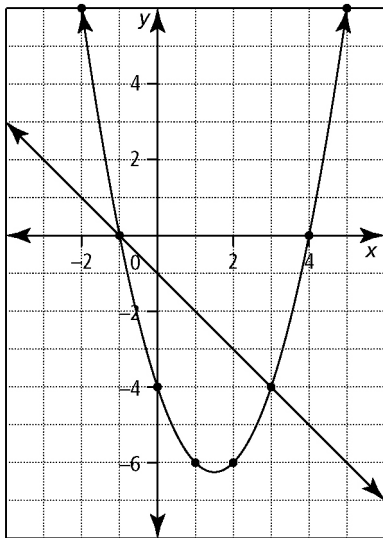
   A $x + 5 = -y$
   $x^2 - 10y = 34$

   B $x + 5 = y$
   $y^2 - 10x = 34$

   C $x + y = -5$
   $x^2 - 34 = -10y$

   D $x + y = 5$
   $x^2 - 10y = 34$

2. Given the graphs of a linear function and a quadratic function, what is the solution set of the system of equations?

   A $\{(-4, 0), (3, -4)\}$

   B $\{(-1, 0), (3, -4)\}$

   C $\{(-1, 0), (4, 0)\}$

   D $\{(1, -6), (2, -6)\}$

3. A rectangular field is enclosed by 600 m of fencing. A second rectangular field, which is alongside a river, has the same area and is also enclosed by 600 m of fencing. However, this second field has fencing on only three sides because there is no need for fencing along the riverbank. The system of quadratic equations that could be used to determine the dimensions of the two fields is

   A $A = x^2 + 300x$
   $A = 2x^2 + 60x$

   B $A = -x^2 + 300x$
   $A = -2x^2 + 60x$

   C $A = -x^2 + 300x$
   $x + y = 300$

   D $A = -2x^2 + 600x$
   $2x + y = 600$

4. What is the solution to the following linear-quadratic system of equations?

   $y = 3x - 3$
   $y = -x^2 + 4x - 1$

   A $\{(-1, 3), (2, -6)\}$

   B $(2, 3)$

   C $(-1, 2)$

   D $\{(-1, -6), (2, 3)\}$

5. How many real number solutions exist for the following quadratic-quadratic system of equations?

   $y = -2x^2 + 2x - 7$
   $y = x^2 - 3x + 1$

   A zero

   B one

   C two

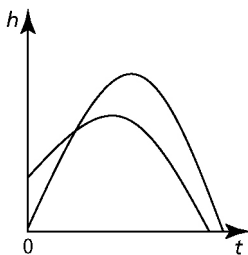   **D** an infinite number

Short Answer

6. Determine the solution to the following system of equations algebraically.

$y = -x^2 - 6x + 3$

$y = -x + 3$

7. Describe a situation that could be modelled by the graph shown, where h is height above the ground and t represents time.

8. Give an example of a quadratic function that would produce an infinite number of solutions in a quadratic-quadratic system of equations with $y = x^2 + 6x - 5$.

9. a) Verify that (3, 14) is a solution to the following system of equations.

$2x^2 + x - 7 = y$

$3x + y - 23 = 0$

b) Are there any other solutions to this system of equations?

10. Determine algebraically the solution set to the following quadratic-quadratic system of equations.

$y = -2x^2 - 3x + 3$

$y = -x^2 - x + \dfrac{7}{4}$

11. Determine the value of k and m if $(-3, 4)$ is a solution to each of the following systems of equations.

a) $x^2 + kx - 2y + m = 0$

$x^2 + 6x + y + m = 0$

b) $y = -2x^2 - kx - m$

$y = mx + 10$

12. The point (2, 5) is a solution to the following system of equations.

$y = -\dfrac{1}{3}(x - 2)^2 + 5$

$y = 2(x - k)^2 - 3$

a) How many possible solutions are there for k? Explain how you determined your answer.

b) Determine the value(s) for k.

c) For one of these values of k, determine the other solution to the system of equations. Express your answer to the nearest hundredth.

Extended Response

13. In the summer, children enjoy the spray park in a community recreation area. The streams of water spraying from two of the fountains follow parabolic paths modelled by the equations $h = -\dfrac{9}{16}d^2 + 4d$ and

$h = -\dfrac{5}{8}d^2 + \dfrac{45}{8}d - \dfrac{47}{8}$, where h is the height, in metres, of the water stream, and d is the distance, in metres, from the centre of the fountain.

a) Solve the system of equations graphically. Round solutions to the nearest tenth.

b) Explain the meaning of the solution to this system of equations.

14. The dimensions of a rectangle are represented by the expressions $x - 4$ and $x - 9$.

a) If the perimeter can be expressed as $2y$ and the area represented by $3y - 9$, write equations in terms of x and y for the perimeter and the area of the rectangle.

b) Solve the system of equations to determine the values of x and y.

c) Determine the dimensions of the rectangle.

d) What are the values of the perimeter and area of the rectangle?