Course: MFM2P Gr. 10 Applied **Lesson: 45**

Unit: Representing Quadratic Relations **Topic: Prerequisite Skills**

- ***homework check:*** **none**

- ***note:*** **Prerequisite Skills**

Recall, a relation is linear if the first differences are constant. A relation is quadratic if the second differences are constant. If neither the first or second differences are constant, the relation is neither linear nor quadratic.

To solve a linear system, we can graph and find the point of intersection or we can use substitution or elimination to solve algebraically. It is up to the student to choose the best solution method if none is suggested. Substitution can also be used to find a value when given an algebraic relation.

- ***homework assignment:*** **FM10 p. 318 # 1 – 7**

Get Ready!

Relations

1. Graph each relation.

a)

x	y
−2	7
−1	10
0	13
1	16
2	19
3	22

b)

x	y
−2	−2
−1	−5
0	−6
1	−5
2	−2
3	3

c)

x	y
−2	−8
−1	−7
0	−6
1	−5
2	−4
3	−3

d)

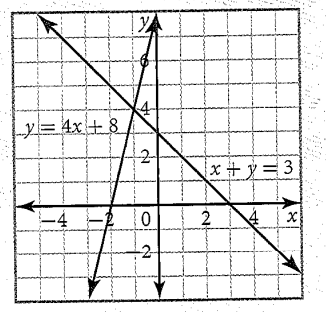
x	y
−2	9
−1	3
0	1
1	3
2	9
3	19

2. Refer to the relations in question 1. Is each relation linear, quadratic, or neither? How do you know?

Linear Systems

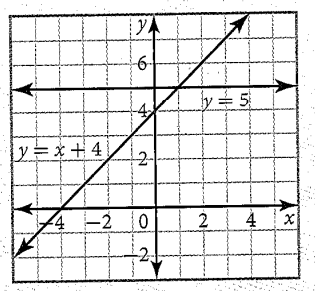
3. Find the solution to each linear system. The first part has been done for you.

a)



The solution is the point of intersection, (−1, 4).

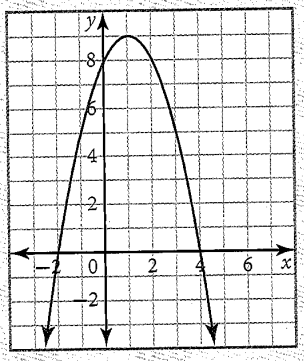
b)



Key Features of Quadratic Relations

4. For each parabola, identify the coordinates of the vertex, the equation of the axis of symmetry, and the x- and y-intercepts. The first part has been done for you.

a)

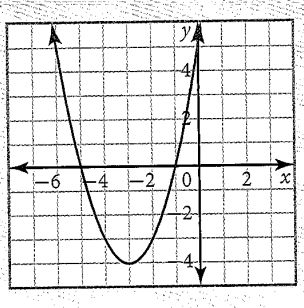


The coordinates of the vertex are (1, 9).

The equation of the axis of symmetry is $x = 1$.

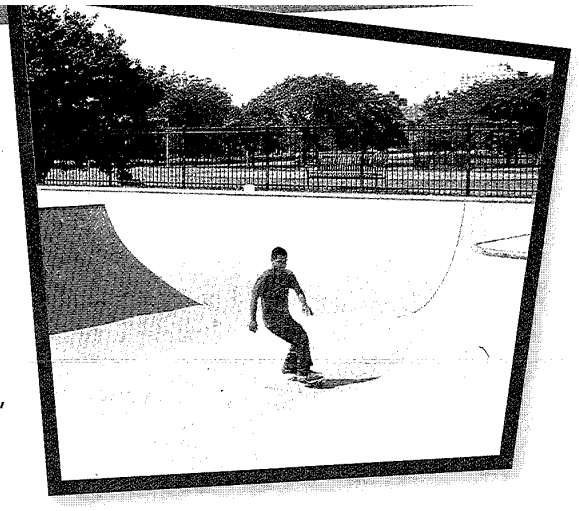
The x-intercepts are −2 and 4, and the y-intercept is 8.

b)

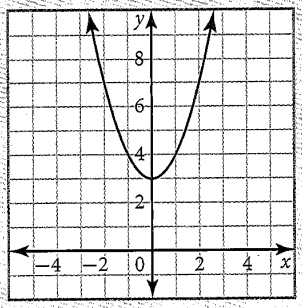


Chapter Problem

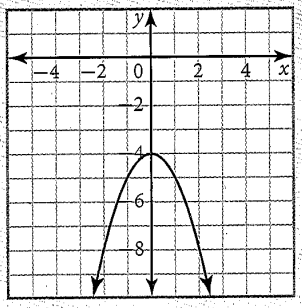
The municipal recreation and parks committee approved a motion at its last meeting to build a skateboard arena in a neighbourhood park. The arena will be enclosed by a chain-link fence 2 m high. The city budget allows for 80 m of fencing. The arena will be rectangular and will contain two skateboard ramps. One ramp will have the shape of a parabola that opens upward, and the other ramp will have the shape of a parabola that opens downward. How could you determine the dimensions of the skateboard arena so it has the greatest area possible?



c)



d)



Algebraic Operations

5. Substitute the known value into the equation, then solve for the indicated variable. The first part has been done for you.

a) Find the value of x when $y = -2$.

$y = -3x + 7$

$-2 = -3x + 7$

$-9 = -3x$

$x = 3$

b) Find the value of y when $x = -1$.

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

c) Find the value of x when $y = 2$.

$y = x^2 - 7$

6. Expand and simplify each expression.

a) $-4x(x - 2)$ **b)** $(x + 5)(x + 3)$

c) $(x - 3)(x + 1)$

7. Factor each polynomial.

a) $-5x^2 + 10$ **b)** $3x^2 - 15x$

c) $x^2 + 7x - 18$