

LESSON

Algebra Lab**9-2****Characteristics of Quadratic Functions***Use with Lesson 9-2*

Materials needed: calculator, 5 colored pencils or markers

ActivityFill in the table by substituting the given values for x .

A	B	C	D	E	F
x	$y = x^2$	$y = x^2 + 1$	$y = x^2 + 3$	$y = x^2 - 2$	$y = x^2 - 4$
-5					
-3					
-1					
0					
1					
3					
5					

1. Examine columns B and C. What relationship do you observe between the elements in the two columns?

2. Examine columns B and D. What relationship do you observe between the elements in the two columns?

3. Examine columns B and E. What relationship do you observe between the elements in the two columns?

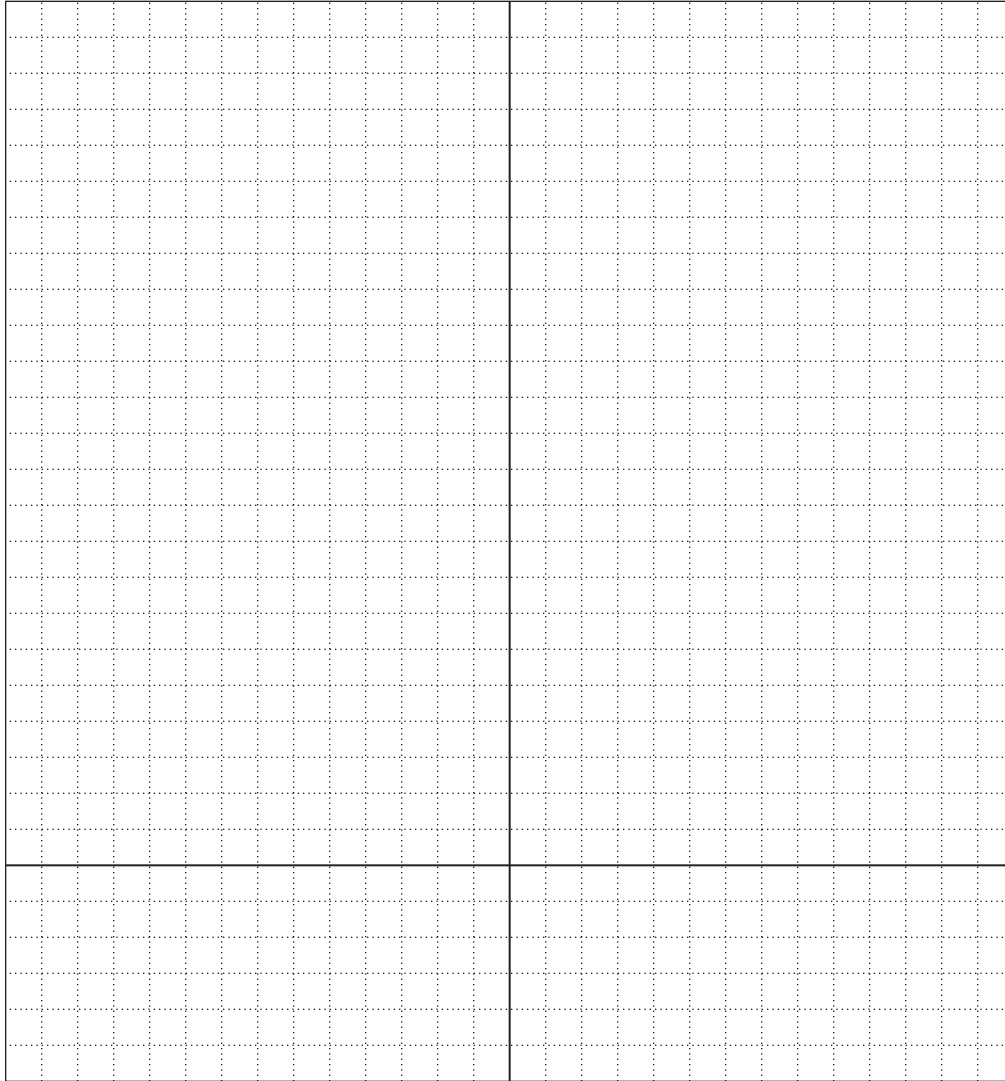
4. Examine columns B and F. What relationship do you observe between the elements in the two columns?

Use a different colored marker for each of the five steps below.

Step 1 Use the table (columns A and B) to sketch the graph of $y = x^2$.**Step 2** Use the table (columns A and C) to sketch the graph of $y = x^2 + 1$.**Step 3** Use the table (columns A and D) to sketch the graph of $y = x^2 + 3$.**Step 4** Use the table (columns A and E) to sketch the graph of $y = x^2 - 2$.**Step 5** Use the table (columns A and F) to sketch the graph of $y = x^2 - 4$.

LESSON **Algebra Lab**

9-2 **Characteristics of Quadratic Functions** continued



Examine the five graphs. Compare each graph to the original $y = x^2$.

5. In what direction and by how many units did the graph of $y = x^2 + 1$ shift?

6. In what direction and by how many units did the graph of $y = x^2 - 2$ shift?

CONCLUSION: Assuming “c” is a positive number:

7. In what direction and by how many units would the graph of $y = x^2 + c$ shift?

8. In what direction and by how many units would the graph of $y = x^2 - c$ shift?

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9-2 *Explore the Axis of Symmetry*

Try This

Activity 1

1. Complete the table.

Function	$y = 1x^2 - 2x - 3$	$y = -2x^2 - 8x - 6$	$y = -1x^2 + 4x$
Graph			
a	1		
b	-2		
$\frac{b}{a}$			
Axis of symmetry (from graph)	$x = 1$		

2. Compare the axis of symmetry with $\frac{b}{a}$ in your chart. What can you multiply $\frac{b}{a}$ by to get the number in the equation of the axis of symmetry? _____

(Hint: Write and solve an equation to find the value.) Check your answer for each function.

3. Use your answer from Problem 2 to complete the equation of the axis of symmetry quadratic function.

$x =$ _____.

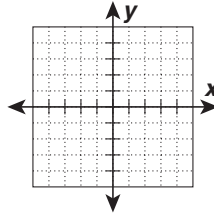
LESSON **Algebra Lab Recording Sheet** p. 598

9-2 *Explore the Axis of Symmetry* continued

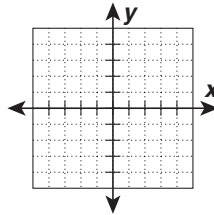
Try This

For the graph of each quadratic function, find the equation of the axis of symmetry.

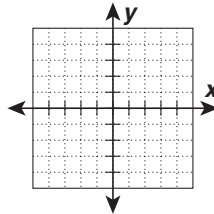
1. $y = 2x^2 + 12x - 7$



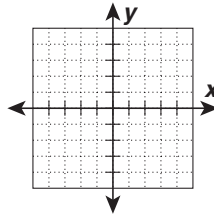
2. $y = 4x^2 + 8x - 12$



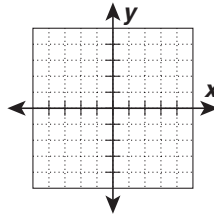
3. $y = 5x^2 - 20x + 10$



4. $y = -3x^2 + 9x + 1$



5. $y = x^2 - 7$



6. $y = 3x^2 + x + 4$

