Quadratics

Practice

Graphing Quadratic Functions

Vertex Form of a Quadratic

Finding the Vertex Form of a Quadratic Using the Zeros

Solving Equations Using Square Roots

Graphing Quadratic Functions

Problem #1: Graph the quadratic function on a piece of graph paper and state the letter of the correct answer.
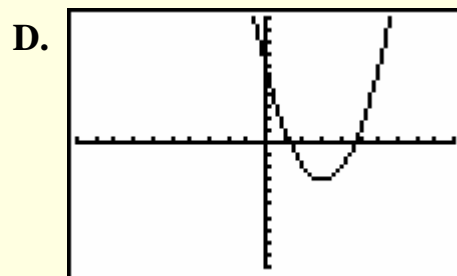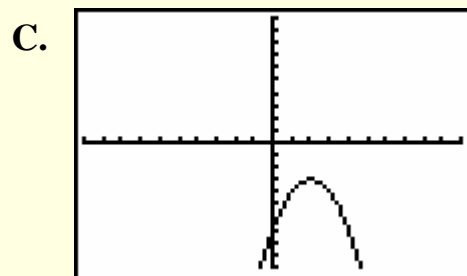
$$y = (x-2)^2 - 3$$

A.

B.

C.

D.

Table of Values

x	$(x-2)^2 - 3$	y
–2	$(-2-2)^2 - 3$	?
– 1	$(-1-2)^2 - 3$	?
0	$(0-2)^2 - 3$	?
1	$(1-2)^2 - 3$	?
2	$(2-2)^2 - 3$	?
3	$(3-2)^2 - 3$	?
4	$(4-2)^2 - 3$	?

Graphing Quadratic Functions

Problem #2: Graph the quadratic function on a piece of graph paper and state the letter of the correct answer.
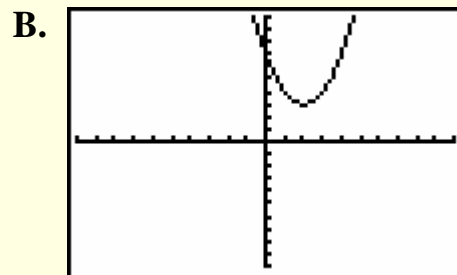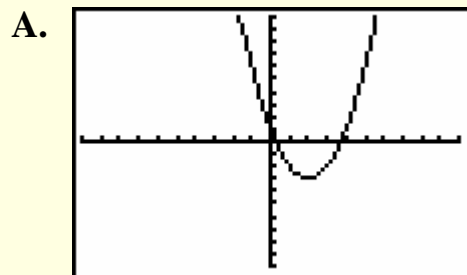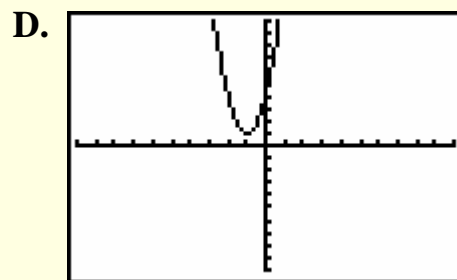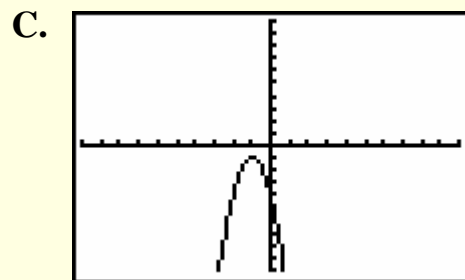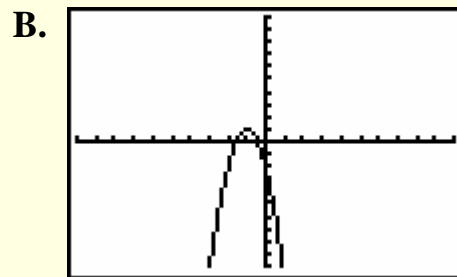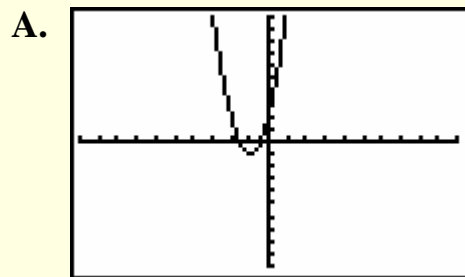
$$y = -3(x+1)^2 - 1$$

A.

B.

C.

D.

Table of Values

x	$-3(x+1)^2 - 1$	y
-2	$-3(-2+1)^2 - 1$	?
-1	$-3(-1+1)^2 - 1$	?
0	$-3(0+1)^2 - 1$	?
1	$-3(1+1)^2 - 1$	?
2	$-3(2+1)^2 - 1$	?

Graphing Quadratic Functions

Problem #3: Graph the quadratic function on a piece of graph paper and state the letter of the correct answer.
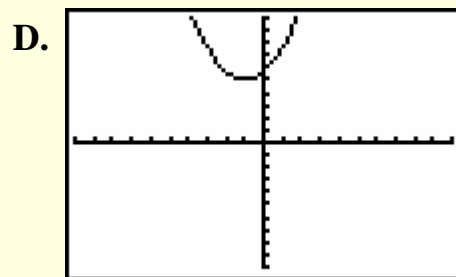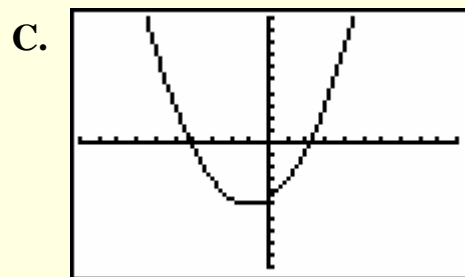
$$y = \frac{2}{3}(x+1)^2 - 5$$

A.

B.

C.

D.
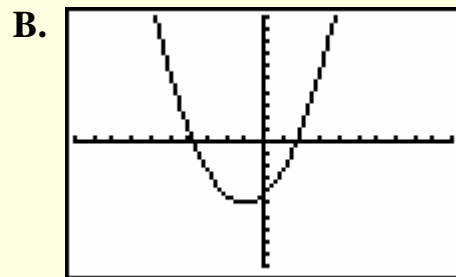
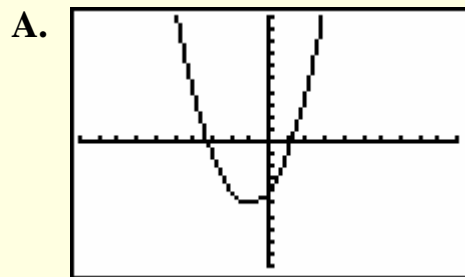### Table of Values

x	$y = \frac{2}{3}(x+1)^2 - 5$	y
-4	$y = \frac{2}{3}(-4+1)^2 - 5$	?
-1	$y = \frac{2}{3}(-1+1)^2 - 5$	?
2	$y = \frac{2}{3}(2+1)^2 - 5$	?
5	$y = \frac{2}{3}(5+1)^2 - 5$	?

Graphing Quadratic Functions
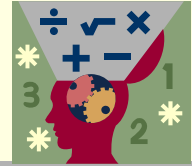
For the next three problems, compare the graphs of the following functions to the graph of the function to the right. Describe the horizontal and the vertical translations of the vertex.
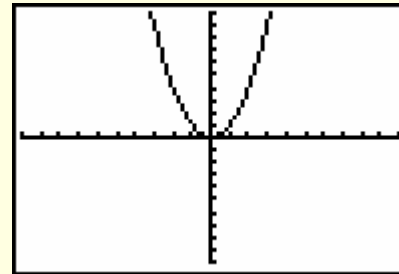
$$y = x^2$$

Problem #4: Describe the horizontal and the vertical translations of the vertex. $y = -(x+2)^2 + 5$

Problem #5: Describe the horizontal and the vertical translations of the vertex. $y = -\dfrac{1}{2}(x+3)^2 - 12$

Problem #6: Describe the horizontal and the vertical translations of the vertex. $y = 2(x-4)^2 + 7$

Vertex Form of a Quadratic

Vertex Form

The vertex form of a quadratic function is $y = a(x-h)^2 + k$, where (h, k) is the vertex and $x = h$ is the axis of symmetry. When "a" is positive, the parabola opens up and the vertex is the minimum value. When "a" is negative, the parabola opens down and the vertex is the maximum value.
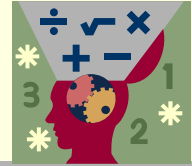
Find the direction of opening, vertex, and axis of symmetry for the next three quadratic functions.

Problem #7: $y = -3(x-2)^2 + 5$ **Problem #8:** $y = 4(x-3)^2 - 12$ **Problem #9:** $y = -7(x+6)^2 + 8$

Finding the Vertex Form of a Quadratic Using the Zeros

Problem #10: Use factoring to find the zeros of the function $x^2 - 2x - 15$. Then use the zeros to determine the vertex of the parabola.

## Finding the Vertex Form of a Quadratic Using the Zeros

Problem #11: Use factoring to find the zeros of the function $x^2 - 6x + 9$. Then use the zeros to determine the vertex of the parabola.

Problem #12: Use factoring to find the zeros of the function $x^2 - 2x - 8$. Then use the zeros to determine the vertex of the parabola.

Problem #13: Use factoring to find the zeros of the function $x^2 - 15x + 56$. Then use the zeros to determine the vertex of the parabola.
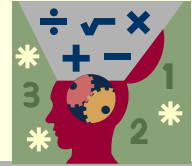
Solving Equations Using Square Roots
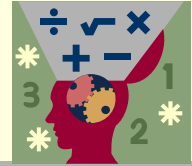
Problem #14: Solve the equation $x^2 = 49$.

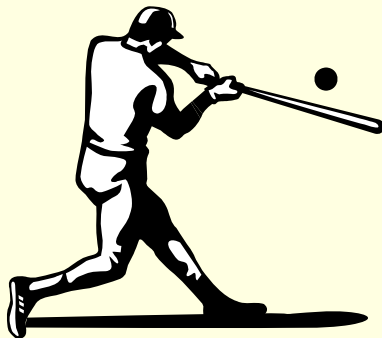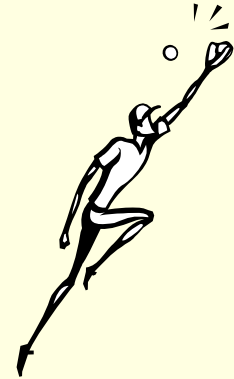Problem #15: Solve the equation $36x^2 = 81$.

Problem #16: Solve the equation $(x-2)^2 - 9 = 0$.

Problem #17:   A pop fly can be easily caught if it stays in the air for 7 seconds.
Suppose a ball that is hit can be represented by the function $h = -16t^2 + 115t + 20,$
where h is the height after t seconds. Find the height of the ball after 7 seconds.
Can the ball be caught?

Answers

Problem #1:   Choice "A".

Problem #2:   Choice "C".

Problem #3:   Choice "B".

Problem #4:   The vertex has translated 2 units left and 5 units up.

Problem #5:   The vertex has translated 3 units to the left and 12 units down.

Problem #6:   The vertex has translated 4 units to the right and 7 units up.

Problem #7:   down; (2, 5); $x = 2$

Problem #8:   up; (3, −12); $x = 3$

Problem #9:   down; (−6, 8); $x = −6$

Problem #10: (1, −16)

Problem #11: (3, 0)

Problem #12: (1, −9)

Problem #13: (15/2, −1/4)

Problem #14: +7, −7

Problem #15: 9/4, −9/4

Problem #16: +5, −1

Problem #17: 6 feet, yes