

## Forms of Quadratic Functions

### Standard Form

$$y = ax^2 + bx + c$$

OR

$$f(x) = ax^2 + bx + c$$

This form allows you to quickly see the y-intercept.

Y-int: (0, c)

### Factored Form

$$y = (x + a)(x + b)$$

OR

$$f(x) = (x - a)(x - b)$$

This form shows you the x-intercepts.

X-ints: (a, 0), (b, 0)

### Vertex Form

$$y = a(x - h)^2 + k$$

OR

$$f(x) = a(x - h)^2 + k$$

This form shows the coordinates of the vertex.

Vertex: (h, k)

Use this function for problems 1 - 10:  $y = (x - 2)^2 - 1$

- 1) Give the coordinates of the vertex of the graph.
- 2) Convert the function to standard form.
- 3) Give the coordinates of the y-intercept.
- 4) Convert the function to factored form.
- 5) Give the coordinates of the x-intercepts.
- 6) Graph the function labeling the vertex, y-intercept, and x-intercepts.
- 7) Enter the function on your calculator in vertex form and graph it. How does it compare to your graph?
- 8) Enter the function on your calculator in standard form and graph it. How does it compare to your graph?
- 9) Enter the function on your calculator in factored form and graph it. How does it compare to your graph?
- 10) Use your calculator to find the vertex, x-intercepts, and y-intercept. Do they match yours?

Give the vertex of each function, and graph it. How does vertex form compare to the other forms in each problem?

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

12)  $y = (x + 4)^2$

13)  $y = x^2 + 3$

14)  $y = -x^2 - 3$

Convert each function to standard form. Give the vertex and y-intercept. Graph. Check your work on the calc.

15)  $y = (x + 4)^2 - 5$

16)  $f(x) = (x - 2)^2 + 3$

17)  $y = (x - 1)^2 + 4$

18)  $f(x) = (x + 3)^2 - 1$

Convert each function to factored form. Give the x and y intercepts. Graph. Show the line of symmetry.

19)  $y = x^2 - 4x - 5$

20)  $y = x^2 + 6x$

21)  $f(x) = x^2 + 2x - 8$

22)  $y = x^2 - 6x - 7$

Convert each function to standard form. Give the x and y intercepts. Graph. Show the line of symmetry.

23)  $f(x) = (x + 2)(x - 3)$       24)  $f(x) = (x - 4)(x - 2)$       25)  $y = (x + 5)(x - 1)$       26)  $f(x) = (x + 3)(x + 4)$

Convert each function to vertex form by completing the square.

27)  $x^2 + 6x = y$       28)  $y = d^2 + 10d$       29)  $y = f^2 + 8f$       30)  $h^2 + 12h = y$

31)  $h^2 + 6h + 5 = y$       32)  $y = x^2 + 10x + 9$       33)  $y = k^2 + 8k + 12$       34)  $x^2 + 12x + 27 = y$

Convert each function to vertex form. Give the vertex and y intercept. Graph. Check your work on the calc.

35)  $y = x^2 + 6x + 8$       36)  $y = x^2 + 10x + 21$       37)  $y = x^2 + 2z$       38)  $f(x) = x^2 + 8x + 7$

Given the roots (zeroes) of a quadratic function, write the function in factored and standard forms. Graph.

39)  $x = -3, 5$       40)  $x = 3, -1$       41)  $x = 3, \text{multiplicity} = 2$       42)  $x = -2, -6$

43)  $x = 0, -4$       44)  $x = -1, \text{multiplicity} = 2$       45)  $x = 0, 7$       46)  $x = -1, 8$

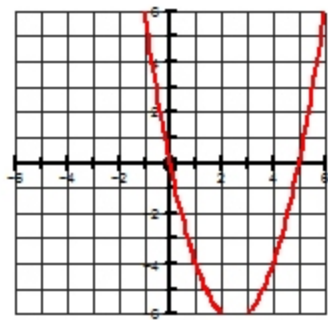
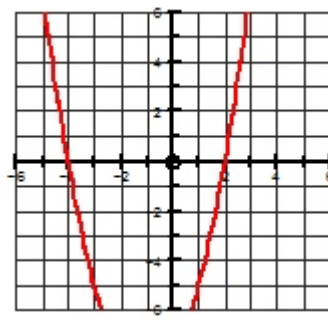
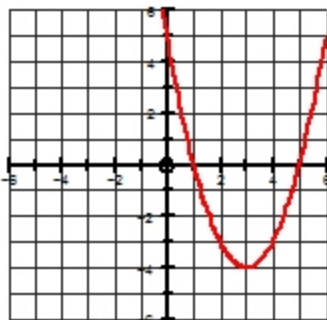
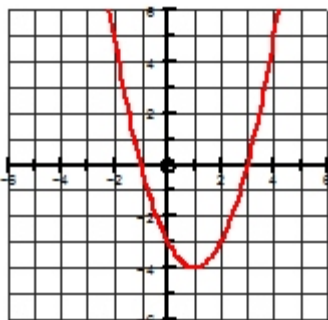
Given the x-intercepts of a quadratic graph write the function in factored and standard forms. Graph.

47)  $(-4, 0), (4, 0)$       48)  $(-1, 0), (5, 0)$       49)  $(-1, 0), (1, 0)$       50)  $(2, 0), (-6, 0)$

51)  $(0, 0), (5, 0)$       52)  $(-3, 0), (0, 0)$       53)  $(-3, 0)$       54)  $(2, 0)$

Given the graph of a function write the equation in factored and standard form.

55)      56)      57)      58)



Given the vertex of a quadratic graph write the function in vertex and standard forms. Graph.

59)  $(-3, -2)$

60)  $(2, 2)$

61)  $(4, -1)$

62)  $(-1, -9)$

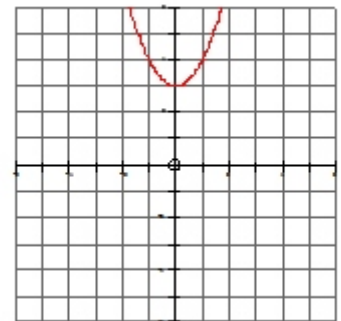
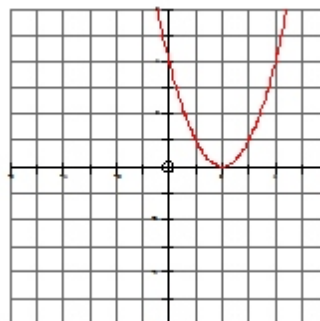
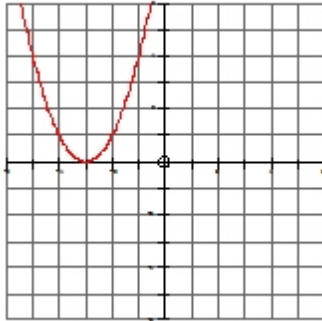
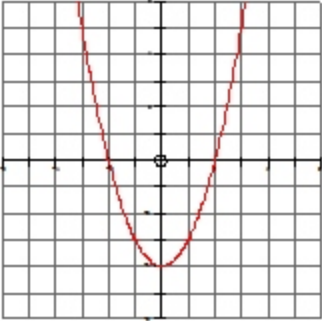
Given the graph of a function write the equation in vertex and standard form.

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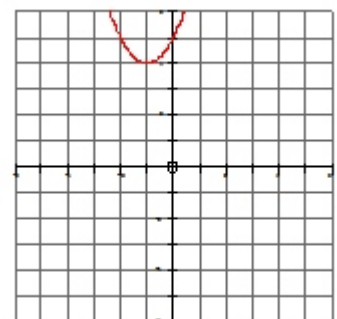
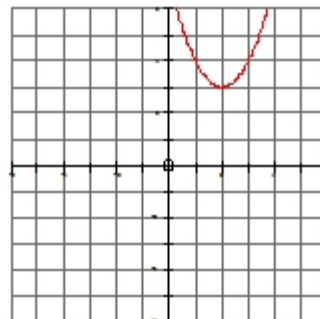
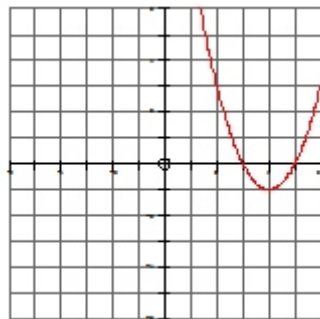
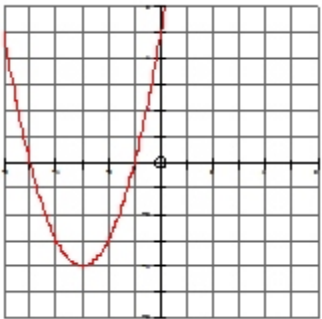


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Convert each function to factored form. Give all intercepts and vertex. Graph. Check your work on the calc.

71)  $y = (x + 2)^2 - 4$

72)  $f(x) = (x - 5)^2 - 1$

73)  $y = (x - 3)^2 - 4$

74)  $f(x) = (x - 1)^2 - 9$

Convert each function to vertex form. Give the vertex and y intercept. Graph. Check your work on the calc.

75)  $y = (x + 8)(x + 2)$

76)  $y = x(x - 4)$

77)  $y = (x + 5)(x + 3)$

78)  $y = (x - 5)(x - 1)$

Graph each equation labeling the vertex and all intercepts.

79)  $y = x^2 - 8x + 12$

80)  $f(x) = x^2 - 6x - 7$

81)  $y = x^2 - 2x - 8$

82)  $y = x^2 + 4x - 5$