Precalculus

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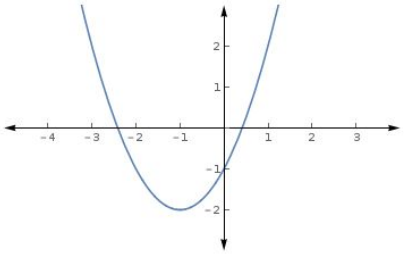
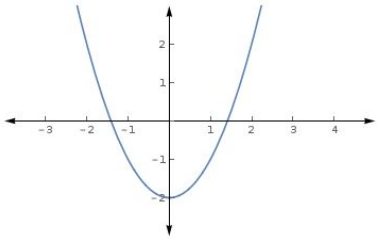
Match the quadratic function with its graph.

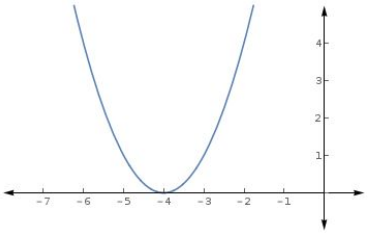
(a)



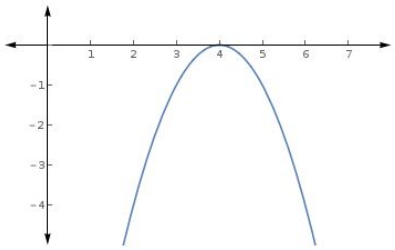
(b)



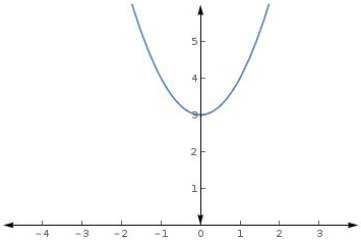
(c)



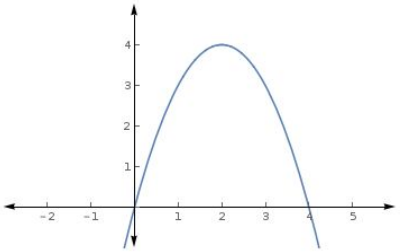
(d)



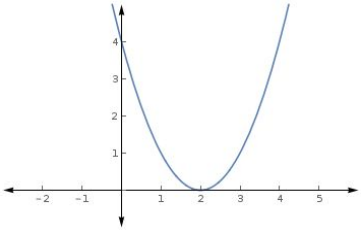
(e)



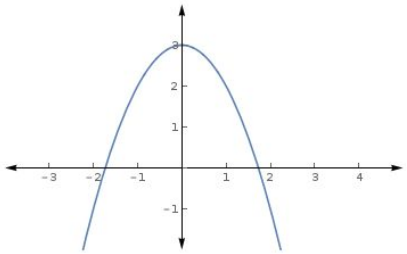
(f)



(g)



(h)



1. $f(x) = (x - 2)^2$

2. $f(x) = (x + 4)^2$

3. $f(x) = x^2 - 2$

4. $f(x) = 3 - x^2$

5. $f(x) = 4 - (x - 2)^2$

6. $f(x) = (x + 1)^2 - 2$

7. $f(x) = x^2 + 3$

8. $f(x) = -(x - 4)^2$

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Use a graphing utility to graph each function in the same viewing window. Describe how the graph of each function is related to the graph of $y = x^2$.

9. (a) $y = \frac{1}{2} x^2$

(b) $y = \frac{1}{2} x^2 - 1$

(c) $y = \frac{1}{2} (x + 3)^2$

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

10. (a) $y = -2x^2$

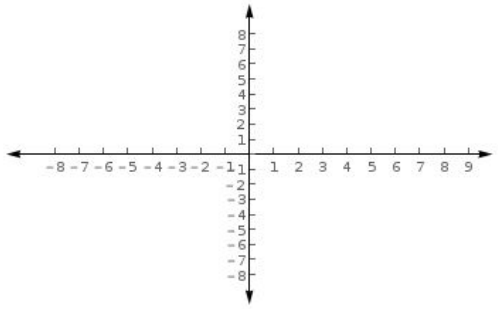
(b) $y = -2x^2 - 1$

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

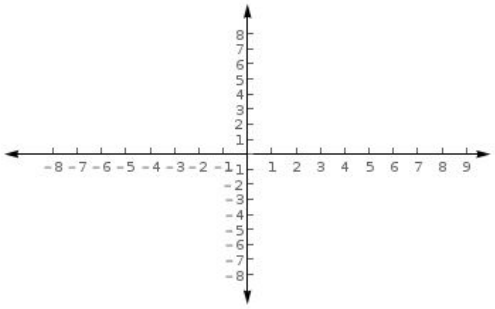
(d) $y = 2(x - 3)^2 - 1$

Sketch the graph of the quadratic function. Identify the vertex and x-intercept(s). Use a graphing utility to verify your results.

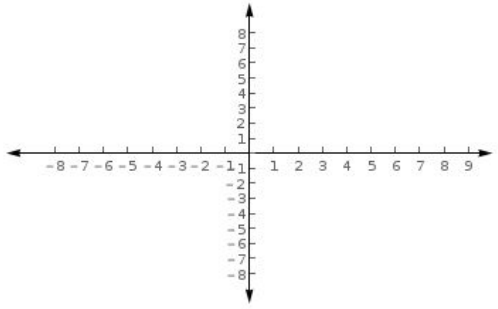
11. $f(x) = 5 - x^2$



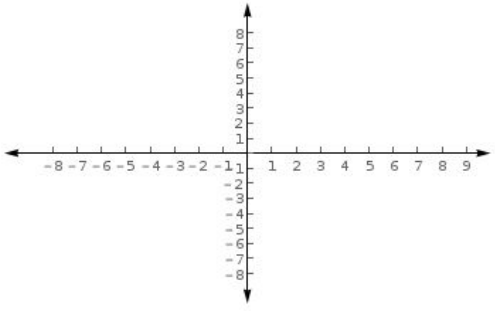
12. $f(x) = (x + 4)^2 - 3$



13. $f(x) = (x - 3)^2$



14. $f(x) = -(x - 6)^2 + 3$



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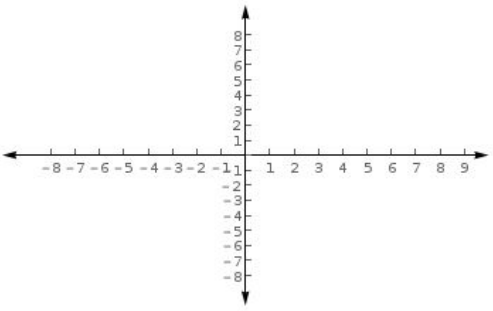
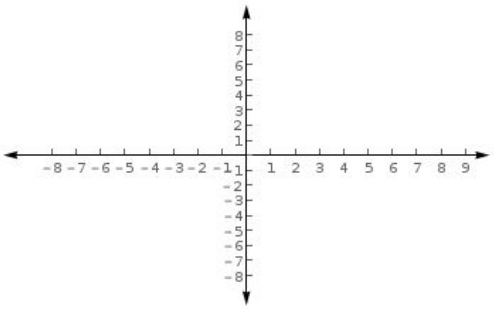
Rewrite the function in standard form, identify the vertex and *x*-intercept(s), then graph the function. Use a graphing utility to graph the equation and verify your results

15. $f(x) = -(x^2 + 2x - 3)$\

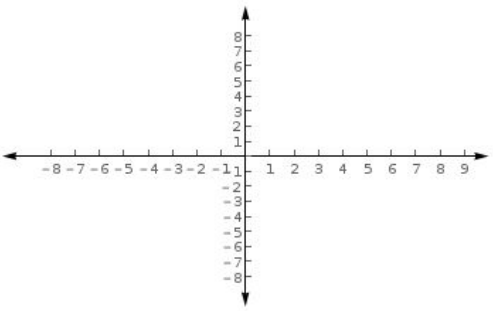
16. $g(x) = x^2 + 8x + 11$

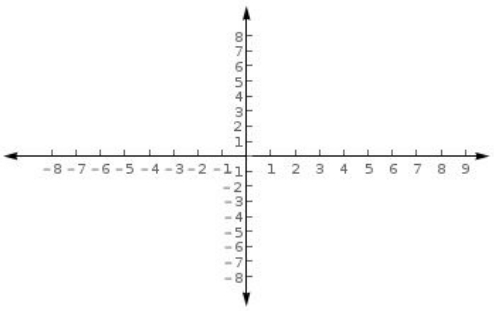




17. $f(x) = -2x^2 + 16x - 31$

18. $g(x) = \frac{1}{2}(x^2 + 4x - 2)$





Write the standard form of the quadratic function that has the indicated vertex and whose graph passes through the given point. Verify your results with a graphing utility.

19. Vertex: $(4, -1)$; Point: $(2, 3)$

20. Vertex: $(-5/2, 0)$; Point: $(-7/2, -16/3)$

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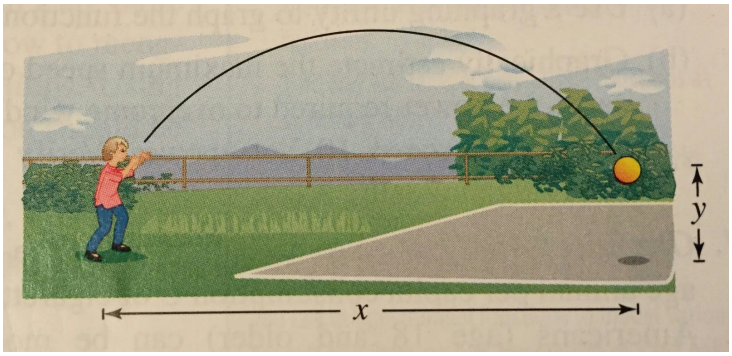
21. ***Height of a Ball*** The height y (in feet) of a ball thrown by a child is given by

$$y = -\frac{1}{12}x^2 + 2x + 4$$

where x is the horizontal distance (in feet) from where the ball is thrown.



(a) Use a graphing utility to graph the path of the ball.

(b) How high is the ball when it leaves the child's hand? (*Hint:* Find y when $x = 0$.)

(c) What is the maximum height of the ball?

(d) How far from the child does the ball strike the ground?

22. ***Path of a Diver*** The path of a diver is given by

$$y = -\frac{4}{9}x^2 + \frac{24}{9}x + 12$$

where y is the height (in feet) and x is the horizontal distance (in feet) from the end of the diving board. What is the maximum height of the diver? Verify your answer using a graphing utility.