Convert from vertex form to standard form of a quadratic:

Problems:

1. $y = 6(x - 4)^2 - 1$	2. $y = \frac{1}{2}(x + 4)^2 + 6$	3. $y = -5(x - 1)^2 + 4$
4. $y = -\frac{1}{3}(x + 6)^2 - 1$	5. $y = 4(x + 2)^2 - 8$	6. $y = \frac{-2}{3}(x - 9)^2 - 2$
7. $y = (x - 2)^2 + 7$	8. $y = (x + \frac{1}{2})^2 - 2$	9. $y = 18(x - \frac{1}{3})^2 + 5$
10. $y = -2\left(x + \frac{1}{2}\right)^2$	11. $y = 13(x - 2)^2 + 15$	12. $y = 2(x + 8)^2 + 10$

Write each function in vertex form.

19. $y = x^2 + 4x$ 20. $y = 2x^2 + 8x + 3$ 21. $y = -2x^2 - 8x$

22. $y = -x^2 + 4x + 4$ 23. $y = x^2 - 4x - 4$ 24. $y = x^2 + 5x$

25. $y = 2x^2 - 6$ 26. $y = -3x^2 - x - 8$ 27. $y = x^2 + 7x + 1$

28. $y = x^2 + 8x + 3$ 29. $y = 2x^2 + 6x + 10$ 30. $y = x^2 + 4x - 3$

Identify the vertex and the y-intercept of the graph of each function.

31. $y = 3(x - 2)^2 - 4$ 32. $y = -\frac{1}{3}(x + 6)^2 + 5$ 33. $y - 2(x - 1)^2 - 1$

34. $y = \frac{2}{3}(x + 4)^2 - 3$ 35. $y = (x - 1)^2 + 2$ 36. $y = -3(x - 2)^2 + 4$

37. $y = 4(x - 5)^2 + 1$ 38. $y = -2(x + 5)^2 - 3$ 39. $y = -5(x + 2)^2 + 5$

Describe how the graph of each function is related to the graph of $f(x) = x^2$.

1. $g(x) = x^2 - 11$

2. $h(x) = \frac{1}{2}x^2$

3. $h(x) = -x^2 + 8$

4. $g(x) = x^2 + 6$
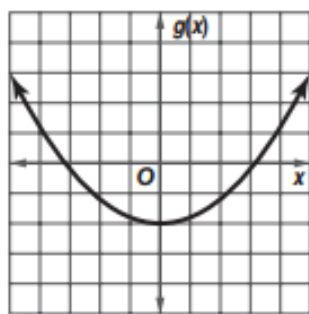
5. $g(x) = -4x^2$

6. $h(x) = -x^2 - 2$

7. MULTIPLE CHOICE Which is an equation for the function shown in the graph?

A $g(x) = \frac{1}{5}x^2 + 2$

B $g(x) = -5x^2 - 2$

C $g(x) = \frac{1}{5}x^2 - 2$

D $g(x) = -\frac{1}{5}x^2 - 2$

Describe how the graph of each function is related to the graph of $f(x) = x^2$.

8. $g(x) = -10 + x^2$

9 $h(x) = -7 - x^2$

10. $g(x) = 2x^2 + 8$

11. $h(x) = 6 + \frac{2}{3}x^2$

12. $g(x) = -5 - \frac{4}{3}x^2$
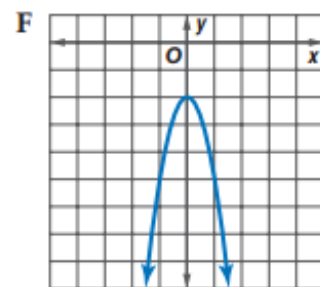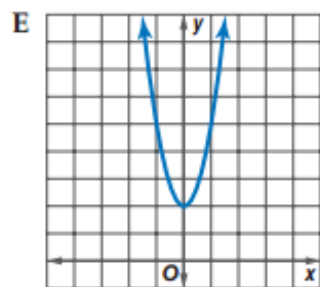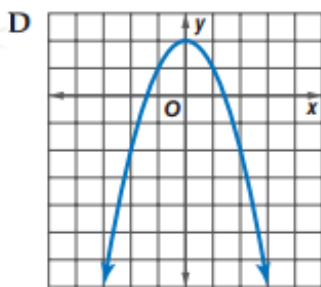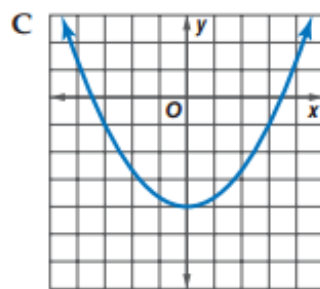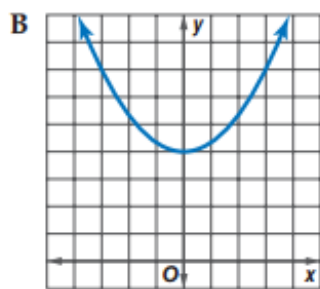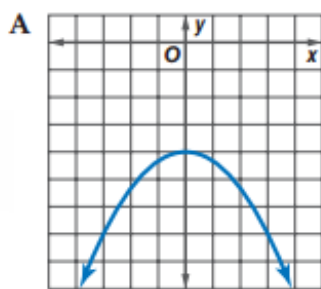
13. $h(x) = 3 + \frac{5}{2}x^2$

14. $g(x) = 0.25x^2 - 1.1$

15. $h(x) = 1.35x^2 + 2.6$

16. $g(x) = \frac{3}{4}x^2 + \frac{5}{6}$

17. $h(x) = 1.01x^2 - 6.5$

Match each equation to its graph.

A

B

C

D

E

F

18. $y = \frac{1}{3}x^2 - 4$

19. $y = -\frac{1}{3}x^2 - 4$

20. $y = \frac{1}{3}x^2 + 4$

21. $y = -3x^2 - 2$

22. $y = -x^2 + 2$

23. $y = 3x^2 + 2$