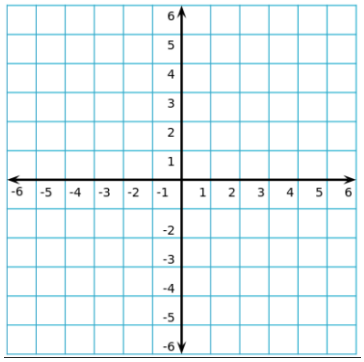
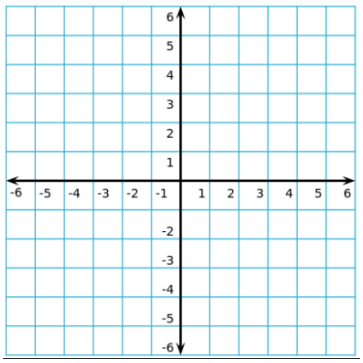
Transformations of Quadratic Functions

Describe the transformation of $f(x) = x^2$ represented by $g(x)$. Then graph $g(x)$.

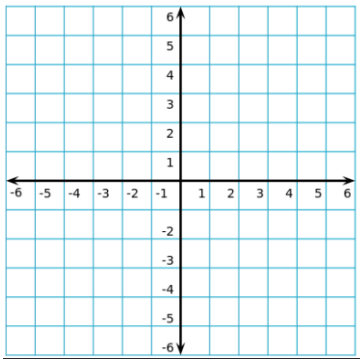
1. $g(x) = x^2 - 3$



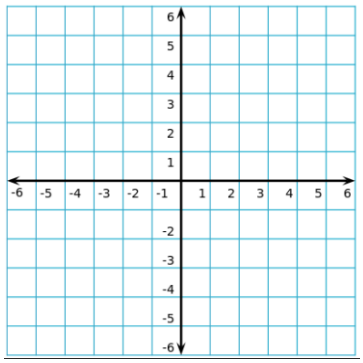
2. $g(x) = (x + 5)^2$



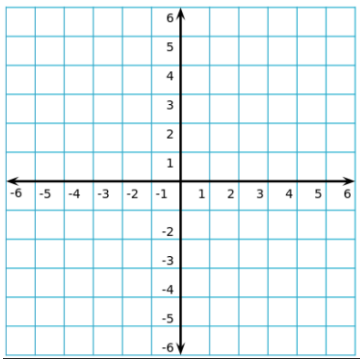
3. $g(x) = (x - 2)^2 + 4$



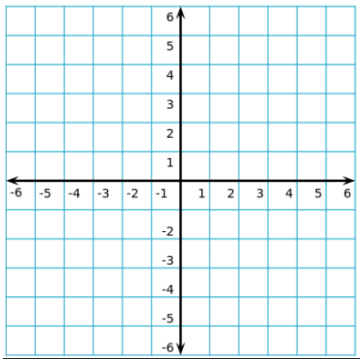
4. $g(x) = -(x + 4)^2 - 1$



5. $g(x) = ½ (x - 1)^2$



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



In Exercises 7 – 11, write a rule for g(x) described by the transformations of graph f(x). Then identify the vertex.

7. $f(x) = x^2$; vertical stretch by a factor of 4 and a reflection in the x-axis, followed by a translation 2 units up.

8. $f(x) = x^2$; vertical compression by a factor of 1/3, followed by a translation 3 units right and 4 units down.

9. $f(x) = (x + 6)^2 + 3$; vertical stretch by a factor of 2 and a translation 1 unit down, followed by a reflection over the x-axis.

10. $f(x) = -2(x - 1)^2 - 4$; translation 3 units left and 4 units up.

11. $f(x) = x^2 - 6$; vertical compression by a factor of 1/4 and a translation 1 unit right followed by a reflection over the x-axis.

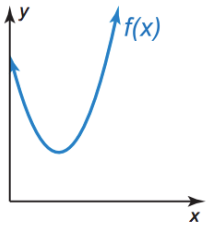
In Exercises 12 – 15, match the function with the correct transformation of the graph f(x).

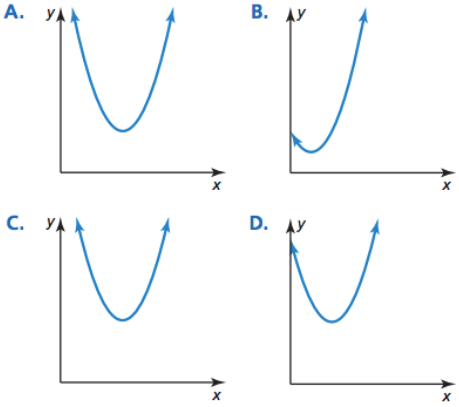
12. f(x – 1)

13. f(x) + 1

14. f(x – 1) + 1

15. f(x + 1) – 1



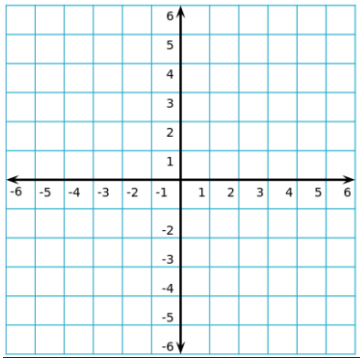


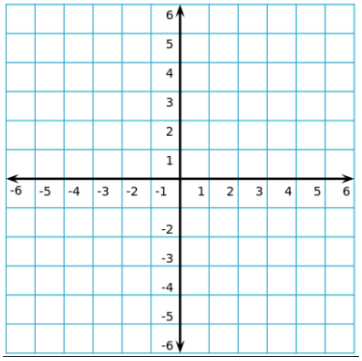
In Exercises 16 – 18 Describe and graph the transformations of $f(x) = x^2$ onto g(x). Then graph.

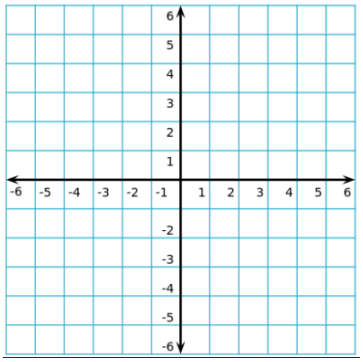
16. g(x) = f(x + 5) – 3

17. g(x) = -f(x – 1) – 1

18. g(x) = 2·f(x) + 2







In Exercises 19 – 21 the function f(x) is transformed onto g(x). Describe the transformation then write the rule for g(x).

19. $f(x) = 2(x + 1)^2 + 5$
    g(x) = f(x – 6) + 1

20. $f(x) = -(x – 4)^2 + 1$
    g(x) = -2·f(x) + 3

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