

Describe the translation(s) of the parent function $f(x) = x^2$ needed to produce the graph of each equation. Then, find the vertex and sketch the graph.

1. $g(x) = x^2 - 6$ 2. $h(x) = (x+5)^2$ 3. $j(x) = (x-3)^2 - 9$
4. $k(x) = x^2 + 3$ 5. $m(x) = (x-2)^2$ 6. $n(x) = -8 + (x+5)^2$

Write an equation for each parabola, then sketch the graph.

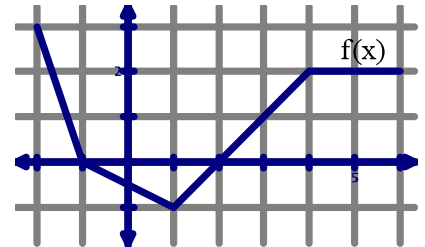
7. $f(x) = x^2$, translated left 3 8. $f(x) = x^2$, translated up 1
9. $f(x) = x^2$, translated right 2 and down 3

Solve.

10. $x^2 + 6 = 31$ 11. $x^2 - 12 = 52$ 12. $(x-3)^2 = 100$ 13. $(x+7)^2 = 144$
14. $(x+4)^2 - 5 = 31$ 15. $13 + (x-5)^2 = -3$

Given the graph of a function $f(x)$ to the right, sketch each translated function.

16. $g(x) = f(x-3) - 2$ 17. $h(x) = 1 + f(x+4)$



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