Assignment

Write

Complete each definition.

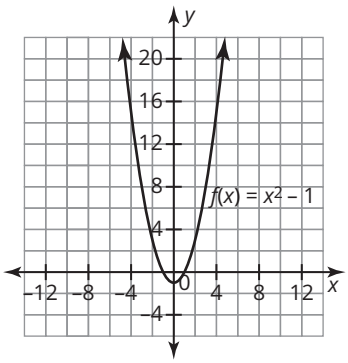
1. The Zero Product Property states that if the product of two or more factors is equal to _____, then at least one factor must be equal to _____.
2. Every positive number has both a _____ square root and a _____ square root.
3. The function $f(x) = x^2$ has a _____ at (0, 0).

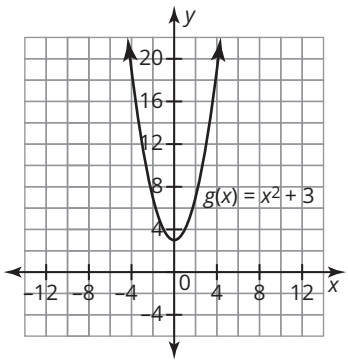
Remember

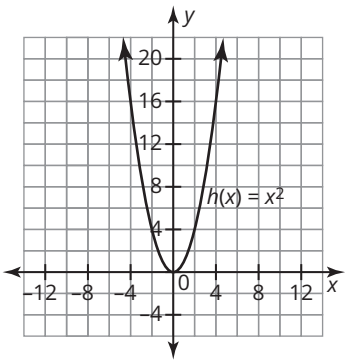
Any quadratic function of the form $f(x) = ax^2 - d$ can be rewritten as two linear factors in the form $(\sqrt{ax} - \sqrt{d})(\sqrt{ax} + \sqrt{d})$.

Practice

1. Determine the solutions for each equation. Identify the solutions on one of the graphs. Then, write the solutions in terms of their respective differences from the axis of symmetry.







a. $8 = x^2 + 3$
b. $7 = x^2$
c. $2 = x^2 - 1$
d. $x^2 = 11$
e. $x^2 + 9 = 13$
f. $14 = x^2 - 1$

2. Estimate the value of each radical expression. Then, rewrite each radical by extracting all perfect squares, if possible.

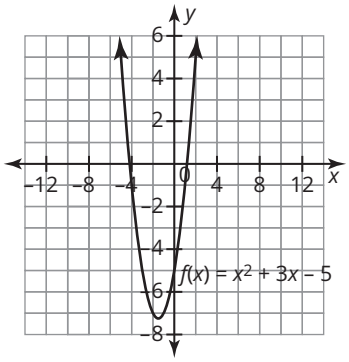
a. $\sqrt{21}$
b. $\sqrt{80}$
c. $\sqrt{63}$
d. $\sqrt{32}$
e. $\sqrt{98}$
f. $\sqrt{192}$

3. Rewrite each quadratic function as two linear factors using what you know about the difference of two squares.

a. $f(x) = 9x^2 - 16$
b. $f(x) = x^2 - 8$
c. $f(x) = 36x^2 - 1$
d. $f(x) = 25x^2 - 12$

Stretch

1. Consider the graph of the function $f(x) = x^2 + 3x - 5$.
   a. Determine the solutions for the equation $x^2 + 3x - 5 = 5$. Identify the solutions on the graph.
   b. Rewrite the equation from part (a) so that the right side of the equation is 0. What do the solutions from part (a) represent in this new equation?
   c. Use your solutions from part (a) to write a product of two binomials, $(x - a)(x - b)$, where a and b are the solutions from part (a). How does this relate to the left side of the equation in part (b)?



Review

1. Identify the axis of symmetry of the graph of $f(x) = -5(x - 3)(x + 12)$.
2. Write a quadratic function in factored form to represent a parabola that opens downward and has zeros at $(-6, 0)$ and $(-2, 0)$.
3. Determine each product. Show your work.
   a. $(2x - 3)(4x + 7)$
   b. $(3x + 5)\left(-\frac{1}{2}x + 16\right)$.
4. Write the equation of the function, $g(x)$, whose graph transforms the graph $f(x) = x^2 + 1$ by reflecting it across the x-axis, shifting it up 6 units, and shifting it to the left 4 units.
5. Graph the function, $g(x)$, whose graph transforms the graph $f(x) = (x - 4)^2$ by vertically stretching it by a factor of 2, reflecting it across the x-axis, and moving it to the left 3 units.