Quadratic Formula Part 1

Standard form of a quadratic gives us two things: the y-intercept $(0, c)$ and the stretch (a). It does not give us the vertex or the x-intercepts (also called zeros, roots, or solutions). However, standard form provides us with what we need to find them. Today, we are looking for the x-intercepts, and we are going to use the **Quadratic Formula** to solve for them.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Step 1 Identify a, b & c	$f(x) = x^2 - 2x - 15$ $f(x) = \boxed{1}x^2\boxed{-2}x\boxed{-15}$ $a = 1, b = -2, c = -15$
Step 2 Copy the quadratic formula, then plug in the values of $a, b, \& c$.	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \dfrac{-(\ ) \pm \sqrt{(\ )^2 - 4(\ )(\ )}}{2(\ )}$ $x = \dfrac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-15)}}{2(1)}$
Step 3 Simplify $-b$, simplify b^2, simplify $4ac$ & simplify $2a$	$x = \dfrac{2 \pm \sqrt{4 + 60}}{2}$
Step 4 Add or subtract the radicand (the part inside the $\sqrt{\ }$)	$x = \dfrac{2 \pm \sqrt{64}}{2}$
Step 5 Square root it, if you can.	$x = \dfrac{2 \pm 8}{2}$
Step 6 Write it as two equation (one + & one -), and add/subtract	$x = \dfrac{2 - 8}{2}$ or $x = \dfrac{2 + 8}{2}$ $x = \dfrac{-6}{2}$ or $x = \dfrac{10}{2}$
Step 7 Divide, if you can.	$\boxed{x = -3 \quad or \quad x = 5}$

Convert each quadratic equation from standard form to factored form.

1. $f(x) = x^2 - 6x - 7$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \dfrac{-(\ ) \pm \sqrt{(\ )^2 - 4(\ )(\ )}}{2(\ )}$	2. $g(x) = x^2 + x - 20$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	3. $h(x) = x^2 + 5x + 6$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

4. $j(x) = x^2 - 6x - 16$ $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$	5. $k(x) = x^2 + 9x + 8$	6. $m(x) = x^2 - 9x$
7. $n(x) = x^2 - 3x - 28$	8. $p(x) = x^2 + 4x - 45$	9. $r(x) = x^2 - 16$
10. $t(x) = x^2 + 4x - 12$	11. $v(x) = x^2 + 7x$	12. $w(x) = x^2 - 7x + 6$

Answers

1. $x = -1$ $x = 7$	2. $x = -5$ $x = 4$	3. $x = -3$ $x = -2$	4. $x = -2$ $x = 8$
5. $x = -8$ $x = -1$	6. $x = 0$ $x = 9$	7. $x = -4$ $x = 7$	8. $x = -9$ $x = 5$
9. $x = -4$ $x = 4$	10. $x = -6$ $x = 2$	11. $x = -7$ $x = 0$	12. $x = 1$ $x = 6$