Name: _____

Converting to Factored Form when $a = 1$
by Factoring

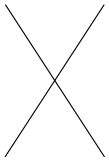
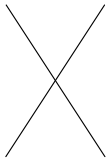
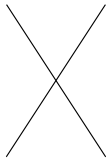
There are two ways to convert a quadratic from standard form into factored form: use the quadratic formula to determine the roots, then write them (along with a) in the factored form structure or simply **to factor**. Today, we are going to develop the skill of factoring.

The process of factoring quadratics is actually the process of multiplying binomials done backwards:

$f(x) = (x+3)(x-5)$ $f(x) = x(x+3) - 5(x+3)$	Step 1 Split one of the () and copy the other next to each term	*Required* Step 1 Recognize that $(A)(C) = (b_1)(b_2)$ & $B = b_1 + b_2$ Use those facts to determine b_1 & b_2.	$f(x) = x^2 - 2x - 15$ (A)(C) = (1)(-15) multiplies to **-15** b_1 **+3** **-5** b_2 **-2** adds to B
$f(x) = \underbrace{x(x+3)} \quad \underbrace{-5(x+3)}$ $f(x) = x^2 + 3x - 5x - 15$	Step 2 Multiply the outside term by every part of the () Repeat .	Step 2 Split Bx into b_1x and b_2x	$f(x) = x^2 \underbrace{-2x} - 15$ $f(x) = x^2 + 3x - 5x - 15$
$f(x) = x^2 \underbrace{+3x - 5x} - 15$ $f(x) = x^2 - 2x - 15$	Step 3 Combine the b_1x with b_2x to make Bx	Step 3 Factor the GCF out of the first group & write it outside () Repeat for the other group	$f(x) = \underbrace{x^2 + 3x} \quad \underbrace{-5x - 15}$ $f(x) = x(x+3) - 5(x+3)$
$f(x) = x^2 - 2x - 15$ (A)(C) = (1)(-15) multiplies to **-15** b_1 **+3** **-5** b_2 **-2** adds to B	*Optional* Step 4 Recognize that $(A)(C) = (b_1)(b_2)$ & $B = b_1 + b_2$	Step 4 Bring the split terms together in one () and write the copied () in front	$f(x) = (x+3)(x-5)$

Convert each quadratic equation from standard form to factored form.

1. $f(x) = x^2 - 6x - 7$ (A)(C) = ( )( ) multiplies to b_1 b_2 adds to B	2. $g(x) = x^2 + x - 20$ (A)(C) = ( )( ) b_1 b_2 B	3. $h(x) = x^2 + 5x + 6$ AC b_1 b_2 B

4. $j(x) = x^2 - 6x - 16$ 	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. $f(x) = (x - 7)(x + 1)$	2. $g(x) = (x + 5)(x - 4)$	3. $h(x) = (x + 2)(x + 3)$	4. $j(x) = (x - 8)(x + 2)$
5. $k(x) = (x + 1)(x + 8)$	6. $m(x) = (x)(x - 9)$	7. $n(x) = (x - 7)(x + 4)$	8. $p(x) = (x + 9)(x - 5)$
9. $r(x) = (x + 4)(x - 4)$	10. $t(x) = (x + 6)(x - 2)$	11. $v(x) = (x)(x + 7)$	12. $w(x) = (x - 6)(x - 1)$