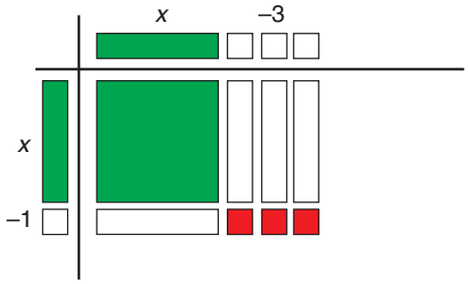
Lesson 5.3: Factoring Trinomials

Practice – III

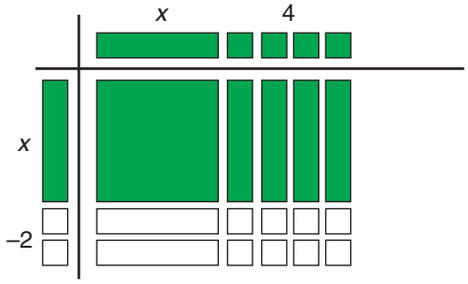
1. Use algebra tiles to factor the following trinomials.

   a. $x^2 - 4x + 3$



$x^2 - 4x + 3 = (x - 3)(x - 1)$

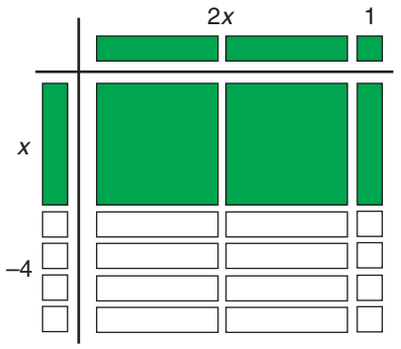
   b. $p^2 + 2p - 8$



Two pairs of x and $-x$ tiles were added to complete the rectangle.

$p^2 + 2p - 8 = (p + 4)(p - 2)$

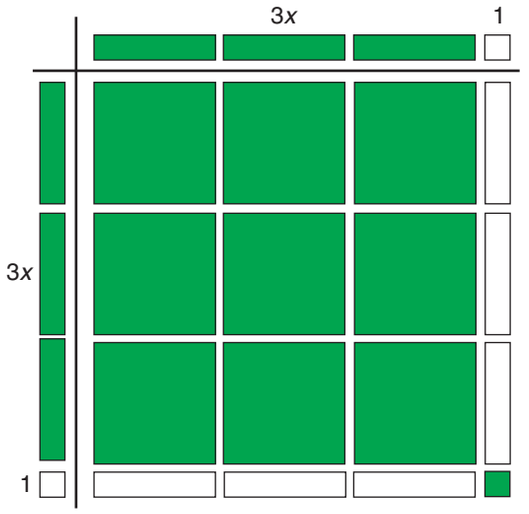
c. $2r^2 - 7r - 4$



A pair of x and $-x$ tiles was added to complete the rectangle.

$2r^2 - 7r - 4 = (2r + 1)(r - 4)$

d. $9x^2 - 6x + 1$



$9x^2 - 6x + 1 = (3x + 1)(3x + 1)$

2. Identify two integers with the given product and sum.

a. product = 42, sum = 13

6 and 7

b. product = 36, sum = –13

–9 and –4

c. product = –9, sum = 0

3 and –3

3. Factor each of the following.

   a. $x^2 + x - 12$

   $b = 1$ and $c = -12$

   The integers 4 and –3 have a sum of 1 and a product of –12.

   $x^2 + x - 12 = (x + 4)(x - 3)$

   b. $i^2 - 10i + 25$

   $b = -10$ and $c = 25$

   The integers –5 and –5 have a sum of –10 and a product of 25.

   $i^2 - 10i + 25 = (i - 5)(i - 5)$

   c. $x^2 - 9$ (Hint: This isn't a trinomial, but it can be factored using the same strategy.)

   $b = 0$ and $c = -9$

   The integers 3 and –3 have a sum of 0 and a product of –9.

   $x^2 - 9 = (x + 3)(x - 3)$

4. Luke factored $x^2 - 9x + 14$ as shown.

   I know –7 and –2 have a sum of –9 and a product of 14, so the factors must be $x - 7$ and $x - 2$.

   Luke showed his work to Destiny, who was working on the same problem. She said that Luke could not be correct because she found different factors for $x^2 - 9x + 14$. Then, she showed Luke her verification.

$$\begin{aligned}(2-x)(7-x) &= (2)(7)+(2)(-x)+(7)(-x)+(-x)(-x)\\ &= 14-2x-7x+x^2\\ &= 14-9x+x^2\\ &= x^2-9x+14\end{aligned}$$

   Explain how this discussion could be resolved.

   Both students have shown a correct factorization. It is possible for a trinomial to be factored in different ways, resulting in what might initially appear to be a different set of factors. In this case if Luke's factors are multiplied by $(-1)(-1) = 1$, the result is Destiny's factors.

$$\begin{aligned}(x-7)(x-2) &= (1)(x-7)(x-2)\\ &= (-1 \bullet -1)(x-7)(x-2)\\ &= -1(x-7) \bullet -1(x-2)\\ &= (-x+7)(-x+2)\\ &= (7-x)(2-x)\end{aligned}$$

Please return to *Unit 5: Polynomials Lesson 5.3* in the *Module* to continue your exploration.