Lesson 9-8

Example 1

Tell whether the trinomial is a perfect square trinomial.

a. $m^2 + 8m + 16$ **b.** $d^2 + 5d + 25$

Solution

a. The first term is a perfect square. $m^2 = m \cdot m$
The last term is a perfect square. $16 = 4 \cdot 4$
The middle term is twice the product of the square roots of the first and last terms. $8m = 2(4 \cdot m)$

The trinomial is a perfect square trinomial.

b. First term: $d^2 = d \cdot d$
Last term: $25 = 5 \cdot 5$
Middle term: $5d \neq 2(5 \cdot d)$

The trinomial is not a perfect square trinomial.

Example 2

Factor each polynomial.

a. $h^2 + 16h + 64$ **b.** $z^2 - 12z + 36$

Solution

a. Determine if the trinomial is a perfect square trinomial.

First term: $h^2 = h \cdot h$ Last term: $64 = 8 \cdot 8$ Middle term: $16h = 2(8 \cdot h)$

Then, use the square roots to write the factors.

$$h^2 + 16h + 64 = (h + 8)(h + 8) = (h + 8)^2$$

b. Determine if the trinomial is a perfect square trinomial.

First term: $z^2 = z \cdot z$ Last term: $36 = 6 \cdot 6$ Middle term: $12z = 2(6 \cdot z)$

Since the sign of the middle term in the trinomial is negative, use a negative sign in each factor.

$$z^2 + 36 = (z - 6)(z - 6) = (z - 6)^2$$

Example 3

Factor $p^2 - 16$.

Solution

$$p^2 - 16$$
$$p \cdot p \quad 4 \cdot 4$$

To factor a difference of two squares, write the two binomials using the square roots of the terms. Make one binomial a sum and the other a difference.

$$p^2 - 16 = (p + 4)(p - 4)$$