Example 1 Difference of Squares

Factor.

a) $x^2 - 100$ **b)** $98a^2 - 450b^2$

Solution

a) $a^2 - b^2 = (a + b)(a - b)$ **Use the pattern for a difference of squares.**

$x^2 - 100 = (x)^2 - 10^2$

$= (x + 10)(x - 10)$

b) $98a^2 - 450b^2 = 2(49a^2 - 225b^2)$ **Remove the greatest common factor.**

$= 2[(7a)^2 - (15b)^2]$

$= 2(7a + 15b)(7a - 15b)$ **Factor the difference of squares.**

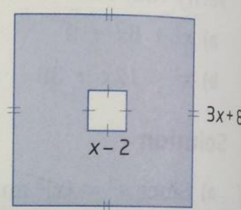
are perfect squares.
Twice the product of these square roots is $2(5k)(6m) = 60km$.
Therefore, $25k^2 - 60km + 36m^2$ is a perfect square trinomial.

$$25k^2 - 60km + 36m^2 = (5k)^2 - 2(5k)(6m) + (6m)^2$$
$$= (5k - 6m)^2$$

Example 4 Area of a Region

a) Find an algebraic expression for the area of the shaded region.

b) Write the area expression in factored form.



Solution

a) The area of the shaded region is the difference in the areas of the two squares.
Area $= (3x + 8)^2 - (x - 2)^2$

b) Method 1: Expand, Then Factor

$$(3x + 8)^2 - (x - 2)^2$$
$$= 9x^2 + 48x + 64 - (x^2 - 4x + 4)$$
$$= 9x^2 + 48x + 64 - x^2 + 4x - 4$$
$$= 8x^2 + 52x + 60$$
$$= 4(2x^2 + 13x + 15)$$
$$= 4(2x^2 + 10x + 3x + 15)$$
$$= 4[(2x^2 + 10x) + (3x + 15)]$$
$$= 4[2x(x + 5) + 3(x + 5)]$$
$$= 4[(x + 5)(2x + 3)]$$
$$= 4(x + 5)(2x + 3)$$