

6-6

## Special Factoring & Factoring review

Objectives:

1. I can expand and factor perfect square trinomials.
2. I can factor the difference of two squares.

### Warm-Up

Expand each of the following:

$$\begin{aligned}
 (x-5)^2 &= (x-5)(x-5) \\
 &= x^2 - 5x - 5x + 25 \\
 &= x^2 - 10x + 25 \\
 (x+6)^2 &= (x+6)(x+6) \\
 &= x^2 + 6x + 6x + 36 \\
 &= x^2 + 12x + 36 \\
 (2x-3)^2 &= (2x-3)(2x-3) \\
 &= 4x^2 - 6x - 6x + 9 \\
 &= 4x^2 - 12x + 9 \\
 (3x-4)^2 &= (3x-4)(3x-4) \\
 &= 9x^2 - 12x - 12x + 16 \\
 &= 9x^2 - 24x + 16
 \end{aligned}$$

Can you see a PATTERN?

### Factoring Perfect Square Trinomials

$$a^2 + 2ab + b^2 = (a + b)^2$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

$$\begin{aligned}
 (a+b)^2 &= a^2 + 2ab + b^2 \\
 (a-b)^2 &= a^2 - 2ab + b^2
 \end{aligned}$$

$$a^2 + 2ab + b^2 = (a + b)^2$$

Expand

$$\begin{aligned}
 (7x+6)^2 &= (7x+6)(7x+6) \\
 &= 49x^2 + 84x + 36
 \end{aligned}$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

$$\begin{aligned}
 (10x-3)^2 &= (10x-3)(10x-3) \\
 &= 100x^2 - 60x + 9
 \end{aligned}$$

$$a^2 + 2ab + b^2 = (a + b)^2$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

Expand: Your Turn!

$$(12x + 2)^2$$

$$(3x - 5)^2$$

$$144x^2 + 24x + 24x + 4$$

$$9x^2 - 30x + 25$$

$$144x^2 + 48x + 4$$

$$a^2 + 2ab + b^2 = (a + b)^2$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

Factor each quadratic expression

$$x^2 + 4x + 4 = (x + 2)^2$$

$$x^2 - 20x + 100$$

$$(x - 10)^2$$

Factor each quadratic expression

$$d^2 - 2d + 1$$

$$r^2 + 6r + 9$$

$$(d - 1)^2$$

$$(r + 3)^2$$

Factor each quadratic expression

$$4x^2 + 12x + 9 = (2x + 3)^2$$

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

## YOUR TURN!

Factor each quadratic expression

$$4x^2 + 20x + 25$$

2   2 · 5   5

$$(2x+5)^2$$

$$9x^2 - 24x + 16$$

$$(3x-4)^2$$

Factoring the difference of two squares

$$a^2 - b^2 = (a + b)(a - b) = a^2 - \cancel{ab} + \cancel{ba} - b^2$$

$$a^2 - b^2$$

$$a^2 - b^2 = (a + b)(a - b)$$

Factor the following quadratic expressions

$$x^2 - 25$$

$$(x+5)(x-5)$$

$$9n^2 - 1$$

$$(3n-1)(3n+1)$$

Factor each of the quadratic expressions

$$25x^2 - 81$$

$$(5x+9)(5x-9)$$

$$z^2 - 16$$

$$(z+4)(z-4)$$

Factor the quadratic expressions

$3x^2 - 48$

$3(x^2 - 16)$

$3(x+4)(x-4)$

$x^4 - 81$

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

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

YOUR TURN!

Factor the quadratic expressions

$x^2 - 100$

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

$z^4 - 16$

$(z^2-4)(z^2+4)$

$(z-2)(z+2)(z^2+4)$

YOUR TURN!

Factor the following quadratic expressions

$c^2 + 24c + 144$

$(c+12)^2$

$x^2 - 6x + 9$

$(x-3)^2$

$x^2 - 49$

$(x-7)(x+7)$