6.7 Special Cases

SWBAT factor special cases of quadratics.

Assignments:

HW50

Factor each completely.

- $x^2 - 25$

1. $x^2 - 4$
2. $a^2 - 49$
3. $p^2 - 1$
4. $x^2 - 36$

- $x^2 - 64$

- Are you starting to see a pattern?

Difference of Squares

- Quadratic *binomials* can only be factored IF:
  - They have a common factor (we've done this before!)
  - They are a difference of squares
- A *difference of squares* will always look like:

$$(perfect\ sqaure) - (perfect\ square)$$

Or, to put it in math notation:

$$a^2 - b^2$$

The a will include a variable

- Identify whether the quadratic binomial is a difference of squares.

1. $x^2 - 9$
2. $k^2 + 16$
3. $x^2 - 5$
4. $x^2 - 25$
5. $n^2 - 169$
6. $b^2 + 8$
7. $b^2 - 2b$
8. $4x^2 - 100$

Factoring a Difference of Squares

- A difference of squares will *always* factor the exact same way.
- Memorize this formula: it is ***extremely*** important (and useful!)
- $a^2 - b^2 = (a - b)(a + b)$

- Factor the difference of squares.

1. $x^2 - 16$
2. $x^2 - 100$
3. $b^2 - 49$
4. $n^2 - 169$
5. $t^2 - 4$
6. $a^2 - 25$
7. $4x^2 - 25$
8. $49x^2 - 81$

Perfect Square Trinomials

- $x^2 + (2\sqrt{c})x + c$ factors into $(x + \sqrt{c})^2$
- $x^2 - (2\sqrt{c})x + c$ factors into $(x - \sqrt{c})^2$
- Example: $x^2 + 8x + 16$

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

1. $r^2 - 6r + 9$
2. $n^2 + 4n + 4$
3. $n^2 - 8n + 16$
4. $n^2 + 10n + 25$
5. $k^2 - 4k + 4$

Don't worry if you don't see the pattern: these can still be factored exactly the same way we've been factoring trinomials

Perfect Square Trinomials

- $ax^2 + (2\sqrt{a}\sqrt{c})x + c$ factors into $\left((\sqrt{a})x + \sqrt{c}\right)^2$
- $ax^2 - (2\sqrt{a}\sqrt{c})x + c$ factors into $\left((\sqrt{a})x - \sqrt{c}\right)^2$

- Example: $4x^2 - 40x + 25$

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

1. $4p^2 - 20p + 25$
2. $9v^2 + 30v + 25$
3. $9x^2 + 12x + 4$
4. $9m^2 - 12m + 4$
5. $9v^2 - 6v - 1$

Don’t worry if you don’t see the pattern: these can still be factored exactly the same way we’ve been factoring trinomials