

Perfect Square Trinomials, Difference of Squares, and the Quadratic Formula

Warm-Up:

Multiply the binomials and look for patterns

1. $(x - 1)(x - 1)$

5. $(x - 1)(x + 1)$

2. $(x - 3)(x - 3)$

6. $(x - 3)(x + 3)$

3. $(2x - y)(2x - y)$

7. $(x - 1)(x - 6)$

4. $(2ax - b)(2ax - b)$

8. $(2x - 3y)(2x - 3y)$

Ex. 1

Multiply these expressions. Describe any patterns you observe.

1. $(x - 1)(x - 1)$

3. $(2x + y)(2x + y)$

2. $(x + 3)(x + 3)$

4. $(2ax + b)(2ax + b)$

Perfect Square Trinomial

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

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

Both expressions have three terms: the square of a, twice a times b, and the square of b.

Ex. 3

Multiply these expressions and describe any patterns you observe

1. $(x - 1)(x - 1)$

3. $(x + 6)(x + 6)$

2. $(x - 3)(x - 3)$

4. $(2x + y)(2x + y)$

Difference of Squares

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

The expression $a^2 - b^2$ has two terms: the square of a and the square of b.

Ex. 5

Identify each expression as a perfect square trinomial, difference of squares, or neither. Factor (unless its neither).

1. $x^2 + 2x + 1$

5. $x^2 + 4x + 1$

2. $y^2 + 4y + 4$

6. $9x^2 + 25$

3. $x^2 - 5x + 25$

7. $y^2 + 2yz + z^2$

4. $4x^2 - 25$

Quadratic Formula use the form of the equation: $ax^2 + bx + c = 0$

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

Group Project

Use the quadratic formula on these equations to check that you are using it correctly.

1. $x^2 - 4x - 12 = 0$

Answers: $x = -2$ and $x = 6$

2. $2x^2 - x - 3 = 0$

Answers $x = 1.5$ and $x = -1$

3. $4x^2 - 25 = 0$

Answers $x = 2.5$ and $x = -2.5$

Solve these equations

1. $2x^2 + 5x - 3 = 0$

2. $3x^2 - 2x - 4 = 0$

Ex. 6

Use the quadratic formula to solve these equations

1. $2x^2 + 7x + 3 = 0$

3. $2x^2 + 2x = -1$

2. $4x^2 = 5x + 2$

Answer Key

Warm Up (page 1)

1. $x^2 - 2x + 1$

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

3. $4x^2 - 4xy + y^2$

4. $4a^2x^2 - 4abx + b^2$

Ex. 1 (page 1)

1. $x^2 - 2x + 1$

2. $x^2 + 6x + 9$

Ex. 3 (page 2)

1. $x^2 - 2x + 1$

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

Ex. 5 (page 2)

1. pst $(x + 1)(x + 1)$

2. pst $(y + 2)(y + 2)$

3. neither

4. dos $(2x + 5)(2x - 5)$

Group Project (page 3)

see answers

Solve these equations (page 3)

1. $x = -3$ and 0.5

Ex. 6 (page 3)

1. $x = -0.5$ and -3

4. $x = 1.569$ and -0.318
(rounded to the nearest thousandth)

5. $x^2 - 1$

6. $x^2 - 9$

7. $x^2 - 7x + 6$

8. $4x^2 - 12xy + 9y^2$

3. $4x^2 + 4xy + y^2$

4. $4a^2x^2 + 4abx + b^2$

3. $x^2 + 12x + 36$

4. $4x^2 + 4xy + y^2$

5. neither

6. neither

7. pst $(y + z)(y + z)$

2. $x = -0.869$ and 1.535
(rounded to the nearest thousandth)

3. no solution