

## INTRODUCTION TO FACTORING

## OBJECTIVE

1. SWBAT factor greatest common factors from polynomials.
2. SWBAT factor difference of squares quadratics.

## NOTES

**GREATEST COMMON FACTOR (GCF)**

For a polynomial, the GCF is the largest term that is a divisor of every term in the polynomial.

You can find this among the coefficients (numbers) first – find the largest number that will divide evenly (without remainder) into all the coefficients.

If a variable is in common among all terms, then it is part of the GCF. The degree of the variable in the GCF is equal to the lowest degree of that variable among the polynomial terms.

## EXAMPLES

Find the GCF for each polynomial; then factor it out.

①  $6x^7 + 15x^3$

②  $10x^7 + 5$

③  $4a^5b + 12a^3b + 22ab$

④  $50p^7q^4r + 30p^4q^2r + 10p^3q^4$

**DIFFERENCE OF SQUARES (QUADRATIC)**

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

**EXAMPLES:**

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

$$4x^2 - 49y^2 = (2x + 7y)(2x - 7y)$$

## EXAMPLES

Factor using the difference of squares formula.

⑤  $k^2 - 100$

⑥  $9x^2 - 25$

⑦  $a^2 - 121b^2$

⑧  $16g^2 - 81h^2$

## [SHOW YOUR WORK]

Factor out the GCF for each polynomial.

1.  $3x^2 + 18x - 12$
2.  $12x^2 - 10x + 2$
3.  $15x^2 + 5x - 30$
4.  $x^3 - 4x^2 - 8x$
5.  $5x^3y - x^2y^2 + 2xy^3$
6.  $24x^2y^3 - 72xy^2$

Factor each polynomial using the difference of squares formula.

7.  $4x^2 - 25$
8.  $x^2 - 1$
9.  $16x^2 - 9$
10.  $49x^2 - 100$
11.  $144x^2 - y^2$
12.  $25x^2 - 36y^2$

Factor each polynomial using either or both methods from this lesson. (If both should be used, use GCF method first.)

13.  $x^2 - 81$
14.  $20x^2 - 28x$
15.  $4x^2 - 400$
16.  $3x^3 - 12x$
17.  $6x^3y - 150xy$
18.  $11x^4 - 99x^2$

- ★ 19. Heather has 2 favorite whole numbers. When she adds them she gets 49, and when she multiplies them she gets 600. What are Heather's 2 favorite numbers?