

Essential Question: What does it mean to factor completely?

Factor fully

Do Now:

a. Factor by factoring out the GCF.

$$4x^3 - 4x^2 - 80x$$

$$4x(x^2 - x - 20)$$

b. Factor into two binomials.

$$x^2 - x - 20$$

$$(x-5)(x+4)$$



What does it mean to factor completely?

Factoring a Polynomial "completely" means....

- We can write the polynomial as a product of a monomial and one or more polynomial factors or two or more polynomial factors
- Polynomial factors
  - have integer coefficients
  - are "prime polynomials" because its terms do not have common factors

Example: Factor  $4x^3 - 4x^2 - 80x$  completely.

$$4x(x^2 - x - 20)$$

$$4x(x-5)(x+4)$$

When factoring completely...make sure to

- 1) Factor out the GCF FIRST!
- 2) Factor using DOTS (if you have a binomial factor) or AM method (if you have a trinomial factor)

Examples: Factor Completely

1.  $4x^2 + 8x - 320$

$$4(x^2 + 2x - 80)$$

$$4(x-8)(x+10)$$

2.  $3x^2 + 15x + 18$

$$3(x^2 + 5x + 6)$$

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

3.  $2x^3 - 22x^2 + 60x$

$$2x(x^2 - 11x + 30)$$

$$2x(x-6)(x-5)$$

4.  $ax^2 - 16a$

$$a(x^2 - 16)$$

$$a(x+4)(x-4)$$

5.  $100y^6 - x^2y^4$

$$y^4(100y^2 - x^2)$$

$$y^4(10y - x)(10y + x)$$

7.  $ax^2 + 2ax + 11a$

$$a(x^2 + 2x + 11)$$

9.  $98 - 2a^2$

$$2(49 - a^2)$$

$$2(7 - a)(7 + a)$$

11.  $2y^2 - 9$

already  
simplified  
prime  
polynomial

13.  $4x^2 + 16$

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

15.  $-4x^2 - 12x + 16$

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

$$-4(x - 1)(x + 4)$$

6.  $32 - 18z^4$

$$2(16 - 9z^4)$$

$$2(4 - 3z^2)(4 + 3z^2)$$

8.  $4x^2 - 36xy + 56y^2$

$$4(x^2 - 9yx + 14y^2)$$

$$4(x - 7y)(x - 2y)$$

10.  $3x^2 + 39x + 108$

$$3(x^2 + 13x + 36)$$

$$3(x + 9)(x + 4)$$

12.  $y^3 - 16$

prime polynomial

14.  $m^3n - mn^3$

$$mn(m^2 - n^2)$$

$$mn(m - n)(m + n)$$

\* 16.  $2x^4 - 4x^2 - 16$

$$2(x^4 - 2x^2 - 8)$$

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

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