

LCM:

27

18

$$\begin{array}{r} = 27 \\ \swarrow \quad \searrow \\ 9 \quad 3 \\ \swarrow \quad \searrow \\ 3 \quad 1 \\ \swarrow \quad \searrow \\ = 3^3 \end{array}$$

$$\begin{array}{r} \underline{\underline{18}} \\ \swarrow \quad \searrow \\ 3 \quad 6 \\ \swarrow \quad \searrow \\ 3 \quad 2 \\ \swarrow \quad \searrow \\ = \underline{\underline{3^2 \times 2}} \end{array}$$

GCF: 9

$$\text{LCM: } \underline{\underline{3^3 \times 2}}$$

$$= \underline{\underline{54}}$$

$$\begin{array}{c}
 360 \\
 | \quad | \\
 36 \quad 10 \\
 | \quad | \\
 6 \quad 5 \\
 | \quad | \\
 3 \quad 2 \\
 | \quad | \\
 3 \quad 2
 \end{array}$$

$$= \underline{\underline{2^3}} \cdot \underline{\underline{3^2}} \cdot 5$$

$$\begin{array}{c}
 336 \\
 | \quad | \\
 8 \quad 42 \\
 | \quad | \\
 4 \quad 21 \\
 | \quad | \\
 2 \quad 7 \\
 | \quad | \\
 3 \quad 2
 \end{array}$$

$$= \underline{\underline{2^4}} \cdot 7 \cdot \underline{\underline{3}}$$

Find LCM
and GCF

GCF \Rightarrow "Look for factors common to all, then choose lowest power of each and multiply"

$$\begin{aligned}
 \text{GCF} &= \underline{\underline{2^3}} \times \underline{\underline{3}} \\
 &= \underline{\underline{24}}
 \end{aligned}$$

LCM \Rightarrow "Must include every factor from all numbers, select highest exponent from factors that repeat."

$$\begin{aligned}
 \text{LCM} &= \underline{\underline{2^4}} \times \underline{\underline{3^2}} \times 5 \times 7 \\
 &= 16 \times 9 \times 35 \\
 &= \underline{\underline{5040}}
 \end{aligned}$$

Factoring



There are 5 different kinds of Factoring:

- Greatest common factor (GCF)
- Factor by grouping ("Pair them up")
- Simple Trinomials (Factor by Inspection)
- Hard Trinomials (Factor by Decomposition)
- Special Factors
 - Difference of Squares
 - Perfect Square Trinomials

Greatest Common Factor- there is a **Greatest Common Factor** amongst any number of terms in a polynomial

- factor out the GCF from the polynomial and multiply it against the remainder.
- sometimes the GCF may be a polynomial.
ex: ~~common binomial~~

EXAMPLES...

1) $5x^2 + 25x^3 - 30x^4$ 2) $36x^7y^4 - 16x^3y^5 - 24x^5y^3$

$$(5x^2)(1+5x-6x^2) \left\{ \begin{array}{l} \text{Lowest degree terms} \\ \text{GCF} \end{array} \right. \quad 4x^3y^3(9x^4y - 4y^2 - 6x^2)$$

3) $5w^3 - 2w^9$ 4) $9x(a - b) - 14y(a - b)$

$$\$^3(5w - 2\$^6) \quad (a-b) \quad \begin{array}{c} \cancel{\text{---}} \\ \cancel{\text{---}} \end{array} \quad \leftarrow \begin{array}{l} \text{Binomial} \\ \text{(common factor)} \end{array}$$

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

$$\begin{aligned} & (x-y)^2 - (x-y) \\ & (x-y)(x-y) - (x-y) \\ & (x-y)[(x-y) - 1] \\ & (x-y)(x-y-1) \end{aligned}$$

$$9x \quad \text{---} \quad -14y \quad \text{---} \quad (9x-14y)$$

Factor:

$$1) 3m^2 + 27$$

$$= 3(m^2 + 9)$$

$$2) -12x^3y^7 + 10x^2y$$

$$= 2x^2y(-6xy^6 + 5)$$

$$= -2x^2y(6xy^6 - 5)$$

$$3) -10a^2b^4 - 35a^{10}$$

$$= -5a^2(2b^4 + 7a^8)$$

$$4) 24a^7b^4c - 8a^{10}b^2c^3 + b^5c^7$$

$$= b^2c(24a^7b^2 - 8a^{10}c^2 + b^3c^6)$$

FACTOR:

$$\textcircled{1} \quad 3\omega^3 \underline{(x+7)^4} - 12\omega^8 \underline{(x+7)^1}$$

$$= 3\omega^3(x+7)^1 \left[(x+7)^3 - 4\omega^5 \right]$$
$$= 3\omega^3(x+7) \left((x+7)^3 - 4\omega^5 \right)$$

$$\textcircled{2} \quad (4\omega^7 - 2b)^7 - 4\omega^7 + 2b$$

$$(4\omega^7 - 2b)^7 - (4\omega^7 - 2b)^1$$

$$(4\omega^7 - 2b)^1 \left[(4\omega^7 - 2b)^6 - 1 \right]$$

Pg. 165
8, 10, 14
15(b), 16