

# Factoring Polynomials

- Types of Factoring
1. Greatest Common
  2. Trinomials I
  3. Trinomials II
  4. Difference Squares

## How to (Greatest) Common Factor a Polynomial

ex 1)  $2x^2, 6$

GCF = 2

ex 3)  $12x^2y, 32y^2$

GCF =  $4y$

ex 2)  $4x^2, 12x$

GCF =  $4x$

ex 4)  $-12y^3, -42y^2$

GCF =  $-6y^2$

Factoring - is the reverse of multiplying  
 - to write an expression as a product of its GCFs

How to factor  $4x^2 + 6x$  ?

Step 1: Find Prime Factors

$$4x^2 = 2 \cdot 2 \cdot x \cdot x$$

$$6x = 2 \cdot 3 \cdot x$$

Step 2: Find GCF

$$GCF = 2x$$

Step 3: Write GCF in front of brackets and "left overs" inside brackets

$$\frac{4x^2}{2x} + \frac{6x}{2x} \qquad 2x(2x + 3)$$

## Common Factor

$$\text{a) } \frac{3x}{3} + \frac{3y}{3} \\ 3(x + y)$$

$$\text{b) } \frac{5x}{5} + \frac{10}{5} \\ 5(x + 2)$$

$$\text{c) } \frac{6a}{3} - \frac{9}{3} \\ 3(2a - 3)$$

$$\text{d) } \frac{3a}{3} - \frac{9b}{3} + \frac{12c}{3} \\ 3(a - 3b + 4c)$$

$$\text{e) } \frac{x^2}{x} - \frac{4x}{x} \\ x(x - 4)$$

$$\text{f) } 3bx - 4by \\ b(3x - 4y)$$

$$\text{g) } \frac{4hx}{4h} + \frac{8hy}{4h} \\ 4h(x + 2y)$$

$$\text{h) } 5x^3 + 3x^2 \\ x^2(5x + 3)$$

$$\text{i) } \frac{5xy^2}{xy} + \frac{2x^2y}{xy} \\ xy(5y + 2x)$$

$$\text{j) } \frac{3y^3}{3y} - \frac{6y^2}{3y} + \frac{3y}{3y} \\ 3y(y^2 - 2y + 1)$$

$$\text{k) } 4y^3 + 6xy - 12xy^2 \\ 2y(2y^2 + 3x - 6xy)$$

## Prime Factorization Worksheet

- Write each number as a product of its prime factors.  
a) 192  $2^6 \cdot 3$     b) 195  $3 \cdot 5 \cdot 13$     c) 1022  $2 \cdot 7 \cdot 73$     d) 6125  $5^3 \cdot 7^2$
- Write each number as a product of its prime factors using factor trees.  
a) 40  $2^3 \cdot 5$     b) 75  $5^2 \cdot 3$     c) 140  $2^2 \cdot 5 \cdot 7$     d) 96  $2^5 \cdot 3$
- Determine the greatest common factor (GCF) of each pair of numbers.  
a) 46, 84    b) 64, 120    c) 81, 216    d) 180, 224
- Determine the least common multiple (LCM) of each pair of numbers.  
a) 12, 14    b) 45, 60    c) 38, 42    d) 28, 52
- Two marching bands are to be arranged in rectangular arrays with the same number of columns. One band has 42 members and the other has 36 members. What is the greatest number of columns in the array?  $6$
- A developer wants to subdivide a rectangular plot of land with sides 3200 m and 2400 m into congruent square pieces. What is the side length with the largest possible square?  $800 \text{ m}$
- What are the dimensions of the smallest square that could be tiled using a 18 cm by 24 cm tile?  $72 \text{ cm} \times 72 \text{ cm}$

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