Lesson #2 Common Factoring

The greatest common factor (GCF) of a set of terms is:

the largest number and/or variable that divides evenly into all terms.

Example 1: Identify the GCF of the following terms.

a) 4, 8, 12   GCF = 4

$4 = 1, 2, 4$
$8 = 1, 2, 4, 8$
$12 = 1, 2, 3, 4, 6, 12$

b) $28k, 14k^2, 21k^3$ GCF = $7k$

$28 = 1, 2, 4, 7, 14, 28$
$14 = 1, 2, 7, 14$
$21 = 1, 3, 7, 21$

$28 = 7 \cdot k$
$14 = k \cdot k$
$21 = k \cdot k \cdot k$

c) p^7q^8, p^3q^6, p^5q^2 GCF = p^3q^2

d) $9x^3y^4, 18x^6y^7, 6x^7y^2$ GCF = $3x^3y^2$

$9 = 1, 3, 9$
$18 = 1, 2, 3, 6, 9, 18$
$6 = 1, 2, 3, 6$

To common factor ...

✓ Look for the GCF of all the terms in the polynomial

✓ Remove the common factor and divide it into all terms

Example 2: Common factor each polynomial.

a) $6x + 30$ GCF = 6

$= 6\left(\dfrac{6x+30}{6}\right)$

$= 6(x+5)$

b) $x^2 - x$ GCF = x

$= x\left(\dfrac{x^2-x}{x}\right)$

$= x(x-1)$

c) $2a^2 - 10a$ GCF = 2a

$= 2a\left(\dfrac{2a^2-10a}{2a}\right)$

$= 2a(a-5)$

d) $10p^4 - 15p^3 - 5p^2$ GCF = $5p^2$

$= 5p^2\left(\dfrac{10p^4-15p^3-5p^2}{5p^2}\right)$

$= 5p^2(2p^2 - 3p - 1)$

e) $m^3n^2 - mn^4 - m^5n$ GCF = mn

$= mn\left(\dfrac{m^3n^2-mn^4-m^5n}{mn}\right)$

$= mn(m^2n - n^3 - m^4)$

f) $49xy^2z + 14x^2yz^2 - 35xyz$

$14 = 1, 2, 7, 14$
$35 = 1, 5, 7, 35$
$49 = 1, 7$

GCF = 7xyz

$= 7xyz\left(\dfrac{49xy^2z + 14x^2yz^2 - 35xyz}{7xyz}\right)$

$= 7xyz(7y + 2xz - 5)$
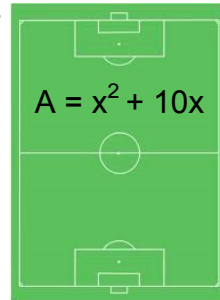
Example 3: A soccer field has the area shown.

a) Find the length and width of the soccer field by factoring the area expression.

$A = x\left(\dfrac{x^2+10x}{x}\right)$

$A = x(x+10)$

$A = lxw$

$L = x$

$W = x+10$

$A = x^2 + 10x$

b) Find the length and width of the soccer field if x = 2 m.

$L = x$
$L = 2m$

$W = x+10$
$= 2+10$
$= 12m$

c) Find the perimeter of the field.

$P = L + l + w + w$
$= 2L + 2w$
$= 2(2) + 2(12)$
$= 4 + 24$
$= 28m$