

## Factoring Polynomials

Factor out the GCF for each polynomial, if possible.

1)  $50k^2 - 40$

GCF = 10 ← greatest integer

$$\frac{50k^2}{10} - \frac{40}{10} = 5k^2 - 4$$

$$10(5k^2 - 4)$$

2)  $-3r^5 + 10r^4$  ← smallest exponent

GCF =  $r^4$

$$\frac{-3r^5}{r^4} + \frac{10r^4}{r^4} = -3r + 10$$

$$r^4(-3r + 10)$$

3)  $2x^5 + 1$

no GCF.

4)  $63r^3 - 35r - 70$

GCF = 7

$$\frac{63r^3}{7} - \frac{35r}{7} - \frac{70}{7} = 9r^3 - 5r - 10$$

$$7(9r^3 - 5r - 10)$$

5)  $60x^4 + 36x^3 - 6x$

GCF =  $6x$

$$\frac{60x^4}{6x} + \frac{36x^3}{6x} - \frac{6x}{6x} = 10x^3 + 6x^2 - 1$$

$$6x(10x^3 + 6x^2 - 1)$$

Factor each polynomial.

6)  $a^2 + 10a + 16$

$a=1, b=10, c=16$

Factor Pairs of 16 (a.c)

1.16

2.8

4.4

Sum = 10 (b)

$2+8=10 \checkmark$

$a^2 + 10a + 16 = (x+2)(x+8)$

or

$(x+8)(x+2)$

7)  $b^2 + b - 12$

$a=1, b=1, c=-12$

Factor Pairs of -12 (a.c)

1.(-12) or -1.12

2.(-6) or -2.6

3.(-4) or -3.4

Sum = 1 (b)

$-3+4=1 \checkmark$

$b^2 + b - 12 = (b-3)(b+4)$

or

$(b+4)(b-3)$

8)  $b^2 + 10b + 25$

$a=1, b=10, c=25$

Factor Pairs of 25 (a.c)

1.25

5.5

Sum = 10 (b)

$5+5=10 \checkmark$

$b^2 + 10b + 25 = (b+5)(b+5)$

$= (b+5)^2$

9)  $x^2 - 19x + 90$

$a=1, b=-19, c=90$

Factor Pairs of 90 (a.c)

-1.(-90)

-2.(-45)

-3.(-30)

-5.(-18)

-6.(-15)

-9.(-10)

Sum = -19 (b)

$-9+(-10)=-19 \checkmark$

$x^2 - 19x + 90 = (x-9)(x-10)$

or

$(x-10)(x-9)$

10)  $n^2 - 2n - 8$

$a=1, b=-2, c=-8$

Factor Pairs of -8 (a.c)

1.(-8) or -1.8

2.(-4) or -2.4

Sum = -2 (b)

$2+(-4)=-2 \checkmark$

$n^2 - 2n - 8 = (n+2)(n-4)$

or

$(n-4)(n+2)$

Factor out the GCF, if possible. Then, factor each polynomial.

$$11) \frac{3x^2 - 15x - 18}{3 \cdot 3 \cdot 3} = x^2 - 5x - 6$$

$$\text{GCF} = 3$$

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

$$a = 1, b = -5, c = -6$$

Factors of -6 (a.c)

$$1 \cdot (-6) \text{ or } -1 \cdot 6$$

$$2 \cdot (-3) \text{ or } -2 \cdot 3$$

$$\text{Sum} = -5 \text{ (b)}$$

$$1 + (-6) = -5 \checkmark$$

$$3x^2 - 15x - 18 = \underline{3}(x+1)(x-6)$$

Don't forget  
the GCF!

$$13) \frac{2k^2 - 50}{2 \cdot 2} = k^2 - 25$$

$$2(k^2 - 25)$$

$$a = 1, b = 0, c = -25$$

Factors of -25 (a.c)

$$1 \cdot (-25) \text{ or } -1 \cdot 25$$

$$5 \cdot (-5)$$

$$\text{Sum} = 0 \text{ (b)}$$

$$5 + (-5) = 0$$

$$2k^2 - 50 = \underline{2}(k+5)(k-5)$$

$$12) \frac{6x^2 + 24x - 72}{6 \cdot 6 \cdot 6} = x^2 + 4x - 12$$

$$\text{GCF} = 6$$

$$6(x^2 + 4x - 12)$$

$$a = 1, b = 4, c = -12$$

Factors of -12 (a.c)

$$1 \cdot (-12) \text{ or } -1 \cdot 12$$

$$2 \cdot (-6) \text{ or } -2 \cdot 6$$

$$3 \cdot (-4) \text{ or } -3 \cdot 4$$

$$\text{Sum} = 4 \text{ (b)}$$

$$-2 + 6 = 4 \checkmark$$

$$6x^2 + 24x - 72 = \underline{6}(x-2)(x+6)$$