

Lesson 11: Factor $ax^2 + bx + c$ by Decomposition – Part 2

Always check for a GCF!

Examples: Factor completely.

$$1) \frac{12x^2}{3} - \frac{15x}{3} - \frac{18}{3} = 3(4x^2 - 5x - 6)$$

$$\text{GCF} = 3$$

$$\begin{array}{l} 1 \times 24 \\ 2 \times 12 \\ 3 \times 8 \\ 4 \times 6 \end{array}$$

$$\begin{array}{r} -5 \\ 3 \quad -8 \\ \hline -24 \end{array}$$

$$= 3((4x^2 - 8x) + (3x - 6))$$

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

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

$$2) \frac{40x^2}{2} - \frac{14x}{2} - \frac{12}{2}$$

$$\text{GCF} = 2$$

$$\begin{array}{r} -7 \\ 8 \quad -15 \\ \hline -120 \end{array}$$

$$= 2(20x^2 - 7x - 6)$$

$$= 2((20x^2 - 15x) + (8x - 6))$$

$$= 2(5x(4x-3) + 2(4x-3))$$

$$3) \frac{4x^3}{x} - \frac{7x^2}{x} - \frac{2x}{x}$$

$$\text{GCF} = x$$

$$\begin{array}{r} -7 \\ 1 \quad -8 \\ \hline -8 \end{array}$$

$$= x(4x^2 - 7x - 2)$$

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

$$= x(4x(x-2) + 1(x-2))$$

$$= x(x-2)(4x+1)$$

$$4) \frac{15x^2y}{5y} + \frac{35xy}{5y} - \frac{50y}{5y}$$

$$\text{GCF} = 5y$$

$$\begin{array}{r} 7 \\ -3 \quad 10 \\ \hline -30 \end{array}$$

$$= 5y(3x^2 + 7x - 10)$$

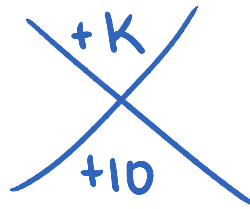
$$= 5y((3x^2 - 3x) + (10x - 10))$$

$$= 5y(3x(x-1) + 10(x-1))$$

$$= 5y(x-1)(3x+10)$$

Determining Integral Values of k

5) $x^2 + kx + 10$



sum of factors

Factors of 10

- 1×10
- -1×-10
- 2×5
- -2×-5

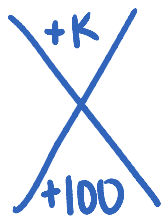
6) $4x^2 + kx + 25$

k values

- $1 + 10 = 11$
- $-1 + (-10) = -11$
- $2 + 5 = 7$
- $-2 + (-5) = -7$

4 possible answers.

$(4)(25) = 100$



Factors of 100

- $\pm 1 \times \pm 100$
- $\pm 2 \times \pm 50$
- $\pm 4 \times \pm 25$
- $\pm 5 \times \pm 20$
- $\pm 10 \times \pm 10$

k values

- ± 101
- ± 52
- ± 29
- ± 25
- ± 20

10 possible answers