

3.2: Factoring a Trinomial

Steps:

- 1) look for GCF
- 2) multiply 1st & last terms
- 3) Find factors that add up to middle term
- 4) replace middle term with both factors
- 5) factor by grouping

Ex 1) Factor: $x^2 + x - 6$
 first middle last

$$\begin{array}{r|l} x^2 + 3x & -2x - 6 \\ \hline \frac{x^2}{x} & \frac{-2x}{-2} \\ \frac{3x}{x} & \frac{-6}{-2} \end{array}$$

$$x(x+3) \quad | \quad -2(x+3)$$

$$\boxed{(x+3)(x-2)}$$

GCF: 1

$$x^2 \cdot -6 = -6x^2$$

$$\frac{3x}{\quad} + \frac{-2x}{\quad} = x$$

Ex 2) Factor: $12m^2 - 5m - 3$

$$\begin{array}{r|l} 12m^2 + 4m & -9m - 3 \\ \hline \frac{12m^2}{4m} & \frac{-9m}{-3} \\ \frac{4m}{4m} & \frac{-3}{-3} \end{array}$$

$$4m(3m+1) \quad | \quad -3(3m+1)$$

$$\boxed{(3m+1)(4m-3)}$$

GCF: 1

$$12m^2 \cdot -3 = -36m^2$$

$$\frac{4m}{\quad} + \frac{9m}{\quad} = -5m$$

$y = -36/x$

Ex 3) Factor: $\frac{6v^2}{3} - \frac{39v}{3} + \frac{60}{3}$

GCF: 3

$3(2v^2 - 13v + 20)$

$3\left(\frac{2v^2}{v} - \frac{5v}{v} - \frac{8v}{-4} + \frac{20}{-4}\right)$

$v(2v-5) - 4(2v-5)$

$3(2v-5)(v-4)$

$2v^2 \cdot 20 = 40v^2$

$-5v + 8v = -13v$

$y = 40/x$

$15y^2 \cdot 56 = 840y^2$

$24y + 35y = 59y$

$y = 840/x$

Ex 4) Factor: $15y^2 + 59y + 56$