

3.5: Part II

Factoring Trinomials of form $x^2 + bx + c$

Recall: multiplying binomials

$$\begin{aligned} &(x+4)(x+2) \\ &x(x+2) + 4(x+2) \\ &x^2 + 2x + 4x + 8 \\ &x^2 + 6x + 8 \end{aligned}$$

\uparrow add $(4+2)$ \uparrow multiply $(4+2)$

$$\begin{aligned} &(x-6)(x+3) \\ &x(x+3) - 6(x+3) \\ &x^2 + 3x - 6x - 18 \\ &x^2 - 3x - 18 \end{aligned}$$

\uparrow add $(-6+3)$ \uparrow multiply $(-6+3)$

pg. 163

ex 1) Factor

$$x^2 - 2x - 8$$

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

$$\begin{array}{l} \text{add} \Rightarrow -2 \\ \text{multiply} \Rightarrow -8 \\ \hline 2 + -4 \end{array}$$

Factors of 8

$$\begin{array}{l} 1 + 8 \\ \hline 2 + -4 \end{array}$$

2) x^2 ^{add} $-12x$ ^{multiply} $+35$

$$\begin{array}{l} \text{add } -12 \\ \text{multiply } 35 \\ \hline -7 + -5 \end{array}$$

$$(x-7)(x-5)$$

check

$$\begin{array}{l} x(x-5) - 7(x-5) \\ x^2 - 5x - 7x + 35 \\ x^2 - 12x + 35 \end{array}$$

3) $x^2 + 7x - 18$

$$\begin{array}{l} \text{add } 7 \\ \text{multiply } -18 \\ \hline -2 + 9 \end{array}$$

$$(x-2)(x+9)$$

$$\begin{array}{l} 18 \\ \hline 1 \quad 18 \\ -2 \quad 9 \\ \hline 3 \quad 6 \end{array}$$

4) $x^2 - 10x + 24$

$$(x-4)(x-6)$$

$$\begin{array}{l} (x-12)(x+2) \\ x(x+2) - 12(x+2) \\ x^2 + 2x - 12x - 24 \\ x^2 - 10x - 24 \end{array}$$

$$5) -4x^2 - 16x + 128$$

$$\text{GCF: } -4$$

$$-4(x^2 + 4x - 32)$$

$$\text{add} \Rightarrow 4$$

$$\text{mult} \Rightarrow -32$$

$$-4 \quad + \quad 8$$

$$\frac{32}{\quad}$$

$$1 \quad 32$$

$$2 \quad 16$$

$$\textcircled{-4 \quad 8}$$

$$\boxed{-4(x-4)(x+8)}$$