

Chapter 7 Review : Factoring

7.1: Factor out the GCF : Always do this step 1st !!

$$\text{ex) } 56x^2y^3z + 70xy^2z^2$$

$$= \underline{7xy^2z} (\underline{8xy + 10z})$$

Factor out 2

$$= \boxed{14xy^2z (4xy + 5z)}$$

7.2: Factor by Grouping : 4 terms.

$$\text{ex) } 2m^3 + 2m^2n + 2mn^2 + 2n^3$$

$$= 2((m^3 + m^2n) + (mn^2 + n^3))$$

$$= 2 \left[\underbrace{m^2(m+n)}_{\text{same}} + \underbrace{n^2(m+n)}_{\text{same}} \right]$$

$$= \boxed{2(m+n)(m^2+n^2)}$$

same

7.3: Factor the Trinomials: $a=1$

$$\text{ex) } n^2 + 6n + 5 = (n + 1)(n + 5)$$

\uparrow
 $a=1$

$\underbrace{\hspace{10em}}$
multiply = 5 (Last #)

Add = 6 (Middle #)

$$\text{ex) } a^2 - 7ab + 12b^2 = (a - 3b)(a - 4b)$$

$\underbrace{\hspace{10em}}$
multiply = 12

Add = -7

$$\text{ex) } x^2 - 5x - 24 = (x - 8)(x + 3)$$

$\underbrace{\hspace{10em}}$
multiply = -24

Add = -5

$$\text{ex) } y^4 + y^2 - 56 = (y^2 + 8)(y^2 - 7)$$

$\underbrace{\hspace{10em}}$
multiply = -56

Add = 1

7.4: Factoring Trinomials : $a \neq 1$

ex) $3x^2 + 7x + 2$

↑
 $a \neq 1$

$$= (x+2)(3x+1)$$

$$\begin{array}{cc} \textcircled{3} & \textcircled{2} \\ \downarrow & \downarrow \\ (1x+2) & \\ (3x \cancel{X} + 1) & \end{array}$$

$$6 + 1 = \boxed{7}$$

ex) $10x^2 - 17x + 3$

$$= (2x-3)(5x-1)$$

$$\begin{array}{cc} \textcircled{10} & \textcircled{3} \\ \downarrow & \downarrow \\ (2x \cancel{X} - 3) & \\ (5x \cancel{X} - 1) & \end{array}$$

$$-15 + -2 = \boxed{-17}$$

ex) $9x^2 - 9x + 2$

$$= (3x-2)(3x-1)$$

$$\begin{array}{cc} \textcircled{9} & \textcircled{2} \\ \downarrow & \downarrow \\ (3x \cancel{X} - 2) & \\ (3x \cancel{X} - 1) & \end{array}$$

$$-6 + -3 = \boxed{-9}$$

7.5: Special Binomials / Trinomials

ex) $x^2 - 16$ *must be minus!!* $= (x + \frac{4}{})(x - \frac{4}{})$

\uparrow \uparrow \uparrow
square square $\sqrt{16} = 4$

Name: Difference of 2 Squares.

ex) $16x^4 - 81 = (4x^2 + 9)(4x^2 - 9)$

Factor

$= (4x^2 + 9)(2x + 3)(2x - 3)$

ex) $7x^5 - 7x = 7x(x^4 - 1)$

Factor

$= 7x(x^2 + 1)(x^2 - 1)$

Factor

$= 7x(x^2 + 1)(x + 1)(x - 1)$

$$\text{ex) } \underbrace{25x^2}_{\substack{\uparrow \\ \text{square}}} + 70x + \underbrace{49}_{\substack{\uparrow \\ \text{square}}}$$

$$= (5x+7)^2$$

$$\begin{array}{r} \textcircled{25} \quad \textcircled{49} \\ \downarrow \quad \downarrow \\ 5 \quad \times \quad 7 \\ 5 \quad \quad 7 \\ \hline 35 + 35 = 70 \end{array}$$