

Review Factoring

Goal of this exercise :

- Determine the common factors in the terms of a polynomial, and express the polynomial in factored form.
- Factor a polynomial, and verify by multiplying the factors.
- Generalize and explain strategies used to factor a trinomial.

Factor the following equations

a) $x^2 + 4x + 4$
 $\begin{matrix} \nearrow & & \nwarrow \\ x & & 2 \end{matrix}$

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

b) $x^2 + 7x + 6$

$$\begin{matrix} \otimes 6 \\ \oplus 7 \end{matrix} \left. \vphantom{\begin{matrix} \otimes 6 \\ \oplus 7 \end{matrix}} \right\} 6 \neq 1$$

$$= (x+6)(x+1)$$

c) $x^2 + 11x + 18$

$$\begin{matrix} \otimes 18 \\ \oplus 11 \end{matrix} \left. \vphantom{\begin{matrix} \otimes 18 \\ \oplus 11 \end{matrix}} \right\} 9 \neq 2$$

$$= (x+9)(x+2)$$

d) $2y^2 + 3y + 1$

$$\begin{matrix} \otimes 2 \\ \oplus 3 \end{matrix} \left. \vphantom{\begin{matrix} \otimes 2 \\ \oplus 3 \end{matrix}} \right\} 2 \neq 1$$

$$= 2y^2 + 2y + y + 1$$

$$= 2y(y+1) + 1(y+1)$$

$$= (2y+1)(y+1)$$

e) $2y^2 + 5y - 12$

$$\begin{matrix} \otimes -24 \\ \oplus 5 \end{matrix} \left. \vphantom{\begin{matrix} \otimes -24 \\ \oplus 5 \end{matrix}} \right\} 8 \neq -3$$

$$= 2y^2 + 8y - 3y - 12$$

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

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

f) $6x^2 + 5x + 1$

$$\begin{matrix} \otimes 6 \\ \oplus 5 \end{matrix} \left. \vphantom{\begin{matrix} \otimes 6 \\ \oplus 5 \end{matrix}} \right\} 2 \neq 3$$

$$= 6x^2 + 2x + 3x + 1$$

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

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

g) $25x^2 + 110x + 121$

$$\begin{matrix} \nearrow & & \nwarrow \\ 5x & & 11 \end{matrix}$$

$$= (5x+11)^2$$

h) $x^2 + 7x + 6$

already done in b)
 $\ddot{\smile}$

$25 - 10x + x^2$ $\begin{matrix} \downarrow & \downarrow & \downarrow \\ 5 & 5 & x \\ \text{DR} & \text{DR} & \end{matrix}$ $= (5-x)^2$	$6z^2 - 16z + z^2$ $= z^2 + 6z - 16$ $\begin{matrix} \otimes -16 \\ \oplus 6 \end{matrix} \left\{ \begin{matrix} 8z - 2 \\ 8z - 2 \end{matrix} \right.$ $= (z+8)(z-2)$	$2x^2 + 8x - 42$ $= 2(x^2 + 4x - 21)$ $\begin{matrix} \otimes -21 \\ \oplus 4 \end{matrix} \left\{ \begin{matrix} 7x - 3 \\ 7x - 3 \end{matrix} \right.$ $= 2(x+7)(x-3)$
$2y^2 + 5y - 12$ $\begin{matrix} \otimes -24 \\ \oplus 5 \end{matrix} \left\{ \begin{matrix} 8y - 3 \\ 8y - 3 \end{matrix} \right.$ $= 2y^2 + 8y - 3y - 12$ $= 2y(y+4) - 3(y+4)$ $= (2y-3)(y+4)$	$y^2 + 3y - 10$ $= (y+5)(y-2)$ $\begin{matrix} \otimes -10 \\ \oplus 3 \end{matrix} \left\{ \begin{matrix} 5y - 2 \\ 5y - 2 \end{matrix} \right.$	$x^2 + 2x - 8$ $= (x+4)(x-2)$ $\begin{matrix} \otimes -8 \\ \oplus 2 \end{matrix} \left\{ \begin{matrix} 4x - 2 \\ 4x - 2 \end{matrix} \right.$

$$\begin{aligned} &= (m-2)(6m+5) \\ &= 6m(m-2) + 5(m-2) \\ &= 6m^2 - 12m + 5m - 10 \\ &= 6m^2 - 7m - 10 \end{aligned}$$

$$\begin{matrix} \otimes -60 \\ \oplus -7 \end{matrix} \left\{ \begin{matrix} -12m + 5 \\ -12m + 5 \end{matrix} \right.$$

i) $6m^2 - 7m - 10$

$$\begin{aligned} &= 4(2h-3)(3h+2) \\ &= 4(3h(2h-3) + 2(2h-3)) \\ &= 4(6h^2 - 9h + 4h - 6) \\ &= 4(6h^2 - 5h - 6) \end{aligned}$$

$$\begin{matrix} \otimes -36 \\ \oplus -5 \end{matrix} \left\{ \begin{matrix} -9h + 4 \\ -9h + 4 \end{matrix} \right.$$

j) $24h^2 - 20h - 24$