

Mathematics 11U

2.3b – Factoring ax^2+bx+c

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

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

$$= 6x^2 + 9x - 10x - 15$$

$$= 6x^2 - x - 15$$

~~Fact 1~~ Distributive Property

$$2(x+3) = 2x+6$$

$$6x^2 - x - 15 \quad \begin{matrix} \otimes & -90 \\ \oplus & -1 \end{matrix}$$

$$= \underbrace{6x^2 + 9x}_{3x} - \underbrace{10x - 15}_{-5}$$

$$= \underline{3x(2x+3)} - \underline{5(2x+3)}$$

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

1, 90
2, 45
3, 30
5, 18
6, 15
9, -10

$$1) \quad 5x^2 - 28x - 12$$

$$= \underbrace{5x^2 - 30x}_{5x} + \underbrace{2x - 12}_2$$

$\begin{cases} \textcircled{x} -60 \\ \textcircled{+} -28 \\ 1, 60 \\ 2, -30 \end{cases}$

$$= 5x(x-6) + 2(x-6)$$

$$= (x-6)(5x+2)$$

$$2) \quad 9x^2 - 15x - 50$$

$\begin{cases} \textcircled{x} -450 \\ \textcircled{+} -15 \end{cases}$

$$= \underbrace{9x^2 + 15x}_{3x} - \underbrace{30x - 50}_{-10}$$

$\begin{cases} \textcircled{x} -450 \\ \textcircled{+} -15 \end{cases}$
 $\textcircled{-30, 15}$

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

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

$$3) 42x^2 + 342x + 336$$

$$= 6(7x^2 + 57x + 56) \quad \begin{matrix} \textcircled{x} 392 \\ \textcircled{+} 57 \end{matrix}$$

$$= 6 \left(\underbrace{7x^2 + 49x}_{7x} + \underbrace{8x + 56}_8 \right) \quad \begin{matrix} 1, 392 \\ 2, 196 \end{matrix}$$

$$= 6 \left[7x(x+7) + 8(x+7) \right] \quad \begin{matrix} 4, 98 \\ 7, 56 \end{matrix}$$

$$= 6(x+7)(7x+8)$$

$$\textcircled{8, 49}$$

$$4) \downarrow -54x^2 + 252x - 240$$

$$-6(9x^2 - 42x + 40) \quad \begin{matrix} \textcircled{x} 360 \\ \textcircled{+} -42 \end{matrix}$$

$$-6 \left(\underbrace{9x^2 - 12x}_{3x} - \underbrace{30x + 40}_{-10} \right)$$

$$-6 \left[3x(3x-4) - 10(3x-4) \right] \quad \begin{matrix} 9, 40 \\ 10, 36 \end{matrix}$$

$$-6(3x-4)(3x-10)$$

$$\textcircled{12, 30}$$