

S.C #37

$$\text{Exp} = \frac{1}{2}x^2 - \frac{1}{3}x^2y + 2y^3 + \frac{1}{4}x^2 - \frac{8}{3}x^2y^2 - \frac{1}{2}y^3$$

LCM = 12

$$\begin{aligned} \boxed{12 \text{ Exp}} &= 12\left(\frac{1}{2}x^2\right) - 12\left(\frac{1}{3}x^2y\right) + 12(2y^3) + 12\left(\frac{1}{4}x^2\right) \\ &\quad - 12\left(\frac{8}{3}x^2y^2\right) - 12\left(\frac{1}{2}y^3\right) \\ &= \underline{6x^2} - \underline{4x^2y} + \underline{24y^3} + \underline{3x^2} - \underline{32x^2y^2} - \underline{6y^3} \\ &= 9x^2 - 4x^2y + 18y^3 - 32x^2y^2 \end{aligned}$$

$$\begin{aligned} \Rightarrow \text{Exp} &= \frac{9}{12}x^2 - \frac{4}{12}x^2y + \frac{18}{12}y^3 - \frac{32}{12}x^2y^2 \\ &= \frac{3}{4}x^2 - \frac{1}{3}x^2y + \frac{3}{2}y^3 - \frac{8}{3}x^2y^2 \end{aligned}$$

5.6 # 37 $\square^2 + 8\square + 7$

$$(5x+1)^2 + 8(5x+1) + 7$$

Let $u = 5x+1$. This gives

$$u^2 + 8u + 7$$

$$= \underline{(u+7)(u+1)}$$

$$= (5x+1+7)(5x+1+1)$$

$$= (5x+8)(5x+2)$$

This expression
is "quadratic in
 $5x+1$ "

u-substitution $(x-1)^2 + 8(x-1) + 7$

Let $u = x-1$. This gives

Factor with respect to u. $u^2 + 8u + 7$

un-substitute $= (u+7)(u+1)$

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

Simplify $= (x+6)(x) = x(x+6)$

Find the GCF of

$$\underline{10}x^5y^2z^2, \underline{20}x^3z^4, \underline{45}x^4y^2z^3$$
$$\begin{array}{r} 2 \overline{)10} \\ \underline{5} \end{array} \quad \begin{array}{r} 2 \overline{)20} \\ \underline{2} \overline{)10} \\ \underline{5} \end{array} \quad \begin{array}{r} 3 \overline{)45} \\ \underline{3} \overline{)15} \\ \underline{5} \end{array}$$

GCF = $5x^3z^2$ it divides all 3 expressions.
It's the biggest thing that does.

Factor out the GCF.

$$\text{GCF} = 2x^3$$

$$\begin{aligned} & 6x^5 - 8x^4 + 2x^3 \\ &= 2x^3 \left(\frac{6x^5}{2x^3} - \frac{8x^4}{2x^3} + \frac{2x^3}{2x^3} \right) \\ &= 2x^3 (3x^2 - 4x + 1) \end{aligned}$$

$$20x(x+5) - 13(x+5) \quad \text{GCF} = (x+5)$$

$$\begin{aligned} &= (x+5) \left(\frac{\cancel{20x(x+5)}}{\cancel{x+5}} - \frac{\cancel{13(x+5)}}{\cancel{x+5}} \right) \\ &= (x+5)(20x - 13) \end{aligned}$$

$$\begin{aligned} & 20x(x+5) - x - 5 \\ = & 20x(x+5) - 1(x+5) \\ = & (x+5)(20x-1) \end{aligned}$$

The "1" often goes overlooked.

$$\begin{aligned} & 20x(x+5) + x+5 \\ = & 20x(x+5) + (x+5) \\ = & (x+5) \left(\frac{20x(x+5)}{(x+5)} + \frac{(x+5)}{(x+5)} \right) \\ = & (x+5)(20x+1) \end{aligned}$$

Factoring by Grouping

$$3x(x-4) - (x-4)$$
$$= (x-4)(3x-1)$$

$$x^3 - 2x^2 - 3x + 6$$
$$= x^2(x-2) - 3(x-2)$$
$$= \boxed{(x-2)(x^2-3)}$$

Why factor by grouping?

To reclaim the original product.

$$(x-3)(2x+5) = 2x^2 + 5x - 6x - 15$$

Factor by grouping:

$$2x^2 + 5x - 6x - 15$$

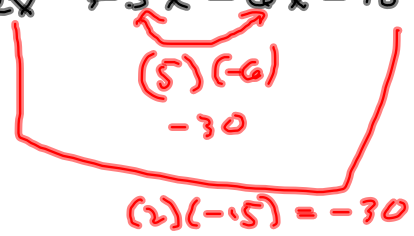
$$= x(2x+5) - 3(2x+5)$$

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

It's easy to
get from
here to there

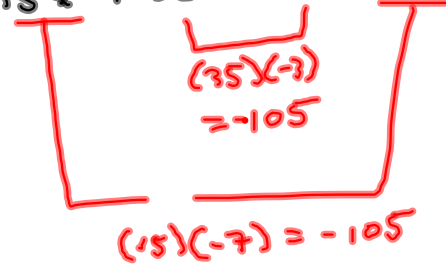
If you can
factor by grouping.

$$(x-3)(2x+5) = 2x^2 + 5x - 6x - 15$$



-30 is the magic #

$$(5x-1)(3x+7) = 15x^2 + 35x - 3x - 7$$



-105 is the magic #.

Factor

$$15x^2 + 32x - 7$$

Find two #s that subtract to give 32 and multiply to give -105

Magic #: $(15)(-7) = -105$

$$(15)(-7) = -105$$

Subtract because magic # is negative. Sweet!

$$\begin{aligned} 32 &= 33 - 1 \\ &= 34 - 2 \\ &= 35 - 3 \end{aligned}$$

$$\begin{aligned} (33)(-1) &= -33 \\ (34)(-2) &= -68 \\ (35)(-3) &= -105 \end{aligned}$$

$$15x^2 + 35x - 3x - 7$$

& factor by grouping.

$$5x(3x+7) - 1(3x+7)$$

Jackie

$$(3x+7)(5x-1)$$

Monday 5.5
Tuesday 5.6