

Unit 4 : Adding and Subtracting Fractions

e.x.

$$\frac{x^2}{5x^3} + \frac{5x^2 - 20}{x^2 + 4x + 4}$$

① $5x^2 - 20$

$5(x^2 - 4)$

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

$$\frac{x^2}{5x^3} + \frac{5(x-2)(x+2)}{(x+2)(x+2)}$$

② $x^2 + 4x + 4$

$(x+2)(x+2)$

$$\frac{1(x+2)}{5x(x+2)} + \frac{5(x-2)5x}{(x+2)5x}$$

Now while performing operation, don't ever i. LCD simplify.

ii. write LCD once, connect tops

iii evaluate tops BEDMAS

$$\frac{x+2 + 5(x-2)5x}{(x+2)5x}$$

$$\frac{x+2 + 5(5x^2 - 10x)}{(x+2)5x}$$

$$(x+2)5x$$

$$\frac{x+2 + 25x^2 - 50x}{(x+2)5x}$$

$$(x+2)5x$$

$$\frac{25x^2 - 49x + 2}{(x+2)5x}$$

$$(x+2)5x$$

$$25 \times 2 = 50$$

$$50 \quad 1$$

$$-50 \quad -1$$

$$+50 \quad 1 = 50$$

wrong
you can't
cross fraction
cancel out

$$\frac{x^2}{5x^3} + \frac{5(x-2)(x+2)}{(x+2)(x+2)}$$

okay, but
not
advisable

$$\frac{x^2}{5x^3} \times \frac{5(x-2)(x+2)}{(x+2)(x+2)}$$

lest you
mix it up
with adding

$$\frac{x^2}{5x^3} \times \frac{5(x-2)(x+2)}{(x+2)(x+2)}$$

$$\frac{1}{5x} \times \frac{5(x-2)}{(x+2)}$$

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

Note: When adding or subtracting (not x or $\frac{1}{2}$) multipl fractions you can do it simultaneously

ex. $\frac{2}{2-3b+b^2} + \frac{3}{2+b-b^2} - \frac{4}{4-4b^2}$

$(b-2)(b-1)$ $(b-2)(b-1)$ $4(1-b^2)$
 $(b-2)(b-1)$ $(b-2)(b-1)$ $4(1+b)(1-b)$
 $(b-2)(b-1)$ $(b-2)(b-1)$ $4(1+b)(1-b)$

$\frac{2}{(b-2)(b-1)} + \frac{3}{(b+1)(-b+2)} - \frac{4}{4(1+b)(1-b)}$

$\frac{2}{(b-2)(b-1)} + \frac{3}{(b+1)(-b+2)} - \frac{1}{(1+b)(1-b)}$

i.LCD
(the denominator is missing what bracket?)

$\frac{2}{(b-2)(b-1)} + \frac{3}{-1(b+1)(b-2)} - \frac{1}{-1(1+b)(-1+b)}$

see if you can factor out a -1 to make the bottom brackets the same.

$\frac{2(b+1)}{(b-2)(b-1)(b+1)} - \frac{3(b-1)}{(b+1)(b-2)(b-1)} + \frac{1(b-2)}{(b+1)(b-1)(b-2)}$

$\frac{2(b+1) - 3(b-1) + (b-2)}{(b-2)(b-1)(b+1)}$

$\frac{2b + 2 - 3b + 3 + b - 2}{(b-2)(b-1)(b+1)} = \frac{3}{(b-2)(b-1)(b+1)}$

$$\text{ex. } \frac{2}{2-x} + \frac{2x}{x^2-3x+2}$$

$$\frac{2}{2-x} + \frac{2x}{(x-2)(x-1)}$$

$$\frac{2(x-1)}{(2-x)(x-1)} + \frac{2x}{(-x+2)(x-1)} = \frac{2(x-1) - 2x}{(x-1)(2-x)}$$

$$= \frac{2x - 2 - 2x}{(x-1)(2-x)}$$

$$= \frac{-2}{(x-1)(2-x)}$$

$$\frac{2}{2p-5q} - \frac{p}{p^2-pq-2q^2} + \frac{4q}{2p^2-9pq+10q^2}$$

$$\frac{2(p-2q)(p+q)}{(2p-5q)(p-2q)(p+q)} - \frac{p(2p-5q)}{(2p-5q)(p-2q)(p+q)} + \frac{4q(p+q)}{(p-2q)(2p-5q)(p+q)}$$

$$\frac{2(p-2q)(p+q) - p(2p-5q) + 4q(p+q)}{(2p-5q)(p+q)(p-2q)}$$

$$\frac{(2p-4q)(p+q) - 2p^2 + 5pq + 4pq + 4q^2}{(2p-5q)(p+q)(p-2q)}$$

$$\frac{\cancel{2p^2} + 2pq - 4pq - \cancel{4q^2} - \cancel{2p^2} + 9pq + \cancel{4q^2}}{(p-2q)(2p-5q)(p+q)}$$

$$\frac{7pq}{(p-2q)(2p-5q)(p+q)}$$

$$(p-2q)(2p-5q)(p+q)$$

Unit 5 : AF Questions \bar{w}

4 operations
[+ - x \div]

Note: When presented
multiple operations
look to pope Francis (jk
BEDMAS) to know which
operation to do first!

ex

$$\textcircled{1} \frac{d^2 - d - 6}{6d^2 - 39} \times \left[\frac{d^2 + 2d}{d^2 - 3d} + \frac{d + 3}{d - 2} \right],$$

$$\textcircled{1} \begin{matrix} d^2 - d - 6 & -4 \\ & -3 \end{matrix} \begin{matrix} \\ 2 \end{matrix}$$

$$\textcircled{2} \begin{matrix} (d-3)(d+2) \\ 3(2d^2-13) \end{matrix}$$

$$\frac{(d-3)(d+2)}{3(2d^2-13)} \times \left[\frac{d(d+2)}{d(d-3)} + \frac{d+3}{d-2} \right]$$

$$" " \times \left[\frac{(d+2)^{\cancel{d-2}}}{(d-3)^{\cancel{d-2}}} + \frac{(d+3)^{\cancel{d-2}}}{(d-2)^{\cancel{d-2}}} \right]$$

$$" " \left[\frac{(d+2)(d-2) + (d+3)(d-3)}{(d-3)(d-2)} \right]$$

$$" " \left[\frac{d^2 - \cancel{2d} + \cancel{2d} - 4 + d^2 - \cancel{3d} + \cancel{3d} - 9}{(d-3)(d-2)} \right]$$

$$\frac{(d-3)(d+2)}{3(2d^2-13)} \times \left[\frac{2d^2 - 13}{(d-3)(d-2)} \right]$$

$$\frac{\cancel{(d-3)}(d+2)\cancel{(2d^2-13)}}{3\cancel{(2d^2-13)}\cancel{(d-3)}(d-2)} = \frac{d+2}{3(d-2)}$$

$$\frac{n^2 - 1}{n^2 + 6n + 5} - \frac{2n^2 + 3n - 2}{2n^2 - 7n + 3} = \frac{n^2 + 5n + 6}{n^2 - 9}$$

$$\left[\frac{a^2 + 5a + 6}{a + 2} - 1 - \frac{2a + 3}{a} \right] \times \frac{a^2 + 3}{a^2 - 9}$$

$$\left[\frac{(a+3)(\cancel{a+2})}{(\cancel{a+2})} - 1 - \frac{2a+3}{a} \right] \times \frac{\cancel{a^2+3}}{(\cancel{a-3})(\cancel{a^2+3})}$$

$$\left[a + 3 - 1 - \frac{2a+3}{a} \right] \times \frac{1}{a^2 - 3}$$

$$\left[\frac{(a+2)a}{1a} - \frac{2a+3}{a} \right] \times \frac{1}{a^2 - 3}$$

$$\left[\frac{a(a+2) - (2a+3)}{a} \right] \times \frac{1}{a^2 - 3}$$

$$\left[\frac{a^2 + \cancel{2a} - \cancel{2a} - 3}{a} \right] \times \frac{1}{a^2 - 3}$$

$$\left[\frac{a^2 - 3}{a} \right] \times \frac{1}{a^2 - 3} = \frac{\cancel{(a^2 - 3)}}{a(\cancel{a^2 - 3})} = \frac{1}{a}$$