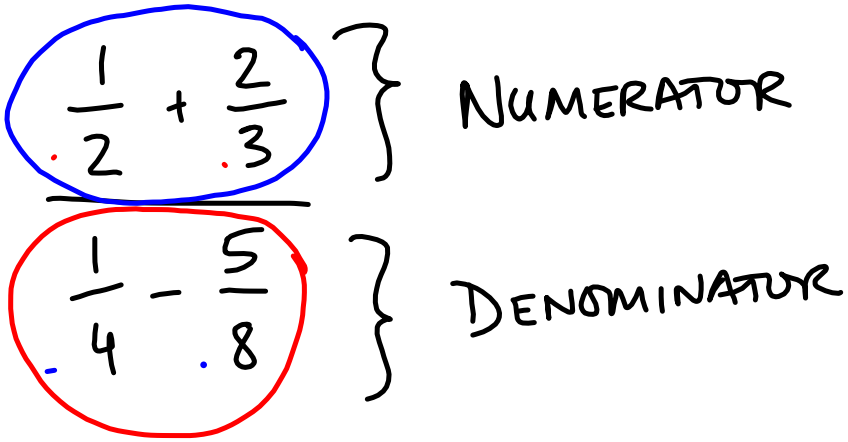
6.5 Complex Fractions



Find a common denominator.

Ex. 1

a.) $\left(\dfrac{\frac{1}{2}+\frac{2}{3}}{\frac{1}{4}-\frac{5}{8}}\right)\left(\dfrac{24}{24}\right) = \dfrac{12+16}{6-15} = \dfrac{28}{-9} = -\dfrac{28}{9}$

LCD: 24
(FOR ALL OF THEM)

THIS IS 1.

b) $\dfrac{4-\frac{2}{5}}{\frac{1}{10}+3} \cdot \dfrac{10}{10} = \dfrac{10\left(4-\frac{2}{5}\right)}{10\left(\frac{1}{10}+3\right)} = \dfrac{40-4}{1+30} = \dfrac{36}{31}$

LCD: 10

Ex. 3

$$\frac{2-\frac{1}{x}}{\frac{1}{x^2}-\frac{1}{2}} \cdot \frac{2x^2}{2x^2} = \frac{2x^2\left(2-\frac{1}{x}\right)}{2x^2\left(\frac{1}{x^2}-\frac{1}{2}\right)} = \frac{4x^2-2x}{2-x^2}$$

LCD: $2x^2$

Ex. 4

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

LCD: $(x-2)(x+2)$

$2-x = -(x-2)$, SO WE CAN LEAVE IT OUT

$$= \frac{\frac{(x-2)(x+2)}{(x-2)}-\frac{2(x-2)(x+2)}{(x+2)}}{-\frac{3(x-2)(x+2)}{(2-x)}+\frac{4(x-2)(x+2)}{(x+2)}}$$

$$= \frac{x+2-2(x-2)}{-3(x+2)+4(x-2)} = \frac{x+2-2x+4}{-3x-6+4x-8}$$

$$= \frac{-x+6}{x-14}$$

31.) $\dfrac{\left(\frac{1}{x+1}+1\right)}{\left(\frac{3}{x+1}+3\right)} \cdot \dfrac{(x+1)}{(x+1)} = \dfrac{\frac{(x+1)}{(x+1)}+x+1}{\frac{3(x+1)}{(x+1)}+3(x+1)}$

$= \dfrac{1+x+1}{3+3x+3} = \dfrac{x+2}{3x+6} = \dfrac{(x+2)}{3(x+2)} = \dfrac{1}{3}$

32.) $\dfrac{\dfrac{2}{x+3}+1}{\dfrac{4}{x+3}+2} \cdot \dfrac{x+3}{x+3} = \dfrac{2+x+3}{4+2x+6}$

$= \dfrac{x+5}{2x+10} = \dfrac{x+5}{2(x+5)} = \dfrac{1}{2}$

47.) $\dfrac{1-\frac{4}{a^2}}{1+\frac{2}{a}-\frac{8}{a^2}}\left(\dfrac{a^2}{a^2}\right) = \dfrac{a^2-4}{a^2+2a-8} = \dfrac{(a+2)\cancel{(a-2)}}{(a+4)\cancel{(a-2)}}$

$= \dfrac{a+2}{a+4}$

59.) $\dfrac{\dfrac{x}{x+1}}{\dfrac{1}{x^2-1}-\dfrac{1}{x-1}} \cdot \dfrac{(x+1)(x-1)}{(x+1)(x-1)} = \dfrac{x\cancel{(x+1)}(x-1)}{\cancel{(x+1)}}$

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

LCD: $(x+1)(x-1)$

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

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

$$= 1-x$$

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

NO YES

DIVISION ONLY CANCELS MULTIPLICATION.