Warm-Up...

The algebraic expression $\left(x-\frac{4}{(x-3)}\right)\div\left(x+\frac{2+6x}{(x-3)}\right)$ in its most simplified form is:

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

B) $\frac{2(x-1)}{(x-3)}$

C) $\frac{(x-4)}{(x+2)}$ ✓

D) $\frac{6x-2}{(x-3)}$

$\left(\frac{x(x-3)}{x-3}-\frac{4}{x-3}\right)\div\left(\frac{x(x-3)}{x-3}+\frac{2+6x}{x-3}\right)$

$\left(\frac{x^2-3x-4}{x-3}\right)\div\left(\frac{x^2-3x+6x+2}{x-3}\right)$ (+3x)

$\left(\frac{(x-4)(x+1)}{(x-3)}\right)\div\left(\frac{(x+2)(x+1)}{(x-3)}\right)$ 1 1

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

$x\neq 3,-2,-1$

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

15b) $\frac{2x^2-x}{x^2+3x}\cdot\frac{x^2-x-12}{2x^2-3x+1}-\frac{x-1}{x+2}$

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

$\frac{x-4}{x-1}-\frac{x-1}{x+2}$ $x\neq 0,-3,1,\frac{1}{2}$ $x\neq -2$

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

$\frac{x^2-2x-8}{(x-1)(x+2)}-\frac{x^2-2x+1}{(x-1)(x+2)}$

$\frac{-9}{(x-1)(x+2)}$

$\frac{8}{5}-\frac{15}{16}$

$\frac{128}{80}-\frac{75}{80}$

$\frac{53}{80}$

$\frac{(4)(2)}{5}\cdot\frac{(5)(3)}{(4)(4)}$

$\frac{(4)(2)}{5}-\frac{(5)(3)}{(4)(4)}$

$2-\frac{3}{4}$

15d) $\frac{x+1}{x+6} - \frac{x^2-4}{x^2+2x} \div \frac{2x^2+7x+3}{2x^2+x}$

$x \neq -6, 0, -2, -\frac{1}{2}, -3$

$\frac{x+1}{x+6} - \left(\frac{(x-2)(x+2)}{x(x+2)} \cdot \frac{x(2x+1)}{(x+3)(2x+1)} \right)$

$\frac{x+1}{x+6} - \frac{x-2}{x+3}$

$\frac{(x+1)(x+3)}{(x+6)(x+3)} - \frac{(x-2)(x+6)}{(x+6)(x+3)}$

$\frac{x^2+4x+3}{(x+6)(x+3)} - \frac{x^2+4x-12}{(x+6)(x+3)}$

$\frac{+15}{(x+6)(x+3)}$

Simplifying complex fractions...fractions within fractions!!

Here is an example:

Simplify this expression...

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{1}{4}+\frac{2}{3}} = \frac{\frac{3+2}{6}}{\frac{3+8}{12}} = \frac{\frac{5}{6}}{\frac{11}{12}}$$

$\frac{5}{6} \times \frac{2\,12}{11}$

$\frac{10}{11}$

What were your strategies??

Simplifying Complex Fractions — First Technique. To simplify a complex fraction, proceed as follows:

1. Simplify the numerator.
2. Simplify the denominator.
3. Simplify the division problem that remains.

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{1}{4}+\frac{2}{3}}$$

Simplifying Complex Fractions — Second Technique. To simplify a complex fraction, proceed as follows:

1. Find a common denominator for both numerator and denominator.
2. Clear fractions from the numerator and denomaintor by multiplying each by the common denominator found in the first step.

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{1}{4}+\frac{2}{3}}$$

Note that the technique indicates that you should multiply the numerator and denominator by the common denominator...NOT...change the denominators.

Does this make sense?? Let's have a look

Let's give these a try...

$$\frac{\frac{3x^2+5x}{x^2-25}}{\frac{2}{x-5}+\frac{1}{x+5}} = \frac{\frac{x(3x+5)}{(x-5)(x+5)}}{\frac{2(x+5)+1(x-5)}{(x+5)(x-5)}} = \frac{\frac{x(3x+5)}{(x-5)(x+5)}}{\frac{2x+10+x-5}{(x-5)(x+5)}} = \frac{\frac{x(3x+5)}{(x-5)(x+5)}}{\frac{3x+5}{(x-5)(x+5)}}$$

$$\frac{x(3x+5)}{(x-5)(x+5)} \cdot \frac{(x-5)(x+5)}{(3x+5)} = x$$

$$\frac{2-\frac{3}{x+5}}{5+\frac{2}{x-3}}$$

Try and simplify these...

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

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

$$\frac{\frac{2}{4x+12}}{\frac{4}{2x+6}+\frac{1}{x+3}} = \frac{\frac{2}{2(x+3)}}{\frac{2}{(x+3)}+\frac{1}{(x+3)}} = \frac{\frac{1}{2(x+3)}}{\frac{3}{(x+3)}}$$

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

$$\frac{\frac{1}{3x}-\frac{4}{x+2}}{\frac{x}{x+2}+\frac{1}{x}} = \frac{\frac{1(x+2)-4(3x)}{3x(x+2)}}{\frac{x(x)+1(x+2)}{x(x+2)}} = \frac{\frac{x+2-12x}{3x(x+2)}}{\frac{x^2+x+2}{x(x+2)}} = \frac{\frac{-11x+2}{3x(x+2)}}{\frac{x^2+x+2}{x(x+2)}}$$

$$\frac{(-11x+2)}{3x(x+2)} \cdot \frac{x(x+2)}{x^2+x+2} = \frac{-11x+2}{3(x^2+x+2)}$$

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#10 d) HW for tonight.

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

$$+\frac{-1}{2} = -\frac{1}{2} = \frac{1}{-2}$$

$$\frac{-1(c+a)(c+b)}{(a-c)(b-c)}$$