11. $\frac{x^2-2}{x^2-2} + \frac{x}{x^2-2}$

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

$\frac{2x^2-4+x}{x^2-2}$

$\boxed{\frac{2x^2+x-4}{x^2-2}}$

12. $\frac{x-2}{x^2+x-12} + \frac{x}{x^2-2x-3}$

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

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

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

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

Simplify the complex fraction.

13. $\frac{\frac{x-1}{x-1} \cdot \frac{2}{x} + \frac{3}{x-1} \cdot \frac{x}{x}}{\frac{1}{2x-2}}$

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

$\frac{\frac{2x-2+3x}{x(x-1)}}{\frac{1}{2(x-1)}} = \frac{5x-2}{x(x-1)} \cdot \frac{2(x-1)}{1}$

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

14. $\frac{\frac{3}{3} \cdot \frac{3}{x+2} + \frac{2}{3} \cdot \frac{x+2}{x+2}}{\frac{x}{x} \cdot \frac{2x}{x+2} - \frac{1}{x} \cdot \frac{x+2}{x+2}}$

$= \frac{\frac{9}{3(x+2)} + \frac{2(x+2)}{3(x+2)}}{\frac{2x^2}{x(x+2)} - \frac{(x+2)}{x(x+2)}}$

$= \frac{9+2x+4}{3(x+2)} \div \frac{2x^2-x-2}{x(x+2)}$

$= \frac{2x+13}{3(x+2)} \cdot \frac{x(x+2)}{2x^2-x-2}$

$= \boxed{\frac{x(2x+13)}{3(2x^2-x-2)}}$

15. $\frac{\frac{2x-1}{2x-1} \cdot \frac{2x-1}{5} - 2 \cdot \frac{2x-1}{2x-1}}{\frac{4x}{4x} \cdot \frac{4x}{4x} - \frac{x}{2x-1} \cdot \frac{4x}{4x}}$

$= \frac{\frac{3x}{2x-1} - \frac{2(2x-1)}{2x-1}}{\frac{5(2x-1)}{4x(2x-1)} - \frac{4x^2}{4x(2x-1)}}$

$= \frac{\frac{3x-4x+2}{2x-1}}{\frac{10x-5-4x^2}{4x(2x-1)}}$

$= \frac{-x+2}{2x-1} \cdot \frac{4x(2x-1)}{-4x^2+10x-5}$

$= \frac{(x-2) \cdot 4x}{(4x^2-10x+5)}$

$= \boxed{\frac{4x(x-2)}{4x^2-10x+5}}$

In Exercises 16 and 17, use the following information.

Doctors Over a twenty year period the number of doctors of medicine M (in thousands) in the United States can be approximated by $M = \frac{28{,}390 + 693t}{85 - t}$ where $t = 0$ represents 1980. The number of doctors of osteopathy B (in thousands) can be approximated by $B = \frac{776 - 12t}{55 - 2t}$.

16. Write an expression for the total number T of doctors of medicine (MD) and doctors of osteopathy (DO). Simplify the result.

$T = \frac{28{,}390+693t}{85-t} + \frac{776-12t}{55-2t}$

17. How many MDs did the United States have in 1990? how many DOs?

$M = \frac{28{,}390 + 693(10)}{85 - 10}$ $\quad t = 10$ $\quad B = \frac{776 - 12(10)}{55-2(10)}$

17. How many MDs did the United States have in 1990? How many DOs?

$M = \frac{28{,}390 + 693(10)}{85 - 10}$ $t = 10$ $B = \frac{776 - 12(10)}{55 - 2(10)}$

$\approx$ 471,000 MDs $\approx$ 19,000 DOs

(11) $2x^2 + x - 4$

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

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

(14) $\frac{x(2x+13)}{3(2x^2-x-2)}$

(15) $\frac{4x(x-2)}{4x^2-10x+5}$

(17) $\approx$ 471,000 MDs

$\approx$ 19,000 DOs