Diagnostic questions 8-13

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9. Simplify and state the restrictions for $\frac{3x^2-5x-2}{3x^2+13x+4} \div \frac{x^2-x-2}{x^2+3x-4}$

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

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

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

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

10. Determine the equivalent to $\frac{x}{3x-6} - \frac{3}{2x-4}$

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

$= \frac{2x^2-4x}{(3x-6)(2x-4)} - \frac{9x-18}{(2x-4)(3x-6)}$

$= \frac{2x^2-13x-18}{(3x-6)(2x-4)}$

11. Simplify $(2x^4 - 2x^2 - 7) - (3x^4 - x^3 + x^2 - 4) + (x^4 - x^3 + 2x^2 - 1)$

$= 2x^4 - 2x^2 - 7 - 3x^4 + x^3 - x^2 + 4 + x^4 - x^3 + 2x^2 - 1$

$= -x^2 - 4$

12. Simplify $(x^2 - 2x - 1) + (3x^2 + x + 2)$

$= 4x^2 - x + 1$

13. Simplify $-2x(x+1)^2 + 3x(x-4)$

$= -2x^3 - 4x^2 - 2x + 3x^2 - 12x$

$= -2x^3 - x^2 - 14x$