

Name: _____

Date: _____

Chapter 7 Practice Questions (7.1-7.4)

Pre-Calculus 11

$$1) \frac{x-4}{x^2-4} + \frac{x^2-3x-4}{x^2+5x+6}$$

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

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

$$x \neq \pm 2, x \neq -3, x \neq -1, x \neq 4$$

$$2) \frac{x^2+3x-40}{x^2+2x-35} \div \frac{x^2+2x-48}{x^2+3x-18}$$

$$= \frac{x^2+3x-40}{x^2+2x-35} \div \frac{x^2+2x-48}{x^2+3x-18}$$

$$= \frac{(x-5)(x+8)}{(x-5)(x+7)} \cdot \frac{(x-3)(x+6)}{(x-6)(x+8)}$$

$$= \frac{\cancel{x+8}}{x+7} \cdot \frac{(x-3)(x+6)}{(x-6)(\cancel{x+8})}$$

$$= \frac{(x-3)(x+6)}{(x+7)(x-6)}$$

$$x \neq 5, x \neq 6, x \neq -7, x \neq -8, x \neq 3$$

$$3) \frac{x^2+2x-3}{x^2+8x+16} \cdot \frac{3x+12}{x-1}$$

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

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

$$x \neq -4, x \neq 1$$

$$4) \frac{x^2-x-6}{x^2-1} \cdot \frac{5x^3+5x^2}{3x-9} \cdot \frac{3x-3}{10x^2+20x}$$

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

$$= \frac{x}{2}$$

$$x \neq \pm 1, x \neq 3, x \neq 0.$$

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

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

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

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

$$6) \frac{x^2 + 7x + 12}{x^2 + 4x + 3}$$

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

$$= \frac{x+4}{x+1}$$

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

$$7) \frac{(2x^2 + 13x + 20)(x-2)}{(2x^2 + 17x + 30)(2-x)}$$

$$\begin{array}{r} 2x \quad 5 \\ x \quad \times \quad 4 \\ \hline 5x + 8x \end{array} \quad \begin{array}{r} 2x \quad 5 \\ x \quad \times \quad 6 \\ \hline 5x + 12x \end{array}$$

$$= \frac{(2x+5)(x+4)(x-2)}{-(2x+5)(x+6)(x-2)}$$

$$= -\frac{x+4}{x+6}$$

$$x \neq 2, x \neq -\frac{5}{2}, x \neq -6$$

$$8) \frac{\frac{x}{y} + 1}{1 - \frac{y}{x}}$$

$$= \left(\frac{x}{y} + \frac{y}{y}\right) \div \left(\frac{x}{x} - \frac{y}{x}\right)$$

$$= \frac{x+y}{y} \div \frac{x-y}{x}$$

$$= \frac{x+y}{y} \cdot \frac{x}{x-y} \quad y \neq 0, x \neq 0$$

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

$$10) \frac{\frac{1}{x+y} - \frac{1}{x}}{y}$$

$$= \left(\frac{1}{x+y} - \frac{1}{x}\right) \cdot \frac{1}{y}$$

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

$$= \frac{x - x - y}{x(x+y) \cdot y} \quad x \neq 0, y \neq 0, x \neq -y$$

$$= \frac{-y}{xy(x+y)}$$

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

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

$$= \left(\frac{1}{x} + \frac{1}{y}\right) \div \frac{1}{x+y} \quad x \neq 0, y \neq 0, x \neq -y$$

$$= \frac{y+x}{xy} \cdot (x+y) = \frac{(x+y)^2}{xy}$$

$$11) \frac{\frac{a-b}{a} - \frac{a+b}{b}}{\frac{a-b}{b} + \frac{a+b}{a}}$$

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11.

$$\left(\frac{a-b}{a} - \frac{a+b}{b}\right) \div \left(\frac{a-b}{b} + \frac{a+b}{a}\right)$$

$$\frac{b(a-b) - a(a+b)}{ab} \div \frac{b(a-b) - a(a+b)}{ab}$$

$$\frac{b(a-b) - a(a+b)}{ab} \times \frac{ab}{a(a-b) + b(a+b)}$$

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

$$\frac{ba - b^2 - a^2 - ab}{a^2 - ab + ba + b^2}$$

$$\frac{-b^2 - a^2}{a^2 + b^2}$$

$$\frac{-b^2 - a^2}{a^2 + b^2}$$

$$\frac{-(a^2 + b^2)}{a^2 + b^2}$$

$$= -1$$

Where: $a \neq 0$, $b \neq 0$

Solve the following rational equations.

$$12) \frac{3x}{x+7} - \frac{8}{2(x+7)} = \frac{-22}{x+7}$$

$$\frac{6x}{2(x+7)} - \frac{8}{2(x+7)} = \frac{-22 \times 2}{2(x+7)}$$

$$6x - 8 = -44$$

$$6x = -36$$

$$x = -6$$

$$x \neq -7$$

$$13) \frac{2}{x-6} + \frac{7}{x+2} = \frac{4x+2}{x^2-4x-12}$$

$$\frac{2(x+2) + 7(x-6)}{(x-6)(x+2)} = \frac{4x+2}{(x-6)(x+2)}$$

$$2x+4+7x-42 = 4x+2$$

$$5x = 2-4+42$$

$$5x = 40$$

$$x = 8$$

$$x \neq 6, x \neq -2$$

$$14) \frac{3x}{x+7} - \frac{8}{x+7} = \frac{-23}{x+7}$$

$$3x - 8 = -23$$

$$3x = -15$$

$$x = -5$$

$$x \neq -7$$

$$15) \frac{2}{5(x-8)} + \frac{4}{5} = \frac{6}{(x-8)}$$

$$\frac{2}{5(x-8)} + \frac{4(x-8)}{5(x-8)} = \frac{6 \times 5}{5(x-8)}$$

$$2 + 4x - 32 = 30$$

$$4x = 60$$

$$x = 15$$

$$x \neq 8$$