

WARMUP

$$\begin{array}{c} 6 \\ -1 \quad -6 \\ \times \\ -7 \end{array}$$

1) Simplify $\frac{x^2 - 7x + 6}{x^2 - 36} = \frac{(x-1)\cancel{(x-6)}}{(x+6)\cancel{(x-6)}} = \frac{x-1}{x+6}$

2) Multiply: $\frac{x^2 - 49}{x^2 - 8x + 7} \cdot \frac{x^2 - 1}{x^2 - 8x - 9} = \frac{(x+7)\cancel{(x-7)}}{(x-1)\cancel{(x-7)}} \cdot \frac{(x+1)\cancel{(x-1)}}{(x-9)\cancel{(x-1)}} = \frac{x+7}{x-9}$

3) Simplify: $\frac{28}{1} \left(\frac{3}{4} + \frac{4}{7} \right) = \frac{28}{1} \cdot \frac{3}{4} + \frac{28}{1} \cdot \frac{4}{7} = \frac{7 \cdot 28}{1} \cdot \frac{3}{4} + \frac{4 \cdot 28}{1} \cdot \frac{4}{7} = \frac{21 + 16}{24 - 7} = \frac{37}{17}$

$4 = 2 \cdot 2$
 $7 = 7$
 $\text{LCD} = 2 \cdot 2 \cdot 7 = 28$

Partner Quiz: write both names on your paper

BLUE

GREEN

1) Simplify:

$$\frac{x^2 + 12x + 36}{x^2 - 36}$$

$$\frac{x^2 - 14x + 49}{x^2 - 49}$$

2) Multiply:

$$\frac{4y+30}{y^2-3y} \cdot \frac{y-3}{2y+15}$$

$$\frac{9y+21}{y^2-2y} \cdot \frac{y-2}{3y+7}$$

3) Divide:

$$\frac{2x+2y}{3} \div \frac{x^2-y^2}{x-y}$$

$$\frac{7}{5x+5y} \div \frac{x-y}{x^2-y^2}$$

4) Subtract:

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

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

5) Add:

$$\frac{y}{y^2+2y+1} + \frac{4}{y^2+5y+4}$$

$$\frac{y}{y^2+5y+6} + \frac{4}{y^2-y-6}$$

6) Solve:

$$x + \frac{7}{x} = -8$$

$$x + \frac{3}{x} = \frac{19}{x}$$

$$1) \frac{x^2 + 12x + 36}{x^2 - 36} \quad \begin{array}{r} 36 \\ 6 \times 6 \\ 12 \end{array}$$

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

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

$$1) \frac{x^2 - 14x + 49}{x^2 - 49} \quad \begin{array}{r} 49 \\ -7 \times -7 \\ -14 \end{array}$$

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

$$= \frac{x-7}{x+7}$$

$$2) \frac{4y+30}{y^2-3y} \cdot \frac{y-3}{2y+15}$$

$$= \frac{2\cancel{(2y+15)}}{y\cancel{(y-3)}} \cdot \frac{\cancel{(y-3)}}{\cancel{(2y+15)}}$$

$$= \frac{2}{y}$$

$$2) \frac{9y+21}{y^2-2y} \cdot \frac{y-2}{3y+7}$$

$$= \frac{3\cancel{(3y+7)}}{y\cancel{(y-2)}} \cdot \frac{\cancel{(y-2)}}{\cancel{(3y+7)}}$$

$$= \frac{3}{y}$$

$$3) \frac{2x+2y}{3} \div \frac{x^2-y^2}{x-y}$$

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

$$= \frac{2}{3}$$

$$3) \frac{7}{5x+5y} \div \frac{x-y}{x^2-y^2}$$

$$= \frac{7}{5\cancel{(x+y)}} \cdot \frac{\cancel{(x+y)}\cancel{(x-y)}}{\cancel{(x-y)}}$$

$$= \frac{7}{5}$$

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

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

$$= \frac{\cancel{2x}}{\cancel{2}(x-2)}$$

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

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

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

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

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

$$5) \frac{y}{y^2+2y+1} + \frac{4}{y^2+5y+4}$$

$$= \frac{y}{(y+1)(y+1)(y+4)} + \frac{4}{(y+1)(y+4)} \cdot \frac{(y+1)}{(y+1)}$$

$$= \frac{y^2+4y+4y+4}{(y+1)(y+1)(y+4)}$$

$$= \frac{y^2+8y+4}{(y+1)(y+1)(y+4)}$$

$$5) \frac{y}{y^2+5y+6} + \frac{4}{y^2-y-6}$$

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

$$= \frac{y^2-3y+4y+12}{(y+2)(y+3)(y-3)}$$

$$= \frac{y^2+y+12}{(y+2)(y+3)(y-3)}$$

$$6) x\left(x + \frac{7}{x} = -8\right) \quad \text{LCD} = x$$

$$x^2 + 7 = -8x$$

$$x^2 + 8x + 7 = 0$$

$$(x+1)(x+7) = 0$$

$$x+1=0 \quad \text{or} \quad x+7=0$$

$$6) x\left(x + \frac{3}{x} = \frac{19}{x}\right) \quad \text{LCD} = x$$

$$x^2 + 3 = 19$$

$$x^2 = 16$$

$$x^2 - 16 = 0$$

$$(x+4)(x-4) = 0$$

$$x = -1 \text{ or } x = -7$$

$$x + 4 = 0 \quad x - 4 = 0$$

$$x = -4 \text{ or } x = 4$$