

# WARMUP - QUIZ REVIEW

SIMPLIFY.

$$\textcircled{1} \frac{5x^2 - 45x + 90}{180 - 5x^2}$$

$$u = x \\ v = 4y$$

$$\textcircled{2} \frac{x^3 + 64y^3}{x - 4y} \div \frac{x^2 - 4xy + 16y^2}{x^2 - 16y^2} = (x + 4y)^2$$

*(Handwritten notes:  $(x+4y)(x^2-4xy+16y^2)$  and  $\frac{(x+4y)(x-4y)}{x^2-4xy+16y^2}$  are crossed out in purple.)*

$$\textcircled{3} \frac{3b}{a-3b} \cdot \frac{a^2 - ab - b^2}{a+2b} \div \frac{(a+2b)}{1} = \frac{3b}{a+2b}$$

*(Handwritten notes:  $\frac{3b}{a-3b}$  and  $\frac{(a+2b)(a-3b)}{a+2b}$  are crossed out in purple.)*

$$\begin{array}{l} \textcircled{1} \frac{-(x-3)}{x+b} \\ \textcircled{2} (x+4y)^2 \\ \textcircled{3} \frac{3b}{a+2b} \end{array}$$

Honors Math III - 5.7 Complex Fractions

Simplify.

1.  $\frac{\frac{1}{x^2} - \frac{1}{y^2}}{\frac{x}{y} + \frac{y}{x} + 2}$

I 3.  $2c^{-1}d + 2cd^{-1} = \frac{2d \cdot d}{c \cdot d} + \frac{2c \cdot c}{d \cdot c}$   
 $= \frac{2d^2 + 2c^2}{dc}$

II 5.  $\frac{x \cdot \frac{1+\frac{1}{x}}{x+1}}{1} = \frac{x+1}{x}$  KCF  
 $= \frac{x+1}{x+1} \cdot \frac{1}{x} = \frac{1}{x}$

7.  $\frac{\frac{r^{-3}+s^{-3}}{r^{-1}+s^{-1}}}{\frac{1}{r \cdot s} + \frac{1}{s \cdot r}} = \frac{\frac{\frac{1 \cdot s^3}{r^3} + \frac{1 \cdot r^3}{s^3}}{\frac{1 \cdot s}{r} + \frac{1 \cdot r}{s}}}{\frac{s^3+r^3}{s^3 r^3}} = \frac{s+r}{s+r}$

9.  $\frac{k + \frac{1}{k-2}}{\frac{k^2}{k-2} + 1} = \frac{sr}{s^3+r^3} \cdot \frac{sr}{s+r} = \frac{(s+r)(s^2-sr+r^2)}{s^2 r^2}$

IV  $3x^{-2} - x^{-1} + 4 = \frac{3}{x^2} - \frac{1}{x} + 4$   
 $\frac{\frac{a^2 \cdot \frac{1+\frac{1}{a^2}}{a^2-1}}{\frac{a^2-1}{a^2}}}{\frac{a^2-1}{a^2}} = \frac{a^2+1}{a^2} = a^2+1 \cdot \frac{a^2}{a^2-1}$   
 $= \frac{a^2+1}{a^2-1}$

III 4.  $\frac{ab^{-1}}{b^{-1}-a^{-1}} = \frac{a}{b \cdot a - \frac{1}{a \cdot b}} = \frac{a}{\frac{a^2 b - 1}{ab}} = \frac{a \cdot ab}{a^2 b - 1} = \frac{a^2 b}{a^2 b - 1}$

8.  $\frac{1-a}{a^{-1}-1}$

$\frac{s^2 - sr + r^2}{s^2 r^2}$

Honors Math III - 5.7 Complex Fractions

Mid Key

Simplify.

$$1. \left( \frac{\frac{1}{x^2} - \frac{1}{y^2}}{\frac{x+y}{y} + 2} \right) \frac{x^2 y^2}{x^2 y^2} = \frac{y^2 - x^2}{x^3 y + x y^3 + 2x^2 y^2}$$

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

$$2. \left( \frac{1 + \frac{1}{a^2}}{1 - \frac{1}{a^2}} \right) \frac{a^2}{1} = \boxed{\frac{a^2 + 1}{a^2 - 1}}$$

$$3. 2c^{-1}d + 2cd^{-1}$$

$$\frac{2d \cdot d}{c \cdot d} + \frac{2c \cdot c}{d \cdot c} = \boxed{\frac{2d^2 + 2c^2}{cd}}$$

$$4. \frac{ab^{-1}}{b^{-1} - a^{-1}}$$

$$\left( \frac{a}{b} \right) \frac{ab}{1} = \frac{a^2}{a-b}$$

$$= \frac{a^2}{a-b} \cdot \frac{1}{1} = \boxed{\frac{a^2}{a-b}}$$

$$5. \frac{1 + \frac{1}{x}}{x+1}$$

$$\frac{x+1}{x} \cdot \frac{1}{x+1} = \boxed{\frac{1}{x}}$$

$$6. \frac{\left(1 + \frac{3}{x} + \frac{2}{x^2}\right) x^2}{\left(1 + \frac{2}{x}\right) x^2}$$

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

$$7. \frac{r^{-3} + s^{-3}}{r^{-1} + s^{-1}}$$

$$\frac{\frac{1}{r^3} + \frac{1}{s^3}}{\frac{1}{r} + \frac{1}{s}} = \frac{\frac{s^3 + r^3}{s^3 r^3} \cdot \frac{rs}{rs}}{\frac{s+r}{rs}} = \boxed{\frac{s^2 + rs + r^2}{s^2 r^2}}$$

$$8. \frac{1-a}{a^{-1}-1}$$

$$= \frac{(1-a)^a}{\left(\frac{1}{a}-1\right)a} = \frac{a-a^2}{1-a}$$

$$= \frac{a(1-a)}{1-a} = \boxed{a}$$

$$9. \left( \frac{k + \frac{1}{k-2}}{\frac{k^2}{k-2} + 1} \right) \frac{k-2}{1}$$

$$= \frac{k^2 - 2k + 1}{k^2 + k - 2} = \frac{(k-1)(k-1)}{(k-1)(k+2)} = \boxed{\frac{k-1}{k+2}}$$