

Name: \_\_\_\_\_  
 PCH Adding and Subtracting Rational Expressions

Date: \_\_\_\_\_  
 Ms. Loughran

Do Now:

$$1. \frac{1}{3y} + \frac{y^2+1}{y^2-4y} + \frac{-(y-2)y}{9y-36}$$

*Handwritten notes:  $3(y-4)$  above  $3y$ ;  $9y(y-4)$  below  $y^2-4y$ ;  $9(y-4)(y)$  below  $9y-36$ .*

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

*Handwritten notes:  $(x+2)(x-2)$  below  $x^2-4$ ;  $(-1)(x+2)$  above  $-1$ .*

$$\frac{x+x+2}{(x+2)(x-2)} \quad x \neq \pm 2$$

$$\frac{3y-12+9y^2+9-y^2+2y}{9y(y-4)}$$

$$3. \frac{1-4x}{2x+5} + \frac{8x^2-16x}{4x^2-25} + \frac{-1}{(2x-5)(2x+5)}$$

*Handwritten notes:  $2x-5-8x^2+20x$  above  $1-4x$ ;  $8y^2+5y-3$  above  $8x^2-16x$ ;  $y \neq 0, 4$  to the right.*

$$\frac{-8x^2+22x-5+8x^2-16x-2x-5}{(2x+5)(2x-5)} \quad x \neq \pm \frac{5}{2}$$

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

$$\frac{2}{2x+5}$$

$$\frac{2}{2x+5}, \quad x \neq \pm \frac{5}{2}$$

$$4. \frac{\overset{(x-3)}{x}}{\overset{(x-3)}{x+2}} + \frac{-2 \overset{(-)(x+2)}{(3-x)} + \overset{-3x+1}{x^2-x-6}}{\overset{-1(x+2)}{x^2-x-6}}$$

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

$$x \neq -2, 3$$

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

$$5. \frac{p^2 - 11p + 28}{p^2 - 4p - 21} - \frac{6(p-7)}{(3+p)(p-7)}$$

$$\frac{p^2 - 11p + 28 - 6p + 42}{(p-7)(p+3)}$$

$$\frac{p^2 - 17p + 70}{(p-7)(p+3)}$$

$$\frac{\cancel{(p-7)}(p-10)}{\cancel{(p-7)}(p+3)} = \frac{p-10}{p+3}, p \neq 7, -3$$

From Tuesday's sheet:

$$3. \frac{r^2 + 4rs + 3s^2}{r^2 + 5rs + 6s^2} \cdot (r + 2s)^{-1} \div \frac{r + s}{r^2 + 4rs + 4s^2}$$

$$\frac{\cancel{(r+3s)}\cancel{(r+s)}}{\cancel{(r+3s)}\cancel{(r+2s)}} \cdot \frac{1}{\cancel{r+2s}} \cdot \frac{\cancel{(r+2s)}^2}{\cancel{r+s}}$$

$$1, \quad r \neq -3s, -2s, -s$$

# Homework 09-19



4.  $(u^4 + u^2v^2 + v^4) \div (u^6 - v^6) \cdot (u^2 - v^2)$

$(u^2 + v^2)^2 - u^2v^2 \cdot \frac{1}{u^6 - v^6}$

$u \neq \pm v$   
 $u^2 - uv + v^2 \neq 0$   
 $u^2 + uv + v^2 \neq 0$

$(\cancel{u^2 - uv + v^2})(\cancel{u^2 + uv + v^2}) \cdot \frac{1}{(u^3 + v^3)(u^3 - v^3)}$   
 $\cdot \frac{u^2 - v^2}{(u + v)(u^2 - uv + v^2)(u - v)(u^2 + uv + v^2)}$

5.  $\frac{a^3 - 27}{a^2 - 9} \div \left( \frac{a^2 + 2ab + b^2}{a^3 + b^3} \cdot \frac{a^3 - a^2b + ab^2}{a^2 + ab} \right)$

$\frac{(a-3)(a^2+3a+9)}{(a-3)(a+3)} \div \left( \frac{(a+b)^2}{(a+b)(a^2-ab+b^2)} \cdot \frac{a(a^2-ab+b^2)}{a(a+b)} \right)$

$\cdot 1 =$

$\frac{a^2+3a+9}{a+3}$

$a \neq -b, 0$   
 $\neq 3$   
 $a^2 - ab + b^2 \neq 0$

7.  $\frac{x^3 + y^3}{6x^2 + 13xy + 6y^2} \div \frac{4x^3 + 4x^2y - 6x^2y - 6xy^2 + 9xy^2 + 9y^3}{x^3 + xy^2 - x^2y - y^3} \cdot \frac{8x^3 + 27y^3}{x^4 - y^4}$

$\frac{(x+y)(x^2-xy+y^2)}{(3x+2y)(2x+3y)} \cdot \frac{x(x^2+y^2) - y(x^2+y^2)}{4x^2(x+y) - 6xy(x+y) + 9y^2(x+y)} \cdot \frac{(2x+3y)(4x^2-6xy+9y^2)}{(x^2-y^2)(x^2+y^2)}$

$\frac{\cancel{(x+y)}(x^2-xy+y^2)}{(3x+2y)\cancel{(2x+3y)}} \cdot \frac{\cancel{(x-y)}(x^2+y^2)}{(\cancel{4x^2-6xy+9y^2})(x+y)} \cdot \frac{\cancel{(2x+3y)}(4x^2-6xy+9y^2)}{\cancel{(x-y)}(x+y)(x^2+y^2)}$

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

$x \neq -\frac{2}{3}y, -\frac{3}{2}y, \pm y$   
 $4x^2 - 6xy + 9y^2 \neq 0$

$$9. \frac{x^2(x-y) + y^2(x-y)}{(x^3 - x^2y + xy^2 - y^3) \cdot (x^4 - y^4)^{-1}} (x^2 - y^2)$$

$$(x^2 + y^2)(x-y) \cdot \frac{1}{(x^2 - y^2)(x^2 + y^2)} \cdot \frac{(x-y)(x+y)}{1}$$

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

$$g(x-y)$$

$$x \neq \pm y, x \neq 0$$

$$x^2 + y^2 \neq 0$$

x and y can't = 0  
at the same time

$$6. \frac{n^2+n}{2n^2+7n-4} \cdot \frac{4n^2-4n+1}{2n^2-n-3} \div \frac{2n^3-n^2}{2n^2+5n-12}$$

$$n \neq \frac{1}{2}, -4, \frac{3}{2}, -1, 0$$

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

$$8. \frac{x^2+xy+y^2}{x^4+x^2y^2+y^4} \cdot \frac{3x(x^2-xy+y^2)+1(x^2-xy+y^2)}{3x^3-3x^2y+3xy^2+x^2-xy+y^2} \div \frac{6x^2-11x+3}{9x^2-1}$$

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

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

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

$$\begin{aligned} x^2-xy+y^2 &\neq 0 \\ x^2+xy+y^2 &\neq 0 \\ x &\neq \pm \frac{1}{3}, \frac{3}{2} \end{aligned}$$

$$10. \left( 3(1+x)^{\frac{1}{3}} - x(1+x)^{\frac{2}{3}} \right) \div (1+x)^{\frac{2}{3}}$$

$$(1+x)^{-\frac{2}{3}} \left[ 3 + 3x^{-x} \right] \cdot \frac{1}{(1+x)^{\frac{2}{3}}}$$

$x \neq -1$

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