Name: _____ Date: _____

Learning Goal 6.1	Simplifying and applying operations to rational expressions, identifying any non-permissible values.

Recall Adding and Subtracting Fractions

$\left(\frac{3}{3}\right)\frac{3}{8}+\frac{5}{12}\left(\frac{2}{2}\right)$ LCM(8, 12) = 24

$= \frac{9}{24}+\frac{10}{24}$

$= \frac{19}{24}$

$\left(\frac{6}{6}\right)\frac{7}{9}-\frac{35}{6}\left(\frac{9}{9}\right)$ LCM(9, 6) = 54

$= \frac{42}{54}-\frac{315}{54}$

$= \frac{-273}{54} \overset{\div 3}{\div 3} = \frac{-91}{18}$

Extend to rational expressions. Simplify and state the non-permissible values.

a. $\frac{2a}{b}-\frac{a-1}{b}$

NPV: $b \neq 0$

$= \frac{2a-(a-1)}{b}$

$= \frac{2a-a+1}{b}$

$= \frac{a+1}{b}$

b. $\frac{2x}{x+4}+\frac{8}{x+4}$

NPV: $x+4 \neq 0$, $x \neq -4$

$= \frac{2x+8}{x+4}$

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

$= 2$

c. $\frac{x^2}{x-2}+\frac{3x}{x-2}-\frac{10}{x-2}$

NPV: $x-2 \neq 0$, $x \neq 2$

$= \frac{x^2+3x-10}{x-2}$

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

$= x+5$

d. $\left(\frac{x}{x}\right)\frac{2x}{xy}+\frac{4}{x^2}\left(\frac{y}{y}\right)$ LCM(xy, x^2) = x^2y

$= \frac{2x^2+4y}{x^2y}$

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

NPV: $x^2y \neq 0$

$x^2 \neq 0$, $x \neq 0$; $y \neq 0$

Assignment | p. 336 # 1 – 7, 9, 10, 13, 15, 18, 23 | Quiz Next Day!

e. $\frac{y^2-20}{y^2-4}+\frac{y-2}{y+2}$

y^2-20 - not factorable

$y^2-4=(y+2)(y-2)$

NPV: $y+2\neq 0$, $y\neq -2$; $y-2\neq 0$, $y\neq 2$

$=\frac{y^2-20}{(y+2)(y-2)}+\frac{y-2}{y+2}\left(\frac{y-2}{y-2}\right)$

$=\frac{y^2-20+(y-2)^2}{(y+2)(y-2)}$

$=\frac{y^2-20+y^2-4y+4}{(y+2)(y-2)}$

$=\frac{2y^2-4y-16}{(y+2)(y-2)}=\frac{2(y^2-2y-8)}{(y+2)(y-2)}$

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

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

f. $\frac{1+1/x}{x-1/x}$

Num: $\frac{1}{1}+\frac{1}{x}=\frac{x+1}{x}$

Den: $x-\frac{1}{x}=\frac{x^2-1}{x}$

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

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

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

NPV: $x\neq 0$; $x+1\neq 0$, $x\neq -1$; $x-1\neq 0$, $x\neq 1$

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

g. $\frac{3}{2a}+\frac{5a^3}{3ab^3}\times\frac{12b^2}{10a^2}$

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

$=\frac{3}{2a}+\frac{5\times 12a^3b^2}{3\times 10a^3b^3}$

$=\frac{3}{2a}+\frac{4a^3b^2}{2a^3b^3}$

$=\frac{3}{2a}+\frac{2a^3b^2}{a^3b^3}$

$=\frac{3}{2a}+\frac{2b^2}{b^3}$

$=\left(\frac{b}{b}\right)\frac{3}{2a}+\frac{2}{b}\left(\frac{2a}{2a}\right)$

$=\frac{3b+4a}{2ab}$ #