Name: _____   Date: _____

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

Simplify and state the non-permissible values.

a.
$$\frac{m}{n} - \frac{m+1}{n}$$

Non-Permissible Values:

$$n \neq 0$$

$$= \frac{m - (m+1)}{n}$$
$$= \frac{m - m - 1}{n}$$
$$= -\frac{1}{n}$$

b.
$$\frac{10m - 1}{4m - 3} - \frac{8 - 2m}{4m - 3}$$

Non-Permissible Values:
$$4m - 3 \neq 0$$
$$4m \neq 3$$
$$m \neq \frac{3}{4}$$

$$= \frac{10m - 1 - (8 - 2m)}{4m - 3}$$
$$= \frac{10m - 1 - 8 + 2m}{4m - 3}$$
$$= \frac{12m - 9}{4m - 3}$$
$$= \frac{3(4m - 3)}{4m - 3}$$
$$= 3$$

c.
$$\frac{2x^2 - x}{x^2 - 2x - 3} + \frac{3 - 6x}{x^2 - 2x - 3} - \frac{-3}{x^2 - 2x - 3}$$

Non-Permissible Values:
$$x^2 - 2x - 3 \neq 0$$
$$(x - 2)(x + 1) \neq 0$$

$$x - 2 \neq 0 \qquad x + 1 \neq 0$$
$$x \neq 2 \qquad x \neq -1$$

$$= \frac{2x^2 - x}{(x-2)(x+1)} + \frac{3-6x}{(x-2)(x+1)} - \frac{-3}{(x-2)(x+1)}$$
$$= \frac{2x^2 - x + (3 - 6x) - (-3)}{(x-3)(x+1)}$$
$$= \frac{2x^2 - x + 3 - 6x + 3}{(x-3)(x+1)}$$
$$= \frac{2x^2 - 7x + 6}{(x-3)(x+1)}$$
$$= \frac{(2x-3)(x-2)}{(x-3)(x+1)}$$

d.
$$\frac{4}{p^2 - 1} + \frac{3}{p + 1}$$

Non-Permissible Values:
$$p^2 - 1 \neq 0$$
$$(p + 1)(p - 1) \neq 0$$
$$p + 1 \neq 0 \qquad p - 1 \neq 0$$
$$p \neq -1 \qquad p \neq 1$$

$$p + 1 \neq 0$$
$$p \neq -1$$

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

e. $\dfrac{x-1}{x^2+x-6} - \dfrac{x-2}{x^2+4x+3}$

f. $\dfrac{2 + {}^4\!/_x}{x - {}^4\!/_x}$

Non-Permissible Values:

Non-Permissible Values:

$x \neq 0$

$x - {}^4\!/_x \neq 0$

$\dfrac{x^2 - 4}{x} \neq 0$

$x^2+x-6 \neq 0 \qquad x^2+4x+3 \neq 0$

$(x+3)(x-2) \neq 0 \qquad (x+1)(x+3) \neq 0$

$\dfrac{(x+4)(x-4)}{x} \neq 0$

$x+3 \neq 0 \quad x-2 \neq 0 \quad x+1 \neq 0 \quad x+3 \neq 0$

$x+4 \neq 0 \qquad x-4 \neq 0$

$x \neq -3 \qquad x \neq 2 \qquad x \neq -1 \qquad x \neq -3$

$x \neq -4 \qquad x \neq 4$

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

$= \dfrac{2x + {}^4\!/_x}{x^2 - {}^4\!/_x}$

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

$= \dfrac{2(x+2)}{x} \times \dfrac{x}{(x+2)(x-2)}$

$\qquad - \dfrac{(x-2)(x-2)}{(x+1)(x+3)(x-2)}$

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

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

$= \dfrac{2}{1} \times \dfrac{1}{x-2}$

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

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

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

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

$= \dfrac{4x - 5}{(x+3)(x-2)(x+1)}$

g.

$$\frac{6x}{2x+6} \div \frac{4x^2}{5x+15} - \frac{x}{2}$$

$$= \frac{6x}{2x+6} \times \frac{5x+15}{4x^2} - \frac{x}{2}$$

$$= \frac{6x}{2(x+3)} \times \frac{5(x+3)}{4x^2} - \frac{x}{2}$$

$$= \frac{6x}{2} \times \frac{5}{4x^2} - \frac{x}{2}$$

$$= \frac{3x}{1} \times \frac{5}{4x^2} - \frac{x}{2}$$

$$= \frac{3}{1} \times \frac{5}{4x} - \frac{x}{2}$$

$$= \frac{15}{4x} - \frac{x}{2}$$

$$= \frac{15}{4x} - \frac{2x^2}{4x}$$

$$= \frac{15 - 2x^2}{4x}$$

Non-Permissible Values:

$2x + 6 \neq 0$	$5x + 15 \neq 0$	$4x^2 \neq 0$
$2x \neq -6$	$5x \neq -15$	$x^2 \neq 0$
$x \neq -3$	$x \neq -3$	$x \neq 0$