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Chapter 6 Review

For each type of question, the achievement level is indicated. Showing work is an important strategy in communicating your knowledge and ideas so please be thorough.

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

1. Simplify the following rational expressions and state any non – permissible values.

Developing		
a. $\frac{25mn}{5m}$	b. $\frac{12x^2}{15x}$	c. $\frac{12x^2(x-3)}{15x(x-3)}$
d. $\frac{3x}{12x(x+5)}$	e. $\frac{2x(x-3)}{x-3}$	f. $\frac{(x-3)(x+4)}{(x+4)(x+6)}$
g. $\frac{3(x+5)}{x(x+8)(x+5)}$	h. $-\frac{p^3q^2}{5p^2q^2}$	i. $\frac{-2(x-6)}{x(x+7)(x-6)}$
Proficient		
j. $\frac{x^2+3}{x^2-x-20}$	k. $\frac{3x}{x^2-36}$	l. $\frac{2x}{12x^2+2x}$
m. $\frac{2x}{2x+4}$	n. $\frac{4x-9}{x^2-9}$	o. $\frac{3x-12}{x^2+x-20}$
Extending		
p. $\frac{2x^2-3x}{4x^2+17x-15}$	q. $\frac{2x^3+4x^2}{6x^2-24}$	r. $\frac{36-9x^2}{x^2-5x+6}$
s. $\frac{2x^2-7xy+6y^2}{x^4-16y^4}$	t. $\frac{98-2x^2}{4x^2-24x-28}$	u. $\frac{5x^2-11x+2}{x^2-3x-28}$

Developing		
a. $\frac{2a}{9}\times\frac{3b^2}{5a^2}$	b. $\frac{7n^3}{4}\div\frac{(7n)^2}{-12}$	c. $\frac{2x^2(x+2)}{3x}\times\frac{5x-4}{8x(x+2)}$
d. $\frac{5(x-3)}{2x}\div\frac{10(x-3)}{3x(x+5)}$	e. $\frac{4x(x+3)}{3(x-1)}\times\frac{5(x-1)}{2x}$	f. $\frac{2(x+1)}{3x}\div\frac{4(x+1)}{x(x-2)}$
Proficient		
g. $\frac{x^2+5x+4}{2x^2-8x+8}\times\frac{4x-8}{x^2-1}$	h. $\frac{4x-10}{x+3}\div\frac{12x^2-60x+75}{2x^2-18}$	
i. $\frac{x^2-x-6}{x+4}\times\frac{x^2-16}{x^2+2x}$	j. $\frac{x-2}{3x-21}\div\frac{3x^2-12}{3x^2-12x-63}$	
k. $\frac{9r^3-54r^2}{9r^2+45r}\times\frac{9r^2+9r}{9r^2-54r^2}$	l. $\frac{m^2-m-12}{m+3}\div\frac{3m-12}{m^2-9}$	

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Extending	
m. $\frac{2x^2-x-1}{x^2+2x-3}\times\frac{4x^2+28x+48}{2x^2-13x-7}$	n. $\frac{2t^2-7t-4}{6t^2-5t-6}\div\frac{4t^2+4t+1}{12t+8}$
o. $\frac{x+4y}{x-5y}\times\frac{x^2-25y^2}{x^2-16y^2}\div\frac{x+5y}{x-4y}$	p. $\frac{x-x-56}{x+8}\div\frac{x^2+14x+49}{x^2-6x-16}\times\frac{3x+24}{x^2-16x+64}$
q. $\frac{3/p-1}{1-9/p^2}$	r. $\frac{16-1/x^4}{4-1/x^2}$

Developing		
a. $\frac{4n}{n+4}+\frac{3n}{n-5}$	b. $\frac{p-1}{p-2}+\frac{p+3}{p+1}$	c. $\frac{4x}{x+5}+\frac{6x}{x+5}$
d. $\frac{n+1}{n-2}-\frac{n-4}{n-2}$	e. $\frac{1}{x-2}-\frac{2}{x+2}$	f. $\frac{6}{a-3}+\frac{2}{a+7}$
g. $\frac{2c-9}{c^2+2c+1}-\frac{4c-9}{c^2+2c+1}$	h. $\frac{7}{b+9}-\frac{4}{b-2}$	i. $\frac{-5}{w}+\frac{2}{w-4}$

Proficient	
j. $\frac{1}{x^2-36}-\frac{1}{6x-x^2}$	k. $\frac{2}{z-3}-\frac{3z}{9-z^2}$
l. $\frac{5}{x^2-25}+\frac{4}{x^2+10x+25}$	m. $\frac{7}{x^2-49}+\frac{3}{x^2+14+49}$
n. $\frac{n-2}{n^2-5n+6}-\frac{n+4}{n^2-11n+30}$	o. $\frac{n-3}{n^2+3n-18}-\frac{n-2}{n^2+n-20}$
p. $\frac{6}{r-4}+\frac{r+5}{4-r}$	q. $\frac{8}{6x+9}+\frac{3}{4x-4}$
Extending	
r. $\frac{4u^2-20u}{u^2+2u-35}-\frac{3u-6}{3u^2-10u+8}$	s. $\frac{x+2}{x^2+5x+6}-\frac{2+x}{4-x^2}+\frac{2-x}{x^2+x-6}$
t. $\frac{x^2+3x+2}{x^2-1}+\frac{x^2+x-2}{x^2-x}-\frac{x^2-x-12}{x^2-3x-4}$	u. $\frac{2x}{x+3}+\frac{3x}{2x+8}\div\frac{x^2}{3x+12}$

Extending
2. Explain why 6 may not be the only non – permissible value for a rational expression that is written in simplest form as $\frac{y}{y-6}$. Give examples to support your answer.

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3. Provide two products of rational expressions that will both result in

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

being the simplified form. State the non-permissible values of both products.

4. Provide two quotients of rational expressions that will both result in

$$\frac{3}{x-5}$$

being the simplified form. State the non-permissible values of both quotients.

5. On a canoe trip, Quinton paddled upstream a distance of $10\ \text{km}$. On the return trip downstream, the average speed of the canoe was $5\ {}^{\text{km}}/_{\text{h}}$ greater than its speed upstream. Write then simplify an expression for Quinton's total paddling time in terms of the average speed upstream.

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Learning Goal 6.2	Solving rational equations, identifying any non-permissible values and extraneous roots.

1. Solve the following rational equations. State any non-permissible values and/or extraneous roots.

Proficient

a. $\frac{4}{n^2}=\frac{5}{n}-\frac{1}{n^2}$	b. $\frac{1}{2x^2}+\frac{5}{2x}=\frac{x-2}{x^2}$	c. $\frac{x-6}{x}=\frac{x+4}{x}+1$
d. $\frac{1}{2a}+\frac{1}{4a^2}=\frac{1}{4a}$	e. $\frac{6b+18}{b^2}+\frac{1}{b}=\frac{3}{b}$	f. $\frac{1}{2x}-\frac{x-1}{2x^2}=\frac{3}{x}$
g. $1=\frac{3}{y+3}+\frac{3y}{y+3}$	h. $\frac{1}{c-8}-1=\frac{7}{c-8}$	i. $\frac{k}{3}-\frac{1}{3k}=\frac{1}{k}$
j. $\frac{1}{x^2}=\frac{x-1}{x}+\frac{1}{x}$	k. $\frac{1}{2m^2}=\frac{1}{m}-\frac{1}{2}$	l. $\frac{z+4}{4}+\frac{z-1}{4}=\frac{z+4}{4z}$

Extending

a. $\frac{1}{z^2-7z+10}+\frac{1}{z-2}=\frac{2}{z^2-7z+10}$	b. $\frac{1}{q^2-3q}+\frac{1}{q-3}=\frac{3}{q^2-3q}$
c. $\frac{6}{p}=\frac{1}{p-5}-\frac{p+4}{p^2-5p}$	d. $\frac{5x-20}{x^2-9x+18}+\frac{1}{x-6}=\frac{x-4}{x^2-9x+18}$
e. $\frac{1}{5a^2+2a}-\frac{6}{5a+2}=\frac{6}{5a^2+2a}$	f. $\frac{6}{f^2-6f+8}=\frac{1}{f^2-6f+8}-\frac{1}{f-4}$
g. $\frac{4}{g}=\frac{1}{g^2+4g}-\frac{g+3}{g^2+4g}$	h. $\frac{1}{h}+\frac{3h+12}{h^2-5h}=\frac{7h-56}{h^2-5h}$
i. $1+\frac{d^2-5d-24}{3d}=\frac{d-6}{3d}$	j. $\frac{x+5}{x^2-2x}-1=\frac{1}{x^2-2x}$
k. $\frac{t+5}{t^2+t}=\frac{1}{t^2+t}-\frac{t-6}{t+1}$	l. $\frac{x-2}{x+3}-1=\frac{3}{x+2}$
m. $\frac{n^2-n-6}{n^2}-\frac{2n+12}{n}=\frac{n-6}{2n}$	n. $\frac{3x^2+24x+48}{x^2}+\frac{x+6}{2x^2}=\frac{1}{x^2}$

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Extending
2. The measure, d degrees, of each angle in a regular polygon with n sides is given by the equation $$d = 180 - \frac{360}{n}.$$ a. What is the measure of each angle in a regular polygon with 15 sides? b. When each angle in a regular polygon is $162°$, how many sides does the polygon have?