

Mathematics 20-1
Rational Expressions and Equations
Chapter 6 Final Exam Review Assignment

Name: Answers
Date: _____

1. What are the non-permissible values of 'c' for the rational expression $\frac{c^2+10c+16}{(c+8)(c+2)} \cdot \frac{(c+1)(3c-4)}{(c-9)(c+8)}$

$$\frac{(c+8)(c+2)}{(c-9)(c+8)} \cdot \frac{(c+1)(3c-4)}{(2c-1)(3c+2)}$$

npv $c \neq 9, -8, -1, \frac{4}{3}, \frac{1}{2}, -\frac{2}{3}$

$$\frac{c^2+10c+16}{c^2-c-72} + \frac{6c^2+c-2}{3c^2-c-4}$$

$\frac{6c^2+c-2}{6c^2+4c-2c-2} \frac{P-12}{S1}$
 $\frac{2c(3c+2)-1(3c+2)}{(2c-1)(3c+2)}$

$\frac{3c^2-c-4}{3c^2-4c+2c-4} \frac{P-12}{S-1}$
 $\frac{c(3c-4)+1(3c-4)}{(c+1)(3c-4)}$

2. Simplify the following rational expressions and determine the non-permissible values.

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

npv
 $x \neq 0, 4, 5$

b) $\frac{4x^2-36}{2x^3+3x^2-9x}$
 $= \frac{4(x^2-9)}{x(2x^2+3x-9)}$
 $= \frac{4(x+3)(x-3)}{x(2x-3)(x+3)}$
 $= \frac{4(x-3)}{x(2x-3)}$

npv
 $x \neq 0, \frac{3}{2}, -3$

$\frac{2x^2+3x-9}{2x^2+6x-3x-9} \frac{P=18}{S3}$
 $= \frac{2x^2+3x-9}{2x(x+3)-3(x+3)}$
 $= \frac{2x^2+3x-9}{(2x-3)(x+3)}$

c) $\frac{2a^2-9a-5}{a^2+a-12} \cdot \frac{a^2+2a-15}{2a^2+3a+1}$
 $= \frac{(2a+1)(a-5)}{(a+4)(a-3)} \cdot \frac{(a+5)(a-3)}{(2a+1)(a+1)}$
 $= \frac{(a-5)(a+5)}{(a+4)(a+1)}$

npv
 $a \neq -4, 3, -\frac{1}{2}, -1$

d) $\frac{4x^2-25}{6x^2+21x+15} + \frac{2x^2-19x+35}{6x^2+30x+24}$
 $= \frac{(2x+5)(2x-5)}{3(2x^2+7x+5)} \cdot \frac{6(x^2-5x+4)}{(2x-5)(x-7)}$
 $= \frac{(2x+5)}{3(2x+5)(x+1)} \cdot \frac{6(x+4)(x+1)}{x-7}$
 $= \frac{2(x+4)}{x-7}$

npv
 $x \neq -1, -\frac{5}{2}, \frac{5}{2}, 7, -4$

$\frac{2x^2-19x+35}{2x^2-14x-5x+35} \frac{P=18}{S3}$
 $= \frac{2x^2-19x+35}{2x(x-7)-5(x-7)}$
 $= \frac{2x^2-19x+35}{(2x-5)(x-7)}$

3. The reciprocal of 4 plus 1 is the reciprocal of what number?

$$\frac{1}{4} + 1 = \frac{1}{x}$$

$$4x \left(\frac{1}{4} \right) + 4x(1) = 4x \left(\frac{1}{x} \right)$$

$$x + 4x = 4$$

$$5x = 4$$

$$x = \frac{4}{5}$$

4. Algebraically solve the following equations.

$$\text{LCD} = 5x(x+2)$$

$$a) \frac{3}{x+2} - \frac{1}{x} = \frac{1}{5x}$$

$$5x(x+2) \left(\frac{3}{x+2} \right) - 5x(x+2) \left(\frac{1}{x} \right) = 5x(x+2) \left(\frac{1}{5x} \right)$$

$$3(5x) - 5(x+2) = x+2$$

$$15x - 5x - 10 = x+2$$

$$10x - x = 2+10$$

$$9x = 12$$

$$x = \frac{12}{9}$$

$$x = \frac{4}{3}$$

$$\text{npv}$$

$$x \neq 0, -2$$

$$b) \frac{x}{x-2} + \frac{1}{x-4} = \frac{2}{x^2-6x+8}$$

$$\text{LCD} = (x-2)(x-4)$$

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

$$x(x-4) + x-2 = 2$$

$$x^2 - 4x + x - 2 - 2 = 0$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$x = 4 \quad | \quad x = -1$$

reject

npv

$$x \neq 4, 2$$

5. Simplify.

$$a) \frac{5x^4 + 2x^3 - 8x}{2x^2} + \frac{3x^5 + x^2 - 2}{5x^3}$$

$$= \frac{5x^4 + 2x^3 - 8x}{2x^2} + \frac{3x^5 + x^2 - 2}{5x^3}$$

$$= \frac{25x^5 + 10x^4 - 40x^2}{10x^3} + \frac{6x^5 + 2x^2 - 4}{10x^3}$$

$$= \frac{31x^5 + 10x^2 - 38x^2 - 4}{10x^3}$$

$$b) \frac{(x+1)}{(x-2)(x+5)} - \frac{2(x+4)}{(x-2)(x-1)}$$

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

$$= \frac{x^2 - 1 - (2x+8)(x+5)}{(x-2)(x-1)(x+5)}$$

$$= \frac{x^2 - 1 - 2x^2 - 10x - 8x - 40}{(x-2)(x-1)(x+5)}$$

$$= \frac{-x^2 - 18x - 41}{(x-2)(x-1)(x+5)}$$

$$c) \frac{y+3}{y-1} - \frac{y-5}{y^2+4y-5}$$

$$= \frac{y+3}{y-1} - \frac{y-5}{(y+5)(y-1)}$$

$$= \frac{(y+3)(y+5) - (y-5)}{(y+5)(y-1)}$$

$$= \frac{y^2 + 8y + 15 - y + 5}{(y+5)(y-1)}$$

$$= \frac{y^2 + 7y + 20}{(y+5)(y-1)}$$