

Period: _____

Name: Key

Chapter 6 Assignment – Rational Expressions & Equations

/25

Show all of your work.

1) Simplify. Keep a list of non-permissible values in the rectangle (2 marks each).

a) $\frac{6x+18}{x^2+8x+15}$ $x \neq -3, -5$

$$\frac{6(\cancel{x+3})}{(\cancel{x+3})(x+5)} = \frac{6}{x+5}$$

ANSWER: $\frac{6}{x+5}$

b) $\frac{x^2-4}{6+3x}$ $x \neq -2$

$$\frac{(x-2)(\cancel{x+2})}{3(\cancel{x+2})} = \frac{x-2}{3}$$

ANSWER: $\frac{x-2}{3}$

2) Simplify. Keep a list of non-permissible values in the rectangle (2 marks each).

a) $\frac{n^2-4}{2n-1} \cdot \frac{12n-6}{n+2}$ $n \neq \frac{1}{2}, -2$

$$\frac{(n-2)(\cancel{n+2})}{(2n-1)} \cdot \frac{6(\cancel{2n-1})}{(n+2)} = 6(n-2)$$

ANSWER: $6(n-2)$

b) $\frac{x-3}{x^2+2x-15} \cdot \frac{2x+10}{2x^2-15x+7} \div \frac{2x+4}{x^2-5x-14}$ $x \neq -5, 3, \frac{1}{2}, 7, -2$

$$\frac{(\cancel{x-3})}{(x+5)(x-3)} \cdot \frac{2(\cancel{x+5})}{(2x-1)(x-7)} \div \frac{2(\cancel{x+2})}{(x-7)(\cancel{x+2})} = \frac{1}{(2x-1)(x-7)}$$

ANSWER: $\frac{1}{2x-1}$

8

3) Simplify. Keep a list of non-permissible values in the rectangle (2 marks each).

a) $\frac{2y}{y+3} + \frac{3}{y^2-9}$

$y \neq \pm 3$

b) $\frac{3x+3}{x^2-4x-12} - \frac{x+1}{x^2-4}$

$x \neq 6, \pm 2$

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

$$\frac{2y^2 - 6y + 3}{(y+3)(y-3)}$$

2

ANSWER:
 $\frac{2y^2 - 6y + 3}{(y+3)(y-3)}$

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

2

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

$$3(x^2 - x - 2) - (x^2 - 5x - 6)$$

$$(x-6)(x+2)(x-2)$$

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

ANSWER:
 $\frac{2x^2 + 2x}{(x-6)(x+2)(x-2)}$

OR
 $\frac{2x(x+1)}{(x-6)(x+2)(x-2)}$

4) Simplify. Keep a list of non-permissible values in the rectangle (3 marks):

$x \neq 0, 8, -3$

$$\frac{1 + \frac{3}{x}}{x - 5 - \frac{24}{x}}$$

$$\frac{x}{x} \cdot 1 + \frac{3}{x} \div \frac{x \cdot x - 5x - 24}{x \cdot x}$$

$$\frac{x+3}{x} \div \frac{x^2 - 5x - 24}{x}$$

$$\frac{(x+3)}{x} \cdot \frac{x}{(x-8)(x+3)}$$

3

$$\frac{1}{x-8}$$

ANSWER:
 $\frac{1}{x-8}$

7

5) Solve and check. Keep a list of non-permissible values in the rectangle (3 marks each).

a) $\frac{x+4}{x} + \frac{5}{x^2+4x} = \frac{-2}{x+4}$ $x \neq 0, -4$

LCD $x(x+4)$

$$\left[\frac{x+4}{x} + \frac{5}{x(x+4)} = \frac{-2}{x+4} \right] \cdot LCD$$

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

$$(x+4)(x+4) + 5 = -2x$$

$$x^2 + 8x + 16 + 5 = -2x$$

$$x^2 + 10x + 21 = 0$$

$$(x+7)(x+3) = 0$$

$$x = -7$$

$$x = -3$$

Check(s):
 $\frac{-3+4}{-3} + \frac{5}{(-3)^2+4(-3)} = \frac{-2}{-3+4}$

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

$$\frac{-1}{-3} - \frac{5}{3} = -2$$

$$\frac{-6}{3} = -2 \checkmark$$

$$\frac{-7+4}{-7} + \frac{5}{(-7)^2+4(-7)} = \frac{-2}{-7+4}$$

$$\frac{3}{-7} + \frac{5}{7} = \frac{2}{-3}$$

ANSWER(S):

$$x = -7, -3$$

b) $\frac{-10}{x^2-12x+35} = \frac{x}{x-5}$ $x \neq 7, 5$

$$\frac{-10}{(x-7)(x-5)} = \frac{x}{x-5}$$

$$\frac{-10(x-5)(x-7)}{(x-7)(x-5)} = \frac{x(x-5)(x-7)}{(x-5)}$$

$$-10 = x(x-7) \quad \frac{-10}{(2)^2-12(2)+35} = \frac{2}{2-5}$$

$$-10 = x^2 - 7x$$

$$x^2 - 7x + 10 = 0$$

$$(x-5)(x-2) = 0$$

$$x = 5$$

$$x = 2$$

Check(s):

$$\frac{-10}{15} = \frac{2}{-3}$$

$$-\frac{2}{3} = -\frac{2}{3} \checkmark$$

ANSWER(S):

$$x = 2$$

6) It takes Ryan 7 hours to do the lawn and gardening maintenance at a commercial property alone. Jeff can do the work in 6 hours alone. Assuming they have enough equipment, how long would it take them to complete the work together? Create and solve a rational equation.

Answer in hours and minutes (to the nearest minute). (4 marks)

	Time to do work alone	Fraction done in 1 hr	Fraction done in x hours
Ryan	7	$\frac{1}{7}$	$\frac{1}{7}(x) = \frac{x}{7}$
Jeff	6	$\frac{1}{6}$	$\frac{1}{6}(x) = \frac{x}{6}$
Together	x	$\frac{1}{x}$	$\frac{1}{x}(x) = \frac{x}{x} = 1$

$$\frac{x}{7} + \frac{x}{6} = 1$$

$$\frac{x(42)}{7} + \frac{x(42)}{6} = 1(42)$$

$$6x + 7x = 42$$

$$13x = 42$$

$$x = \frac{42}{13} \text{ hrs} = 3 \text{ (23) hr}$$

$$0.23 \text{ hr} \times 60 \frac{\text{min}}{\text{hr}} = 13.8 \text{ min} = 14 \text{ min}$$

SENTENCE ANSWER:

It would take them 3 hrs 14 min to complete work together.

