AGS 3 Name: _____ Period: ____ Date: _____

Notes 4.7

Warmup – Perform the indicated operation

1. $\frac{7x}{2x} - \frac{x-2}{20x+16}$ CD: $4(5x+4)$

$\frac{14(5x+4)}{4(5x+4)} - \frac{(x-2)}{4(5x+4)}$

$\frac{70x+56}{4(5x+4)} - \frac{x-2}{4(5x+4)}$

$\boxed{\frac{69x+58}{4(5x+4)}}$

2. $\frac{x-4}{x^2+5x+6} + \frac{x-1}{x^2-4}$ CD: $(x+2)(x+3)(x-2)$

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

$\frac{(x-2)(x-4)}{(x+2)(x-2)(x+3)} + \frac{(x-1)(x+3)}{(x+2)(x+3)(x-2)}$

$\frac{x^2-6x+8}{(x+2)(x-2)(x+3)} + \frac{x^2+2x-3}{(x+2)(x-2)(x+3)}$

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

3. $\frac{x^2+2x-8}{x-1} \cdot \frac{x^2+x-2}{2}$

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

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

4. $\frac{3x+27}{6x^2+18x} \div \frac{16x+72}{4x+4}$

$\frac{3(x+9)}{26x(x+3)} \cdot \frac{14(x+1)}{28(2x+9)}$

$\boxed{\frac{(x+9)(x+1)}{4x(x+3)(2x+9)}}$

Investigation – Solving equations with rational expressions.

How do you think you might solve this equation? $\frac{4}{x^2} = \frac{5}{x} - \frac{1}{x^2}$

What do you know about rational expressions that might help?
What do you know about solving equations?

Steps to solve this type of equation:

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

1. Find a common denominator

CD: x^2

2. Rewrite so each rational expression has the common denominator

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

3. Multiply every term by the common denominator so the denominators all cancel out

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

4. Write the simplified equation

$$4 = 5x - 1$$

5. Solve the equation

$$4 = 5x - 1$$
$$5 = 5x$$
$$x = 1$$

6. Check the solution to see if it is extraneous.

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

$$4 = 5 - 1$$
$$4 = 4$$

$\boxed{x = 1}$

Practice:

a. $\frac{1}{x^2-3x}+\frac{1}{x-3}=\frac{3}{x^2-3x}$ CD: $x(x-3)$

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

$1+x=3$

$\boxed{x=2}$

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

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

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

b. $1=\frac{3}{x+3}+\frac{3x}{x+3}$ CD: $x+3$

$\frac{1(x+3)}{x+3}=\frac{3}{x+3}+\frac{3x}{x+3}$

$x+3=3+3x$

$3=3+2x$

$0=2x$ $\boxed{x=0}$

$1=\frac{3}{0+3}+\frac{3(0)}{0+3}$

$1=\frac{3}{3}+\frac{0}{3}$

$1=1$

c. $\frac{2x}{x+1}-\frac{x+3}{x+1}=\frac{4}{x+1}$ CD: $x+1$

$2x-(x+3)=4$

$x-3=4$

$\boxed{x=7}$

$\frac{2(7)}{7+1}-\frac{7+3}{7+1}=\frac{4}{7+1}$

$\frac{14}{8}-\frac{10}{8}=\frac{4}{8}$

$\frac{4}{8}=\frac{4}{8}$