

Rational Expressions

Day 1 Rational Expressions

A rational expression is the quotient of two polynomials. In other words, a fraction.

Undefined: An undefined fraction is a fraction with a denominator of 0. All of the following terms are the same thing: undefined, not defined, no meaning.

For what value(s) of x is the fraction undefined?

1) $\frac{2}{6x}$

2) $\frac{3ab}{a(a-1)}$

3) $\frac{y-2}{y^2-5y+6}$

To find what makes a fraction undefined you need to set the denominator equal to zero and solve.

Sep 9-9:04 PM

To SIMPLIFY a rational expression: Factor the numerator and denominator, this will reveal any common factors that you can then cancel.

Simplify the following rational expressions:

1) $\frac{3x-12}{3x}$

2) $\frac{5a^2b}{10a}$

3) $\frac{12xy^2}{3xy}$

4) $\frac{4a^2-16}{4a+8}$

Factors that are opposites: (a-2) and (2-a) are opposites or additive inverses so $\frac{(a-2)}{(2-a)} = -1$

Oct 5-7:40 AM

Oct 5-7:41 AM

4-2

Name_____

Date_____

Day 1 Homework

Reducing Rational expressions

1) $\frac{2x}{x^2}$

2) $\frac{4x^2}{6x}$

3) $\frac{18x^2}{90x^4}$

4) $\frac{3x^2}{15x^3}$

5) $\frac{14x^2y}{7xy}$

6) $\frac{10X^2Y^4}{15XY^5}$

7) $\frac{54x^2y}{72x^5y}$

8) $\frac{10x^2y^3z}{8x^3yz}$

9) $\frac{24x^4y^3z^6}{8x^2y^4z^4}$

10) $\frac{8x+4}{4}$

11) $\frac{7x}{7x+7}$

12) $\frac{6x^2-12x}{9x}$

13) $\frac{2x+6}{x+3}$

14) $\frac{x-2}{5X-10}$

15) $\frac{x+3}{X^2-X-12}$

Name _____

Date _____

Day 2
Class work

$$1) \frac{X^2 - 9}{X^2 + 4X + 3}$$

$$2) \frac{n^3 - 4n}{n^3 + n^2 - 6n}$$

$$3) \frac{12}{2X + 4}$$

$$4) \frac{5X^2 - 45X + 90}{5X^2 - 180}$$

$$5) \frac{X^2 - X - 12}{X^2 - 8X + 15}$$

$$6) \frac{X^2 - X - 20}{X^2 - 25}$$

$$7) \frac{2X^2 + 6X}{X^2 + 7X + 12}$$

$$8) \frac{3X^2 + 3X}{3X}$$

$$9) \frac{9X^2 - 18X}{3X^2 - 12}$$

$$10) \frac{6X^3 + 12X^2 - 48X}{3X^3 + 9X^2 - 30}$$

Do Now

Simplify:

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

2) $\frac{4 - 4r}{2r^2 + r - 3}$

3) $\frac{4x(6 - x)}{2x^2(x - 6)}$

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Day 3 Multiply/Divide Rational Expressions

1) $\frac{x^2 - 4x - 12}{x^2 - 4} \cdot \frac{1}{x - 6}$

Multiplying Rational Expressions:

- 1) Factor all parts
- 2) Reduce or Cancel
- 3) Leave answer in factored form

Sep 9-8:57 AM

2) $\frac{y - 7}{y} \div \frac{y^2 - 49}{y^2}$

Dividing Rational Expressions:

- 1) Keep Change Flip
- 2) Follow the rules for Multiplication

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Sep 10-7:27 AM

Name: _____

Day 3 Homework

1) Simplify: $\left(\frac{x^2-4}{10x}\right)\left(\frac{5x^2}{x^2+2x}\right)$

A) $\frac{x-2}{2x}$

C) $\frac{x+2}{2x}$

B) $x-1$

D) $\frac{x-2}{2}$

2) Simplify: $\frac{x^2-4x-12}{x^2-4} \cdot \frac{1}{x-6}$

A) $\frac{x^2-36}{x-2}$

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

B) $\frac{1}{x-2}$

D) $\frac{2x-12}{x-2}$

3) Simplify: $\frac{2x^2-x-6}{2x^2+3x-2} + \frac{x^2-9}{x^2-x-6} \times \frac{4x^2-4x+1}{2x^2-5x+2}$

A) $\frac{2x+3}{x+3}$

C) $\frac{x+3}{2x+3}$

B) $\frac{(2x+3)(x+3)}{(x+2)^2}$

D) 2

4) Simplify: $\frac{4x}{x^2-16} \cdot \frac{4x-16}{12x^3}$

5) Simplify: $\frac{3y}{y^2-25} \cdot \frac{5y+25}{27y^3}$

6) Simplify: $\frac{6x-3}{4x+8} \cdot \frac{2x+4}{4x^2-1}$

7) Simplify: $\frac{8-4y}{3y-9} \cdot \frac{y^2-9}{y^2+y-6}$

8) Perform the indicated operation and simplify:

$$\frac{x^2-16}{x^2-x-20} \cdot \frac{x+4}{x-4}$$

9) Simplify: $\frac{x-2}{x} + \frac{x^2-4}{x^3}$

10) Simplify: $\frac{9-x^2}{x^2} + \frac{3+x}{x^3}$

11) Simplify: $\frac{6+3x}{12-2x} + \frac{4-x^2}{36-x^2}$

12) Simplify: $\frac{16x^3}{(x-y)^2} + \frac{4x}{x-y}$

13) Simplify: $\frac{x^2-36}{x^2+3x-18} + \frac{x^2-12x+36}{x^2-6x}$

14) Simplify: $\frac{x^2+9x+20}{x^2-16} + \frac{x^2+5x}{4x-16}$

15) Perform the indicated operation and simplify:

$$\frac{x^2-3x}{2x^2+x-6} + \frac{x^2-5x+6}{x^2-4}$$

16) Simplify: $\frac{y+2}{y^2-9} \cdot \frac{4y+12}{3y+6} + \frac{8}{2y-6}$

17) Simplify: $\frac{4x-y}{x+y} \cdot \frac{x^2-y^2}{16x^2-y^2} + \frac{2x-2y}{16x+4y}$

18) Simplify: $\frac{x^2-25}{2x+12} \cdot \frac{x^2+8x+12}{4x-20} + \frac{x^2+7x+10}{8x}$

19) Perform the indicated operations and simplify:

$$\frac{x^2-3x}{x^2+3x-10} \cdot \frac{2x+10}{3} + \frac{x^2-x-6}{x^2-4}$$

20) Perform the indicated operations and simplify:

$$\frac{x^2-9}{x^2-5x} \cdot \frac{5x-x^2}{x^2-x-12} + \frac{x-4}{x^2-8x+16}$$

Day 5

1. Find the value of x that makes the fraction undefined.

$$\frac{x+2}{x^2+9x-36}$$

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2. Multiply: $\frac{a^2-5a+4}{3a+6} \cdot \frac{2a+4}{a^2-16}$

3. Divide: $\frac{w^2-w}{5w} \div \frac{w^2-1}{5}$

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Adding and Subtracting Rational Expressions

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

1. Factor denominators
2. Find the LCD
(The LCD is all the factors of the first denominator times the un-used factors of the second denominator)
3. Multiply the top and bottom of each fraction by the LCD
4. Bring down the denominator and add/subtract the numerators
5. Factor the new numerator
6. Cancel/Reduce

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$$\frac{1}{2a+2} + \frac{1}{a^2-1}$$

1. Factor denominators
2. Find the LCD
(The LCD is all the factors of the first denominator times the un-used factors of the second denominator)
3. Multiply the top and bottom of each fraction by the LCD
4. Bring down the denominator and add/subtract the numerators
5. Factor the new numerator
6. Cancel/Reduce

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

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ex. $\frac{3a-2}{5a} + \frac{2a-3}{4a}$ ex. $\frac{x+5}{x} - \frac{8}{x^2}$ ex. $\frac{x-y}{xy^2} + \frac{x+y}{x^2y}$

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Name _____

Period _____

Day 5
Homework

$$1) \frac{9a}{7b} - \frac{a}{7b} + \frac{3a}{7b} =$$

$$2) \frac{X^2 + 16}{4 - x} - \frac{8x}{4 - x} =$$

$$3) \frac{3}{4x} - \frac{3}{8x} =$$

$$4) \frac{X - Y}{X Y^2} + \frac{X + Y}{X^2 Y} =$$

$$5) \frac{X + 3}{X - 2} - \frac{10}{X^2 - 2X} =$$

$$6) \frac{7}{Y^2 - 49} - \frac{6}{Y^2 - 2Y - 35} =$$

$$7) \frac{9}{X^2 + 7X + 10} + \frac{3}{X + 5} - \frac{1}{X + 2} =$$

$$8) \left(Y - \frac{25}{Y} \right) + \left(1 + \frac{5}{Y} \right)$$

Day 6

Express the area and perimeter as a fraction in simplest form.

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



$$\frac{x}{x+2}$$

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ex. $\frac{3a-2}{5a} + \frac{2a-3}{4a}$

ex. $\frac{x+5}{x} - \frac{8}{x^2}$

ex. $\frac{x-y}{xy^2} + \frac{x+y}{x^2y}$

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Name: _____

Day 6 Class work/Homework

1) Combine and simplify: $\frac{2x}{3} + \frac{x}{9} + \frac{2x}{3}$

2) Combine and simplify: $\frac{x}{y} - \frac{r}{s}$

3) Combine and simplify: $\frac{3}{x^2 - 9} + \frac{2}{x - 3}$

4) Combine and simplify: $\frac{3}{x^2 - 16} + \frac{2}{x^2 - 4x}$

5) Combine and simplify: $\frac{4b}{3} - \frac{5b}{12} + \frac{b}{6}$

6) Combine and simplify: $\frac{3}{x+2} - \frac{2}{x^2+x-2} + \frac{2}{x-1}$

7) Combine and simplify: $\frac{2}{x-1} + \frac{3}{x+1} - \frac{4}{x^2-1}$

8) Combine and simplify: $\frac{2}{y-3} + \frac{4}{3-y}$

9) Combine and simplify: $\frac{3}{4x} - \frac{4}{5x} + \frac{7}{10x}$

10) Combine and simplify: $\frac{y}{y^2+y-12} - \frac{3}{y^2+3y-18}$

11) Combine and simplify: $\frac{4}{x^2+4x-5} - \frac{3}{x^2-1}$

Day 7

$$\frac{4x+6}{x^2-1} + \frac{1}{x+1}$$

$$\frac{4y}{y^2-25} - \frac{5}{y+5}$$

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Solve for a : $\frac{a-2}{a} = \frac{a+2}{2a}$

Sep 20-8:55 PM

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

Check your answer for
undefined root

Sep 20-8:19 PM

Solve the equation for x:

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

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

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Name _____ Date _____

Day 7 Class work/ homework

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

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

$$3) \frac{4m}{m-2} - \frac{13}{3m-6} = \frac{1}{3}$$

$$4) \frac{1}{t-5} + \frac{1}{t+5} = \frac{8}{t^2-25}$$

$$5) \frac{w+1}{w-3} - \frac{2w-1}{w^2-9} = 1$$

$$6) \frac{6}{x^2-1} = \frac{-3}{x+1} + \frac{5}{x-1}$$

$$7) \frac{3}{2b+4} - \frac{4}{b-2} = \frac{3}{2b^2-8}$$

$$8) \frac{t+1}{2t+6} - \frac{t-2}{2t-6} = \frac{9}{t^2-9}$$

$$9) \frac{20}{y^2-4} = \frac{1}{y-2} - \frac{5}{y+2}$$

$$10) \frac{30}{9-y^2} = \frac{5}{3+y} + \frac{2}{3-y}$$

Name: _____

Day 8

1) Find the positive root of $\frac{4}{x-1} = \frac{x+1}{12}$, $x \neq 1$

2) Solve for x : $\frac{3}{2x-1} = \frac{1}{3x-5}$

3) Find the solution set of $\frac{3a+2}{2a} = \frac{4a+4}{3a}$.

4) Find the solution set of $\frac{x+2}{x} = \frac{(x+1)}{(x-3)}$.

5) Solve by factoring: $y = \frac{24}{y-2}$

6) Solve by factoring: $\frac{2}{c-1} = \frac{c}{c+2}$

7) Solve by factoring: $\frac{y+1}{8} = \frac{2}{y+1}$

8) Solve for x : $\frac{x+1}{8} = \frac{11}{16}$

9) Find the solution set of $\frac{2x-2}{3} = -2$.

10) Find the solution set of $\frac{2x-1}{3} = \frac{x+2}{4}$.

11) Find the solution set of $\frac{3x}{4x-2} = \frac{2}{3}$.

12) Find the solution set of $\frac{3}{8a} = \frac{6}{10a+3}$.

13) Solve: $\frac{3}{x} - 2 = \frac{-2x}{x+1}$

14) Solve: $\frac{7x}{x-1} - \frac{3}{x} = 7$

15) Find the solution set of $\frac{y}{7} + \frac{y}{2} = \frac{27}{14}$.

16) Find the solution set of $\frac{4x}{3} + \frac{3x}{4} = \frac{25}{4}$.

17) Find the solution set of $\frac{x}{4} - \frac{x}{5} + \frac{x}{3} = 23$.

18) Find the solution set of $\frac{7x-9}{x^2-25} - \frac{3}{x-5} = \frac{2}{x-5}$.

19) Find the solution set of $\frac{2}{a+4} - \frac{1}{a-2} = \frac{1-2a}{a^2+2a-8}$.

20) Find the solution set of $\frac{y+1}{2y+6} - \frac{9}{y^2-9} = \frac{y-2}{2y-6}$.

21) Solve for x : $\frac{x}{2} + \frac{x}{3} = 40$

22) Solve for x : $\frac{x}{x-2} - \frac{8}{x+3} = \frac{10}{x^2+x-6}$

Name: _____

Day 9 Review day 1

1) Find the solution set of $\frac{2x+3}{6} - \frac{2x+3}{3} = \frac{1}{2}$.

2) Find the solution set of $\frac{3x+2}{x} = \frac{4x-2}{3x} + \frac{1}{3}$.

3) Find the solution set of $\frac{7x-9}{x^2-25} - \frac{3}{x-5} = \frac{2}{x-5}$.

4) Find the solution set of $\frac{4y}{y-2} - \frac{13}{3y-6} = \frac{1}{3}$.

5) Solve for x: $\frac{5}{x-3} - \frac{30}{x^2-9} = 1$

6) Solve for x: $\frac{x}{x-1} + \frac{2}{x^2-1} = \frac{8}{x+1}$

7) Expressed as a single fraction, $\frac{5}{x-3} - \frac{1}{x}$ is equivalent to

8) The expression $\frac{x}{x-1} + \frac{x}{x+1}$ is equivalent to

9) Expressed as a single fraction, $\frac{3}{x-1} - \frac{2}{x}$ is equivalent to

10) Express $\frac{1}{2x} - \frac{3}{14x}$ as a single fraction in simplest form.

11) Combine and simplify: $\frac{3}{x^2-9} + \frac{2}{x-3}$

12) Combine and simplify: $\frac{3}{x^2-16} + \frac{2}{x^2-4x}$

Name: _____
Day 10 Review 2

Date: _____

1) What is the solution set of the equation $\frac{x}{x-4} - \frac{1}{x+3} = \frac{28}{x^2 - x - 12}$?

2) Solve for x : $\frac{2}{x} + \frac{3}{5x} = 1$

3) Solve for all values of x : $\frac{9}{x} + \frac{9}{x-2} = 12$

4) Solve: $3 - \frac{2}{x} = \frac{6}{x+1}$

5) Solve: $2x - \frac{1}{2} = \frac{x-1}{x+1} + x + 2$

6) What is the value of x in the equation $\frac{x}{2x+1} = \frac{4}{3}$?

7) What is the sum of $\frac{3}{x-3}$ and $\frac{x}{3-x}$?

8) The expression $\frac{6}{y-5} - \frac{y+5}{y^2-25}$ is equivalent to:

9) Expressed as a single fraction, $\frac{5}{x-3} - \frac{1}{x}$ is equivalent to:

10) What is the sum of $(y-5) + \frac{3}{y+2}$?

Day 12

1) $\frac{2x+3}{6x} - \frac{x-2}{4x}$

2) $\frac{2}{a^2-4} - \frac{1}{a^2+2a}$

Sep 13-9:28 AM

2-6 Complex Rational Expressions

A complex fraction is a fraction whose numerator, denominator, or both contain fractions.

To simplify Complex Fractions:
1) Find the LCD for the entire problem.
2) Multiply each term by the LCD.
3) Simplify by following the rules for reducing fractions

1) $\frac{1 + \frac{1}{b} - \frac{2}{b^2}}{1 - \frac{1}{b}}$

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2) Express $\frac{\frac{2}{a}}{\frac{3}{4a^2}}$ in simplest form.

3) Simplify: $\frac{\frac{b}{10} + \frac{1}{2}}{\frac{b^2}{25} - 1}$

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$$\frac{4y - \frac{1}{y}}{y - \frac{1}{2}}$$

$$5) \frac{a - \frac{49}{a}}{a - 9 + \frac{14}{a}}$$

$$\frac{\frac{1}{a} - 1}{1 - \frac{1}{a}}$$

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$$7) \frac{a - \frac{49}{a}}{a - 9 + \frac{14}{a}}$$

$$8) \text{ The expression } \frac{\frac{a}{b} - \frac{b}{a}}{\frac{1}{a} + \frac{1}{b}} \text{ is equivalent to}$$

$$9) \text{ In simplest form, } \frac{\frac{1}{x^2} - \frac{1}{y^2}}{\frac{1}{y} + \frac{1}{x}} \text{ is equal to}$$

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Day 12 Homework

$$1) \frac{\frac{X}{2} + \frac{X}{4}}{\frac{X}{8} - \frac{X}{2}}$$

$$2) \frac{1 - \frac{1}{Y^2}}{1 + \frac{1}{Y}}$$

$$3) \frac{2X - 5 - \frac{3}{X}}{2 + \frac{1}{X}}$$

$$4) \frac{1 + \frac{2}{Y+1}}{1 + \frac{4}{Y-1}}$$

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

$$6) \frac{\frac{1}{r} - \frac{1}{s}}{\frac{r^2}{s^2} - 1}$$

$$7) \frac{\frac{5}{a+b} - \frac{5}{a-b}}{\frac{10}{a^2 - b^2}}$$

$$8) \left(X - 5 + \frac{6}{X} \right) \div \left(3 - \frac{6}{X} \right)$$

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Day 13

$$1) \frac{\frac{3}{a^2} + \frac{5}{a^3}}{\frac{10}{a} + 6}$$

$$2) \frac{1 + \frac{4}{x} + \frac{3}{x^2}}{1 - \frac{9}{x^2}}$$

$$3) \frac{1 + \frac{2}{y} - \frac{24}{y^2}}{1 + \frac{4}{y} - \frac{12}{y^2}}$$

$$4) \frac{\frac{1}{k} - \frac{3}{k^2} + \frac{2}{k^3}}{\frac{1}{k} - \frac{4}{k^2} + \frac{4}{k^3}}$$

$$5) \frac{1 + \frac{7}{y-2}}{1 + \frac{3}{y+2}}$$

$$6) \frac{1 + \frac{4}{X+1}}{X-1 - \frac{24}{X+1}}$$

$$7) \frac{\frac{3}{x-2} - \frac{3}{X+2}}{\frac{12}{x^2-4}}$$

$$8) \frac{2 + \frac{2}{x-4}}{1 + \frac{x-1}{2x-8}}$$

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Day 14

Class/homework

$$1) \frac{4 + \frac{1}{X}}{3 + \frac{2}{X^2}}$$

$$2) \frac{3 + \frac{9}{X-3}}{4 + \frac{12}{X-3}}$$

$$3) \frac{\frac{3}{X^2} - \frac{4}{X}}{4 + \frac{12}{X-3}}$$

$$4) \frac{\frac{4}{3X}}{\frac{6}{4X} - 2}$$

$$5) \frac{1 + \frac{7}{X-2}}{1 + \frac{3}{X-2}}$$

$$6) \frac{\frac{4X-3}{X^2-5X}}{\frac{1}{X} + \frac{2}{x-5}}$$

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Day 15
Complex Review

$$1) \frac{\frac{X^2}{8} - 1}{\frac{16}{X} - \frac{1}{2}}$$

$$2) \frac{\frac{X}{4} - \frac{8}{X}}{\frac{2}{1} - \frac{X}{1}}$$

$$3) \frac{1 + \frac{1}{X} - \frac{12}{X^2}}{1 - \frac{4}{X} - \frac{32}{X^2}}$$

$$4) \frac{\frac{3}{b} - 1}{1 - \frac{6}{b} + \frac{9}{b^2}}$$

$$5) \frac{1 - \frac{3}{y}}{1 - \frac{9}{y^2}}$$

$$6) \frac{\frac{3}{x-2} - \frac{3}{x+2}}{\frac{12}{x^2 - 4}}$$

$$7) \frac{\frac{5}{x-y} - \frac{5}{x+y}}{\frac{10}{x^2 - y^2}}$$

Name: _____

Day 16 Review 1

- 1) Expressed as a fraction in lowest terms, $\frac{x^2 - x - 2}{x^2 - 4}$,
 $x \neq \pm 2$ is equivalent to

- 2) Express in lowest terms: $\frac{x^2 - 9}{x^2 + 3x}$, $x \neq 0, -3$

- 3) For what value(s) of x is $\frac{2x}{x - 5}$ undefined?

- 4) For what value(s) of x is $\frac{4}{x^2 - 9}$ undefined?

- 5) Simplify for *all* values of x for which the expression
 is defined: $\frac{x^2 - x - 20}{x^2 + 7x + 12} \times \frac{2x^2 + 6x}{x^2 - 25}$

- 6) Simplify: $\frac{9a^3}{4b} \cdot \frac{8b^3}{3a^2}$

- 7) Simplify: $\frac{3}{x^4} + \frac{6}{x^2}$

- 8) Simplify: $\frac{y^2 - 81}{(y - 9)^2} + \frac{5y + 45}{4y - 36}$

- 9) Simplify: $\frac{4x - y}{x + y} \cdot \frac{x^2 - y^2}{16x^2 - y^2} + \frac{2x - 2y}{16x + 4y}$

- 10) Perform the indicated operations and simplify:

$$\frac{x^2 - 9}{x^2 - 5x} \cdot \frac{5x - x^2}{x^2 - x - 12} + \frac{x - 4}{x^2 - 8x + 16}$$

- 11) Perform the indicated operation and simplify:

$$\frac{3x-9}{x^2-9} - \frac{1}{x+3}$$

- 12) Express $\frac{x+2}{3} + \frac{x-3}{4}$ as a single fraction in simplest form.

- 13) Combine and simplify: $\frac{3}{x+2} - \frac{2}{x^2+x-2} + \frac{2}{x-1}$

- 14) The expression $\frac{x}{x-1} + \frac{x}{x+1}$ is equivalent to

- 15) Find the solution set of $\frac{2x-1}{3} = \frac{x+2}{4}$.

- 16) Find the solution set of $\frac{x+2}{x} = \frac{(x+1)}{(x-3)}$.

- 17) Solve: $\frac{3}{x} - 2 = \frac{-2x}{x+1}$

- 18) Find the solution set of $\frac{y}{7} + \frac{y}{2} = \frac{27}{14}$.

- 19) Find the solution set of $\frac{7x-9}{x^2-25} - \frac{3}{x-5} = \frac{2}{x-5}$.

- 20) Expressed in simplest form, $\frac{\frac{1}{x} - 1}{x - \frac{1}{x}}$ is equivalent to

- 21) The expression $\frac{\frac{x}{z} - \frac{z}{x}}{\frac{1}{z} + \frac{1}{x}}$ is equivalent to

- 22) Simplify: $\frac{1 + \frac{1}{c} - \frac{20}{c^2}}{1 + \frac{4}{c} - \frac{5}{c^2}}$

Name: _____

Day 17 Review 2

1) Express $\frac{2x - 10}{x^2 - 2x - 15}$ in simplest form.

2) Simplify: $\frac{5x^2 + 11x + 2}{5x + 1}$

3) Simplify: $\frac{12x + 36}{3x + 9}$

4) For what value(s) of x is $\frac{x - 2}{x + 3}$ undefined?

5) For what value(s) of x is $\frac{x - 4}{3x + 9}$ undefined?

6) Simplify: $\left(\frac{x^2 - 4}{10x}\right)\left(\frac{5x^2}{x^2 + 2x}\right)$

7) Simplify: $\frac{8x^3y^4}{21r} \cdot \frac{14r^2}{2x^2y^2}$

8) Simplify: $\frac{13x^2}{4y} + \frac{26x}{8y^2}$

9) Simplify: $\frac{2x - 14}{5x - 10} + \frac{x^2 - 49}{x^2 - 4}$

10) Simplify: $\frac{b^2 - 25}{(b - 5)^2} + \frac{4b + 20}{2b - 10}$

11) Perform the indicated operations and simplify:

$$\frac{x^2 - 3x}{x^2 + 3x - 10} \cdot \frac{2x + 10}{3} + \frac{x^2 - x - 6}{x^2 - 4}$$

- 12) Expressed in simplest form, $\frac{x}{2} - \frac{x}{3} + \frac{x}{4}$ is equivalent to
- 13) Expressed in simplest form, $\frac{x-7}{6} - \frac{3x-2}{12}$ is equivalent to
- 14) Combine and simplify: $\frac{y-20}{y^2-16} + \frac{2}{y-4}$
- 15) Solve for x : $\frac{3}{2x-1} = \frac{1}{3x-5}$
- 16) Solve: $\frac{x+1}{x-1} = \frac{2}{2x-1} + \frac{2}{x-1}$
- 17) Find the solution set of $\frac{x}{4} - \frac{x}{5} + \frac{x}{3} = 23$.
- 18) Find the solution set of $\frac{y+1}{2y+6} - \frac{9}{y^2-9} = \frac{y-2}{2y-6}$.
- 19) The expression $\frac{\frac{a-1}{a}}{\frac{a^2-1}{a^2}}$ is equivalent to
- 20) The fraction $\frac{b + \frac{b}{a}}{a - \frac{1}{a}}$ is equivalent to
- 21) Simplify: $\frac{1 - \frac{5}{y} + \frac{6}{y^2}}{1 - \frac{3}{y}}$