

## Advanced Algebra Chapter 9 Outline

### 9-1

14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 44, 45, 50, 65, 66, 67 (20)

### 9-2

14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 26, 28, 30, 32, 34, 46, 47, 48, 54, 55 (20)

### 9-3

16, 17, 18, 19, 20, 21, 22, 24, 26, 32, 34, 40, 41, 42, 47, 48, 52, 53, 55, 56 (20)

**Wksts on 9-1, 9-2, and 9-3**

**Quiz on 9-1, 9-2, and 9-3**

### 9-4

14, 16, 18, 20, 22, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 38, 39, 41, 42, 43 (20)

### 9-5

13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 28, 29, 31, 32, 33, 39, 40 (20)

### 9-6

Day 1: 4, 5, 6, 7, 11, 12, 13, 14, 17, 18, 23, 24, 25, 27, 28, 44, 45, 46, 47, 48 (20)

Day 2: 8, 9, 15, 16, 19, 20, 21, 22, 31, 32, 34, 35, 36, 42, 43 (15) and **Quiz on 9-4 and 9-5**

### Review

Pages 513-516, 7-38

### Practice Test

Page 517, 1-25

### **Chapter 9 Test**

### 9-1 Multiplying and Dividing Rational Expressions

**Objective:** Simplify rational expressions and complex fractions.

**Simplify:** 3 steps: 1) factor, 2) cancel, and 3) rewrite.

$$\text{Ex 1) } \frac{2x^2 - 10x}{(x-5)(x^2-1)}$$

$$\text{Ex 2) } \frac{p^2 + 2p - 3}{p^2 - 2p - 15}$$

$$\text{Ex 3) } \frac{p^2w - p^2}{p^3 - p^3w}$$

$$\text{Ex 4) } \frac{8x}{21y^3} \cdot \frac{7y^2}{16x^3}$$

$$\text{Ex 5) } \frac{10pt^2}{3c^2d} \div \frac{5pt}{6c^2d^2}$$

$$\text{Ex 6) } \frac{k-3}{k+1} \div \frac{k^2-4k+3}{1-k^2}$$

$$\text{Ex 7) } \frac{2d+6}{d^2+d-2} + \frac{d+3}{d^2+3d+2}$$

$$\text{Ex 8) } \frac{x^2}{9x^2-4y^2}$$

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$$\frac{x^3}{2y-3x}$$

$$\text{Ex 9) } \frac{r^2}{r^2-25s^2}$$

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$$\frac{r}{5s-r}$$

### 9-2 Adding and Subtracting Rational Expressions

Objective: Determine the LCM of Polynomials  
Add and Subtract rational expressions

I. LCM--Least Common Multiple--use each factor the greatest number of times it appears as a factor and simplify.

Ex 1) 9

15

Ex 2)  $a^2b^3$

$a^4b$

Ex 3)  $18r^2s^5$

$24r^3st^2$

$15s^3t$

Ex 4)  $p^3 + 5p^2 + 6p$

$p^2 + 6p + 9$

II. Simplify.

Ex 5)  $\frac{5a^2}{6b} + \frac{9}{14a^2b^2}$

Ex 6)  $\frac{w + 12}{4w - 16} - \frac{w + 4}{2w - 8}$

Ex 7)  $\frac{x + 10}{3x - 15} - \frac{3x + 15}{6x - 30}$

## 9-3 Graphing Rational Functions

A **Rational Function** is in the form of  $f(x) = \frac{p(x)}{q(x)}$  =  $\frac{\text{polynomial}}{\text{polynomial}}$

Their graphs may have breaks in continuity such as asymptote or hole in the graph.  
See page 485 and 486.

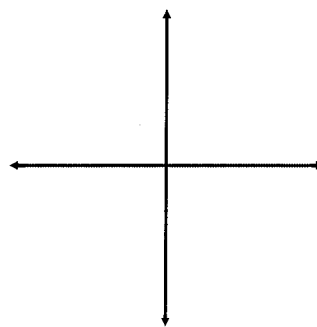
I. Determine the equations of any vertical asymptotes and the values of x for any holes in the graph.

Ex 1)  $f(x) = \frac{x^2 - 1}{x^2 - 6x + 5}$

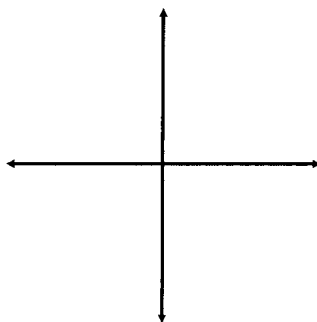
Ex 2)  $f(x) = \frac{x^2 - 4}{x^2 + 5x + 5}$

II. Graph.

Ex 3)  $f(x) = \frac{x^2 - 9}{x + 3}$



Ex 4)  $f(x) = \frac{x}{x - 2}$



**9-4 Direct, Joint, and Inverse Variation**

**Objective:** Recognize and solve direct, joint, and inverse variation problems.

I. **Direct:** y varies directly as x if there is some nonzero k such that  $y = kz$ . (k is a constant)

$$\frac{x_1}{y_1} = \frac{x_2}{y_2}$$

example:

Ex 1) If y varies directly as x and y = -15 when x = 5. Find y when x = 3.

II. **Joint Variation:** y varies jointly as x and z if there is some number k such that  $y = kxz$  where k, x, and z cannot be zero.

$$\frac{y_1}{x_1 z_1} = \frac{y_2}{x_2 z_2}$$

Example:


Ex 2) y varies jointly as x and z. Find y when x = 10, z = 5, if y = 12 when z = 8 and x = 3.

III. Inverse Variation: y varies inversely as x if there is some nonzero constant k such that  $y = k/x$ .

$$\frac{x_1}{y_2} = \frac{x_2}{y_1}$$

Example:

Ex 3) If y varies inversely as x and y = -6, when x = 2, find y when x = -7.



Now, let us get started on your homework!!

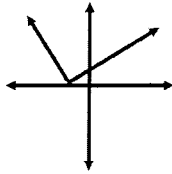
9-5 Classes of Functions

**Objective:** ID graphs as different types of functions  
 ID equations as different types of functions

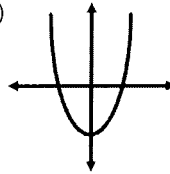
**I. ID Graphs**

- A) Go to page 499 and 500.
- B) Turn to page 501 and let us discuss #4-8.
- C) Examples

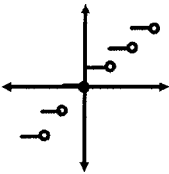
Ex 1)



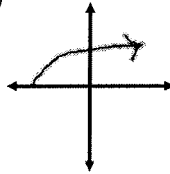
Ex 2)



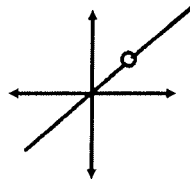
Ex 3)



Ex 4)

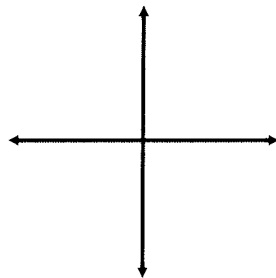


Ex 5)

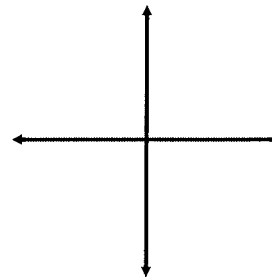


**II. Identify the equation and then graph.**

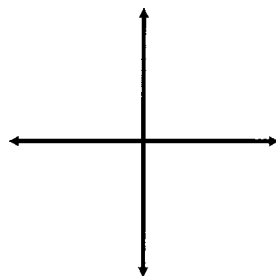
Ex 6)  $y = -3$



Ex 7)  $y = \sqrt{9x}$



Ex 8)  $y = |x| - 1$






9-6 Solving Rational Equations and Inequalities  
Day 1

Objective: To solve rational Equations (today) and Inequalities (tomorrow)

Ex 1)  $\frac{5}{24} + \frac{2}{3-x} = \frac{1}{4}$

Ex 2)  $\frac{9}{28} + \frac{3}{z+2} = \frac{3}{4}$

Ex 3)  $\frac{p^2 - p + 1}{p + 1} = \frac{p^2 - 7}{p^2 - 1} + p$



Now let me help  
you get started  
on your  
homework : )

9-6 day 2

Today, we are going to solve Rational Inequalities.

Follow these steps:

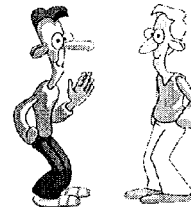
- 1) State the excluded values
- 2) Solve the related equation (just like yesterday)
- 3) Use the values from #1 and #2 to divide the number line into regions. Test a value in each region to see what works.

Ex 1)  $\frac{1}{4a} + \frac{5a}{8a} > \frac{1}{2}$

Ex 2)  $\frac{1}{3s} + \frac{2}{9s} < \frac{2}{3}$

Work Problem

Ex 3) Scott and Tony mow lawns. Tony does the job alone in 4.5 hours while Scott does the job alone in 3.7 hours. How long does it take for them to mow the lawn if they work together to complete the job?



"Rate x Time = Distance"

Ex 4) Jaime swam for 5 hours in a stream with a current of 1 mph. She leaves her dock and swims upstream for 2 miles and then back to her dock. What is her swim speed in still water?

