

# Math 0995 CBE 3 Review

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**UtahState**University

# CBE 3

- Covers lessons 14-18
  - Rational Expressions
  - Multiplying and Dividing Rational Expressions
  - Adding and Subtracting Rational Expressions
  - Radical Expressions
  - Simplifying Radical Expressions

# Rational Expressions

Simplifying, Adding, Subtracting, Multiplying, and Dividing

# Rational Expressions

- Rational expressions are just like big fractions
- To simplify rational expressions, we look for factors of the numerator that are also factors of the denominator that “cancel out”

# Problem 1

- Simplify the expression:  $\frac{-9x + 9y}{x - y}$

- Solution: -9

# Problem 2

- Simplify the expression:  $\frac{6m^3 + m}{m}$

- Solution:  $6m^2 + 1$

# Multiplying Rational Expressions

- Rational expressions multiply just like fractions.
- Factor everything!
- Multiply tops, multiply bottoms, and simplify

# Dividing Rational Expressions

- Dividing rational expressions is the same as multiplying by the reciprocal.
- Switch the division to multiplication and then multiply just like before.

# Problem 3

- Multiply and simplify the expression:  $\frac{8x + 80}{16} \times \frac{6}{30x}$

- Solution:  $\frac{x + 10}{10x}$

# Problem 4

- Simplify the expression: (Leave in factored form)

$$\frac{5x^2 + 25x + 30}{5x - 20} \div \frac{x^2 + x - 6}{x + 4}$$

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

# Adding/Subtracting Rational Expressions

- Again, think of rational expressions just like big fractions
- Get a common denominator and then add the numerators!

# Problem 5

- Perform indicated operation

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

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

# Problem 6

- Perform the indicated operations: (Leave denominator in factored form)

$$\frac{1}{x^2 - 13x + 40} - \frac{8}{x - 8}$$

- **Solution:**  $\frac{-8x + 41}{(x - 5)(x - 8)}$

# Radical Expressions

Simplifying, Adding, Subtracting, Multiplying, and Dividing

# What are radical expressions?

- Radical expressions are roots
- A mathematical operation acting on what is inside of it.
- Radical expressions can also be written as exponents.
- If the inside is not a perfect square, cube, or other power then we can still simplify the radical expression.

# Problem 7

- Simplify the expression  $-(10000)^{\frac{3}{4}}$

- Solution: -1000

# Problem 8

- Simplify  $\sqrt[3]{320x^{11}y^{16}}$

- Solution:  $4x^3y^5\sqrt[3]{5x^2y}$

# Problem 9

• Simplify  $\sqrt{162} - \sqrt{18}$

• Solution:  $6\sqrt{2}$

# Problem 10

- **Multiply and simplify:**  $(4\sqrt{x} - 6)(3\sqrt{x} - 1)$ 
  - Don't forget to distribute!

- **Solution:**  $12x - 22\sqrt{x} + 6$

# Other Resources

- Aggie Math Learning Center
  - Visit [usu.edu/math/amlc](http://usu.edu/math/amlc) for more videos, resources, tutoring times, and recitation leader office hours

