Name: _____ Points: _____

Fractions

Rule for Adding and Subtracting Fractions:

(1) Find the least common denominator (LCD) of the fractions.
(2) Convert each fraction to an equivalent fraction with LCD as the denominator.
(3) Add or subtract the numerators, keep the LCD as the denominator.
(4) Reduce the answer to the lowest term.

1. **Practice Problems**:

a. $\frac{2}{15}+\frac{4}{5}$

b. $\frac{7}{8}-\frac{5}{12}$

c. $\frac{2}{3}+\frac{4}{9}-\frac{1}{6}$

Rule for Multiplying Simple or Improper Fractions:

(1) Reduce numerators with denominators, where possible (Cross cancel).
(2) Multiply all the numerators together; and multiply all the denominators together. (Multiply across)
(3) Reduce the answer to the lowest term. (If step (3) is performed properly, the answer should already be in the lowest term)

Rule forDividing Simple or Improper Fractions:

(1) Change division to multiplication by taking the reciprocal of the fraction after the division sign ÷.
(2) Follow the steps for multiplying fractions.

2. **Practice Problems**:

a. $\frac{5}{18}\cdot\frac{12}{25}$

b. $\frac{1}{6}\div\frac{9}{10}$

c. $12\cdot\frac{5}{8}$

d. $\frac{5}{9}\div 3$

e. $\frac{6}{7}\div\frac{9}{8}\cdot\frac{21}{24}$

Prepared by Profs. Ghezzi, Han, and Liou-Mark
Supported by BMI, NSF STEP #0622493, and Perkins

I. Properties of Exponents

Multiplication/Product Rule	$x^m \cdot x^n =$
Division/Quotient Rule	$\frac{x^m}{x^n} =$ where $(x \neq 0)$
Zero Exponent	$x^0 =$ where $(x \neq 0)$
Power of a Power	$(x^m)^n =$
Power of a Product	$(x \cdot y)^n =$
Power of a Quotient	$\left(\frac{x}{y}\right)^n =$ where $(y \neq 0)$
Negative Exponent	$x^{-n} =$ where $(x \neq 0)$

2. Find the error in each problem. Use the properties of exponents to justify your answers.

Find the error #1

Multiply: $a^2 \cdot a^3 = a^6$

Find the error #2

Add: $x^2 + x^2 = x^4$

Find the error #3

$$\frac{x^5}{x^{-2}} = x^3$$

Find the error #4

$$(2x^5)^4 = 8x^9$$

Find the error #5

$$\frac{x^2 y^3}{xy^3} = xy$$

Prepared by Profs. Ghezzi, Han, and Liou-Mark
Supported by BMI, NSF STEP #0622493, and Perkins

3. Simplify and leave your answers with positive exponents only.

a. $\left(5x^{5}y^{-3}\right)\left(6x^{8}y^{5}\right)$

b. $\dfrac{16a^{6}b^{-3}}{24a^{-6}b^{2}}$

c. $\left(2x^{-11}y^{2}\right)^{5}$

d. $\dfrac{\left(4v^{-7}w^{-9}\right)^{3}}{\left(8v^{3}w^{-4}\right)^{2}}$

e. $\dfrac{\left(12m^{13}n^{7}\right)\left(6m^{-11}n^{-5}\right)}{\left(9m^{-7}n^{3}\right)}$

Prepared by Profs. Ghezzi, Han, and Liou-Mark
Supported by BMI, NSF STEP #0622493, and Perkins

4. Write the following numbers in scientific notation.

a. The average distance from the center of the Earth to the center of the Moon is 384,403 km.

b. The estimated cost of aid and reconstruction following the 2004 tsunami was $7,500,000,000

c. The mass of a proton is 0.00000000000000000000000000016726 kg

d. The average cost for a pound of coffee in 1887 was $0.106.

5. Perform the indicated operation and write your answer in scientific notation.

a. $\left(4\times10^{-9}\right)\left(8.3\times10^{11}\right)$

b. $\dfrac{\left(2.4\times10^{4}\right)}{\left(4\times10^{-5}\right)}$

c. $\dfrac{(.00000000000000013)(12{,}000{,}000)}{(3900000)(.0000004)}$

Prepared by Profs. Ghezzi, Han, and Liou-Mark
Supported by BMI, NSF STEP #0622493, and Perkins