Math 4. Classwork #24

Review of operations with fractions:

Fraction addition: $\frac{5}{12} + \frac{2}{15} = \frac{5 \cdot 5}{60} + \frac{2 \cdot 4}{60} = \frac{25+8}{60} = \frac{33}{60} = \frac{33}{60} : \frac{3}{3} = \frac{11}{20}$

1. Find common denominator, which is LCM.
2. Add, simplify if needed.

Fraction subtraction: $3\frac{2}{15} - \frac{5}{12} = 3\frac{2 \cdot 4}{60} - \frac{5 \cdot 5}{60} = 3\frac{8}{60} - \frac{25}{60} = 2\frac{68}{60} - \frac{25}{60} = 2\frac{43}{60}$

1. Find common denominator, which is LCM.
2. Borrow 1 if needed,
3. Subtract, simplify if needed.

Compute: (*Remember the common denominator is LCM, borrow 1 from the wholes if needed, DO NOT convert the entire whole number into a fraction.*)

(a) $4\frac{5}{12} - \frac{8}{9} =$ (b) $1\frac{1}{30} + \frac{5}{24} =$

Fraction multiplication: $\frac{3}{4} \cdot \frac{2}{3} =$

1. Multiply numerators and denominators: $\frac{3}{4} \cdot \frac{2}{3} = \frac{3 \cdot 2}{4 \cdot 3}$

2. Simplify by using number prime factorization: $\frac{3}{4} \cdot \frac{2}{3} = \frac{3 \cdot 2}{4 \cdot 3} = \frac{3 \cdot 2}{2 \cdot 2 \cdot 3} = \frac{1}{2}$

Fraction division: $\dfrac{1}{2} \div \dfrac{2}{3} = \dfrac{1}{2} \cdot \dfrac{3}{2} = \dfrac{1 \cdot 3}{2 \cdot 2} = \dfrac{3}{4}$

1. Find a **reciprocal (inverse)** of the divisor. **Reciprocal** of $\dfrac{2}{3}$ is $\dfrac{3}{2}$.
2. Turn division into multiplication and simplify by using prime factorization:

Compute: (*First make all fractions irregular; then multiply*)

(a) $\dfrac{9}{16} \cdot \dfrac{4}{45} =$

(b) $3\dfrac{3}{7} \cdot \dfrac{7}{24} =$

Compute: (*First make all fractions irregular; then divide*)

(a) $1\dfrac{1}{4} \div 2\dfrac{1}{2} =$

(b) $\dfrac{4}{13} \div \dfrac{11}{13} =$

Exponents review:

$$b^n \times b^m = b^{n+m}$$

$$(b^2)^3 = (b \cdot b)^3 = (b \cdot b) \cdot (b \cdot b) \cdot (b \cdot b) = b^{2 \cdot 3} = b^6$$

$$(b^n)^m = b^{n \cdot m}$$

$$(a \cdot b)^3 = (a \cdot b) \cdot (a \cdot b) \cdot (a \cdot b) = a \cdot a \cdot a \cdot b \cdot b \cdot b = a^3 b^3$$

$$(a \cdot b)^n = a^n b^n$$

$$a^{-n} = \dfrac{1}{a^n}$$

Simplify:

$$\frac{x^5 \cdot x^8}{x^{-3}} =$$

$$\frac{2^3 \cdot 3^2 \cdot 6^8}{2^{10} \cdot 3^6} =$$
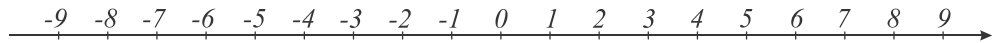
$$\frac{y^n \cdot y^{n+2}}{y^{2n}} =$$

$$\frac{y^{n+12}}{y^n \cdot y^{11}} =$$
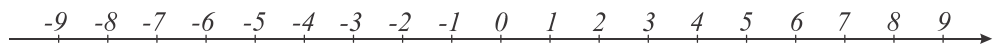
$$\frac{m^{n+12}}{m^n} =$$

$$\frac{4b - ab}{b} =$$

Show on the number line points that are satisfying the following inequalities:

a) $|x| < 4$

-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9

b) $\left|x - \frac{1}{2}\right| > 3$

-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9

d) $|4x - 4| \geq 8$

-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9

There are three bags of balls containing identical colors: one has red, the other has green, and the third bag has blue balls. If you take out 75 balls from one of the bags, 46 from the other, and 52 from the third, there is an equal number of balls in each bag. How many balls were in each bag at the beginning if we started with a total of 533 balls?

$$\frac{0.4+8\cdot\left(5-0.8\frac{5}{8}\right)-5\div2\frac{1}{2}}{\left(1\frac{7}{8}\cdot8-\left(8.9-2.6\div\frac{2}{3}\right)\right)34\frac{2}{5}}\cdot90=$$