Math 4. Class Work 8

Addition and subtraction of fractions with unlike denominators

- To add fractions, bring them to a Common denominator. The **common denominator** of fractions should be the multiple of these denominators – the **LCM** can do this task!

For example, $\frac{3}{8}+\frac{5}{12}=\frac{3\cdot3}{8\cdot3}+\frac{5\cdot2}{12\cdot2}=\frac{9}{24}+\frac{10}{24}=\frac{19}{24}$

If both numbers are prime, the least common multiple is their product.

Multiplication of fractions by a number.

- To multiply a fraction by a number, simply multiply the numerator by the number
- Finding a part of a whole number involves multiplication of the fraction by number

$\frac{2}{7}\cdot 3=\frac{2}{7}+\frac{2}{7}+\frac{2}{7}=\frac{2+2+2}{7}=\frac{3\cdot2}{7}=\frac{6}{7}$ (this is also finding 2/7 of 3)

Multiplication of fraction by a fraction.

- To multiply two fractions, we need to multiply the numerators, multiply the denominators and reduce the fractions, if possible.
- Finding a part of a fraction involves multiplication of the fractions

Examples: $\frac{3}{8}\cdot\frac{2}{7}=\frac{3\cdot2}{4\cdot2\cdot7}=\frac{3\cdot2}{4\cdot7\cdot2}=\frac{3}{4\cdot7}=\frac{3}{28}$ (this is also 3/8 of 2/7)

Division of fractions.

- To divide one fraction by another, we multiply the dividend by the **inverse fraction**.
- An inverse fraction has the numerator and denominator switched, so the product of the original and its inverse fraction is 1. Inverse fractions can also be called reciprocal.

Example: $\frac{4}{3}$ has a reciprocal of $\frac{3}{4}$, and $\frac{4}{3}\cdot\frac{3}{4}=1$

Complex fractions

- Complex fractions are formed by two fractional or tow numeral expressions, one on the top and the other one on the bottom. Simplify the expressions first. Remember – the fraction line means division

Example: $\frac{(2+3)\cdot5}{7-\frac{1}{2}}=\left((2+3)\cdot5\right):\left(7-\frac{1}{2}\right)=(5\cdot5):\left(\frac{7\cdot2-1}{2}\right)=25:\left(\frac{13}{2}\right)=25\cdot\frac{2}{13}=\frac{50}{13}$

Problems:

1. Write the answer as a fraction:
   a) Milk was evenly poured into 6 glasses. What fraction of the milk is in 1 glass? In 3 glasses? In 5 glasses?

   b) In a bundle of 11 balloons: 3 of them are yellow, 4 are green, the rest are red. What fraction of all the balloons are red? Yellow? Green?

2. Multiply and divide the following fractions:

   a) $\frac{9}{2} \cdot \frac{2}{9} =$ $\frac{4}{9} : \frac{8}{9} =$

   b) $\frac{8}{21} \cdot \frac{7}{10} =$ $\frac{3}{4} : \frac{1}{2} =$

   c) $\frac{4}{7} \cdot \frac{5}{24} : 1\frac{1}{14} =$ $25 \cdot \frac{7}{15} : \frac{7}{9} =$

3. Find the part of the whole

   $a)\ \frac{3}{4}\ of\ 12, \qquad b)\ \frac{2}{7}\ of\ 14, \qquad c)\ \frac{5}{8}\ of\ 56$

4. Painter painted $\frac{2}{7}$ of the house is 4 days. How many days will it take him to paint the whole house? Represent with an equation.

5. Evaluate:

   $a)\ \frac{3}{7} \cdot 2; \qquad b)\ 3 \cdot \frac{1}{6}; \qquad c)\ 9 \cdot \frac{5}{6}; \qquad d)\ 2\frac{1}{3} \cdot 2; \qquad e)\ 4 \cdot 1\frac{1}{2};$

6. A melon weighs 7 pounds, and a watermelon is $1\frac{1}{5}$ times heavier. By how many pounds is a watermelon heavier than a melon?

7. $4\frac{1}{2}$ kg. of candies were packed into $\frac{1}{2}$ kg packages. How many packages were the candies packed into?

8. Find the unknown:

   $a)\ \frac{1}{3} \cdot x = \frac{1}{6}\ ; \qquad b)\ \frac{2}{3} \cdot x = 1\ ; \qquad c)\ 3 \cdot x = \frac{1}{3}$

9. Addition and subtraction of mixed numbers – convert to improper fractions,

a) $5\frac{5}{12}+3\frac{2}{9}=$ b) $7\frac{1}{9}-4\frac{1}{3}=$

c) $2\frac{4}{9}+\frac{1}{6}=$ d) $2\frac{2}{7}-1\frac{3}{5}=$

10. Draw a number line with a unit segment equal to 10 cells and mark the fractions:

$$\frac{1}{5};\ \frac{2}{5};\ \frac{3}{5};\ \frac{5}{5};\ \frac{6}{5};\ \frac{8}{5}.$$

11. Write the expressions as fractions and evaluate them. Remember, the division is a fraction line:

a) $14:42$; b) $2:3:5$; c) $2:8\cdot 3$; d) $(21\cdot 18):14$; *e*) $50:(16\cdot 25)$;

12. Evaluate the complex fractions by first simplifying the expression in the numerator and then in the denominator.

a) $\dfrac{6}{1-\frac{1}{3}}$; b) $\dfrac{1-\frac{1}{6}}{2+\frac{1}{6}}$;

13. Evaluate the complex fraction:

$$\frac{3\frac{1}{5}}{\left(1\frac{5}{6}\cdot 1\frac{5}{22}\right):18\cdot 5}$$