Math 4a. Class work 13.

Algebra.

1. Complex fractions.

Complex fractions are formed by two fractional expressions, one on the top and the other one on the bottom, for example:

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{7}{9}-\frac{2}{5}}$$

We know that the fraction bar is a just another way to write the division sign, so the above expression is equivalent to

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{7}{9}-\frac{2}{5}} = (\frac{1}{2}+\frac{1}{3}) \div (\frac{7}{9}-\frac{2}{5})$$

And it is easy to simplify a complex fraction:

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{7}{9}-\frac{2}{5}} = \left(\frac{1}{2}+\frac{1}{3}\right) \div \left(\frac{7}{9}-\frac{2}{5}\right) = \frac{\frac{3}{6}+\frac{2}{6}}{\frac{35}{45}-\frac{18}{45}} = \frac{\frac{5}{6}}{\frac{17}{45}} = \frac{5}{6} \div \frac{17}{45} = \frac{5}{6} \cdot \frac{45}{17} = \frac{5}{2} \cdot \frac{15}{17} = \frac{75}{34}$$

1. Compute:

$$\frac{6}{1-\frac{1}{3}} =$$

$$\frac{1-\frac{1}{6}}{2+\frac{1}{6}} =$$

$$\frac{\frac{1}{2}+\frac{3}{4}}{\frac{1}{2}} =$$

$$\frac{\frac{7}{10}+\frac{1}{3}}{\frac{7}{10}+\frac{1}{2}} =$$

$$\frac{2-\frac{\frac{1}{2}-\frac{1}{4}}{2}}{2+\frac{\frac{1}{2}-\frac{1}{4}}{2}}=$$

2. Write all value for n (n is a natural number) for which the following fractions will be improper fractions:

$$\frac{10}{3+n};\qquad \frac{19}{2n};\qquad \frac{16}{20-n};\qquad \frac{23}{3n};$$

3. Solve the following equations:

$138 + x + 57 = 218;$

$248 - (y + 123) = 24;$

$(24 - x) + 37 = 49;$

$(y + 263) - 97 = 538;$

$169 + (87 + n) = 303$

4. Solve the following equations:

$128 \cdot 4x = 128 \cdot 12$ $\qquad$ $12x \cdot 350 = 350 \cdot 48$

$280 \cdot 15x = 45 \cdot 280$ $\qquad$ $29x \cdot 430 = 58 \cdot 430$

5. A farmer has a cow, a goat and a goose. The cow and the goat will eat all the grass on his meadow in 45 days, the cow and the goose will eat all the grass on the same meadow in 60 days, and the goat and the goose will eat all the grass on the meadow in 90 days. How many days will it take them altogether to eat all the grass on the meadow? (we assume that the new grass is not growing.)

6. Simplify the following expressions:

$m - (n + m) =$

$-(n - x) - x =$

$p + (-m + k - p) =$

$-a - (m - a + p) =$

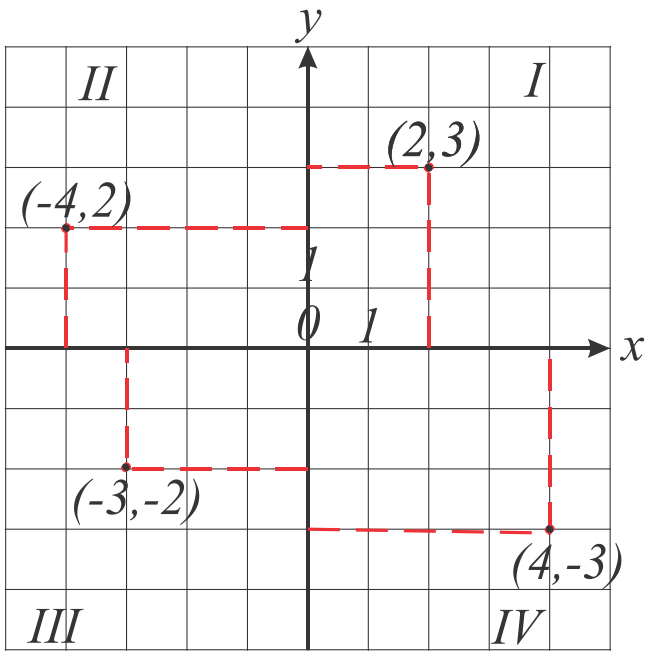
$-(m - a) - (k + a) =$

$m + (k - a - m) =$

$m - (a + m) - (-a - m) =$

$a - (a - b) =$

2. Coordinates.



On a number line each point represents a number and each number is linked to a point if an origin (point at 0) and a unit segment are defined. This number is a coordinate of a point on the line in the defined system: absolute value of this number shows the distance (how many unit segments can be put in) between the point and the origin and the sign shows on which side of the origin this point is located. On a plane each point corresponds to a unique ordered pair of numbers. To define this pair for each point 2 perpendicular number line are usually used. These two number lines intersect at the point called origin, associated with pair (0,0), have the same unit segment, and are

called axis, usually x and y axis. The pair of numbers allied with each point of the plane in this particular system of coordinate defined as a distance from the point to both axis, and the signs of these numbers correspond to a quadrant where point is located (quadrants I, II, III, and IV on the picture above). Such pair of numbers is an ordered pair, so the pair (n,m) and the pair (m,n) are linked to two different points. Absolute value of the first number in the pair is the distance to from the point the y axis and absolute value of the second one is the distance from the point to the x axis.

Can you imagine any other algorithm to link a point in a plane and a pair of numbers?

7. Find the coordinates of the ends of the segments and its midpoints on the picture below: