Math 4a. Class work 11.

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

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{2}{3}+\frac{1}{4}}=(\frac{1}{2}+\frac{1}{3})\div(\frac{2}{3}+\frac{1}{4})$$

And it is easy to simplify a complex fraction:

$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{2}{3}+\frac{1}{4}}=\left(\frac{1}{2}+\frac{1}{3}\right)\div\left(\frac{2}{3}+\frac{1}{4}\right)=\frac{\frac{3}{6}+\frac{2}{6}}{\frac{8}{12}+\frac{3}{12}}=\frac{\frac{5}{6}}{\frac{11}{12}}=\frac{5}{6}\div\frac{11}{12}=\frac{5}{6}\cdot\frac{12}{11}=\frac{5}{1}\cdot\frac{2}{11}=\frac{10}{11}$$

Exercises.

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:

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

3. Simplify the following expressions:

   a) $2a+3(a+b)-3b=$

   b) $5(m-3n)+14n=$

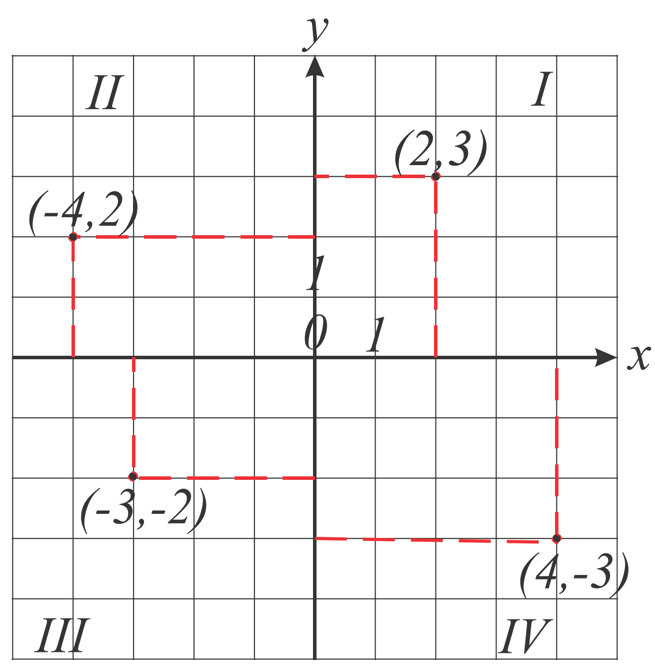
   c) $10b-(c-b)+c=$

   d) $\frac{1}{2}b+\frac{1}{2}(b+c)-\frac{1}{4}c=$

   e) $\frac{2}{5}(x+y)-\left(\frac{1}{5}x+\frac{1}{5}y\right)$

   f) $\frac{1}{3}(x+2)+\frac{2}{5}\left(x-\frac{3}{4}\right)=$

Coordinates.

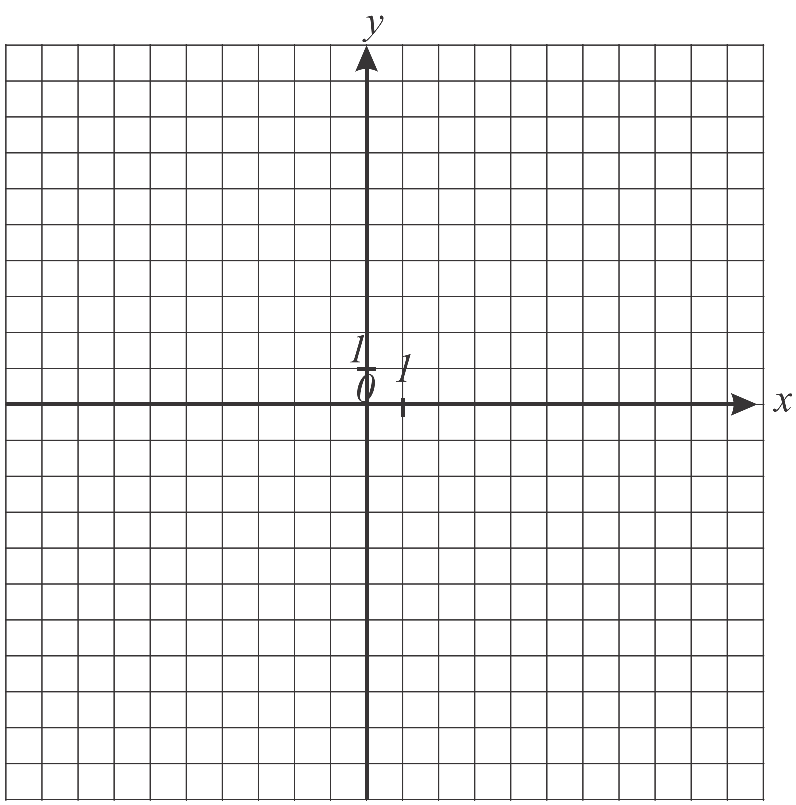


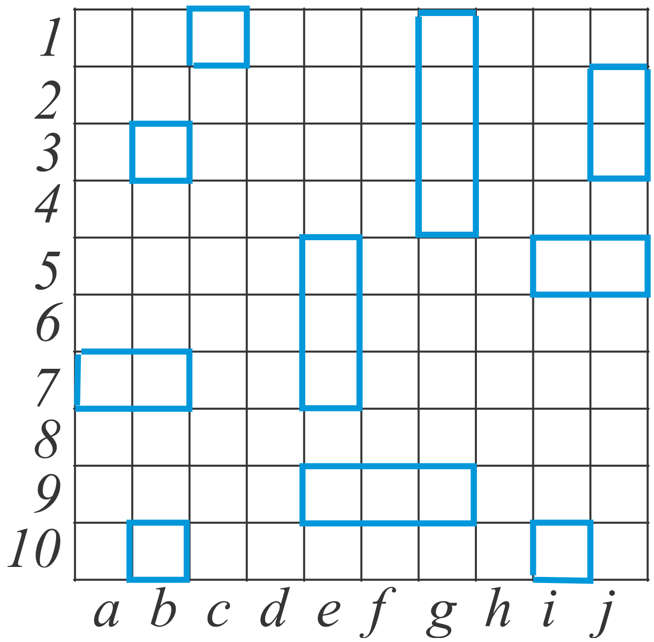
On a number line each point represents a number and each number is linked to a point if an origin (point at 0) and a unit segment are defined. This number is a coordinate of a point on the line in the defined system: absolute value of this number shows the distance (how many unit segments can be put 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 2 different points. Absolute value of the first number in the pair is the distance to the x axis and absolute value of the second one is the distance to the y axis.
Can you imagine any other algorithm to linked a point in a plane and a pair of numbers?

4. ABCD is a rectangle. Find the coordinates of point D and draw the rectangle.

   a. A(-9; 2), B(-9; 4), C(-3; 4)
   b. A(0; 6), B(0; -2), C(5, -2)
   c. A(9; 0), B(9, -5), C(2, -5)
   d. A(-6; 0), B(-6;-7), C(0; -7)

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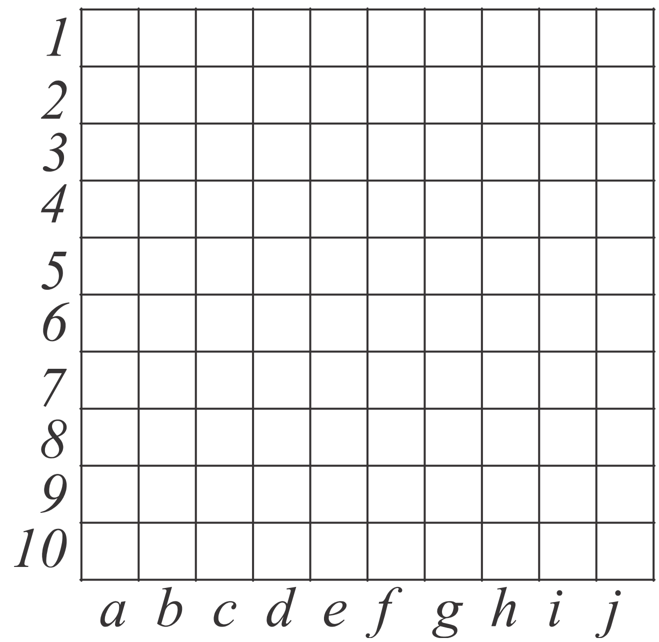
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