Math 4d. Classwork 18.

Algebra.

Warm up:

$(4.43 + 3.753) + 5.57 =$

$8.375 \cdot 6.34 + 3.66 \cdot 8.375 =$

$(2.38 - 1.89) + 7.62 =$

$589.567 : 10 =$ $\qquad$ $786 : 10 =$

$654.1 : 1000 =$ $\qquad$ $789.564 \cdot 100 =$

$654.3 \cdot 1000 =$ $\qquad$ $0.45 : 1000 =$

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:

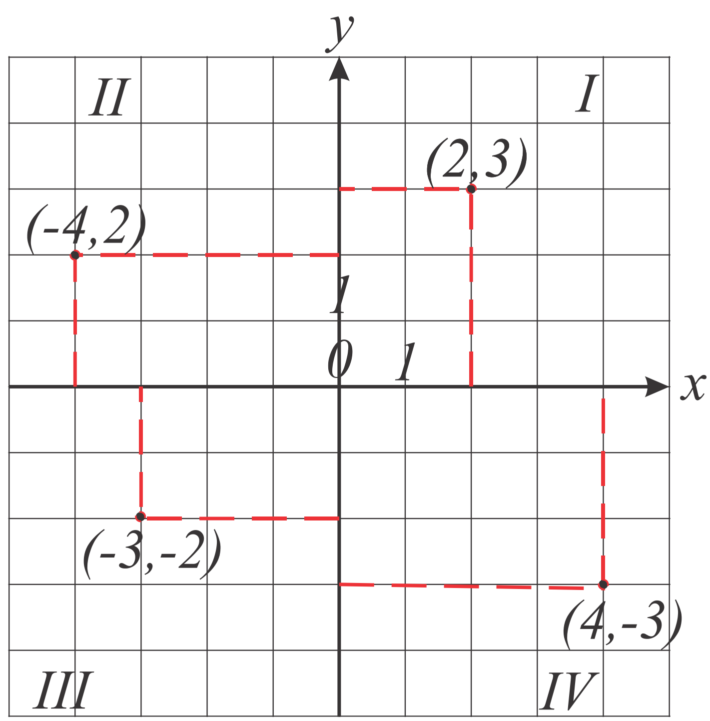
$$\frac{\frac{1}{2}+\frac{1}{3}}{\frac{2}{3}+\frac{1}{4}} = \left(\frac{1}{2}+\frac{1}{3}\right) \div \left(\frac{2}{3}+\frac{1}{4}\right) = \frac{\frac{3}{6}+\frac{2}{6}}{\frac{8}{12}+\frac{3}{12}} = \frac{\frac{5}{6}}{\frac{11}{12}} = \frac{5}{6} \div \frac{11}{12} = \frac{5}{6} \cdot \frac{12}{11}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

Exercises.

1. Compute:

$a. \dfrac{6}{1-\frac{1}{3}}$; $\quad b. \dfrac{1-\frac{1}{6}}{2+\frac{1}{6}}$; $\quad c. \dfrac{\frac{1}{2}+\frac{3}{4}}{\frac{1}{2}}$

$d. \dfrac{\frac{7}{10}+\frac{1}{3}}{\frac{7}{10}+\frac{1}{2}}$; $\quad e. \dfrac{2-\dfrac{\frac{1}{2}-\frac{1}{4}}{2}}{2+\dfrac{\frac{1}{2}-\frac{1}{4}}{2}}$;



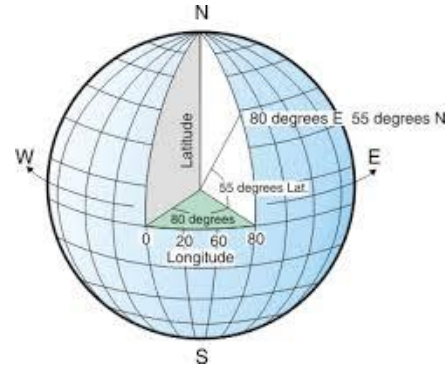
Coordinates.

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 axes, 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

Earth coordinate system:

A *geographic coordinate system* uses a three-dimensional spherical surface to determine locations on the earth. Any location on earth can be referenced by a point with longitude and latitude coordinates. The values for the points can have the following units of measurement:



- Decimal degrees
- Decimal minutes
- Decimal seconds

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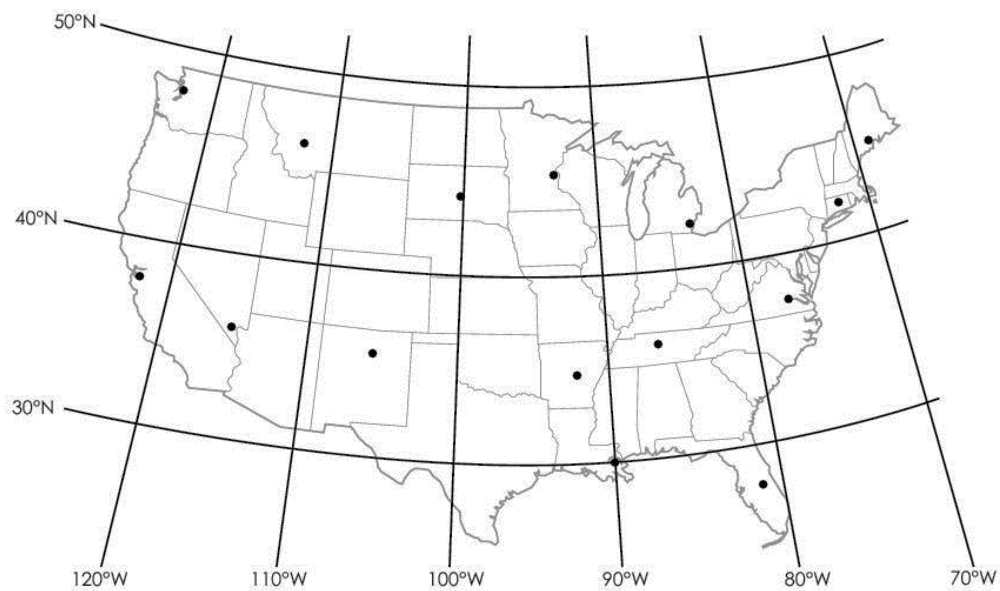
Latitude and Longitude



Using the coordinates listed below, write the name of the city next to its plotted latitude and longitude point on the map.

Detroit, Michigan: 42°N, 83°W

New Orleans, Louisiana: 30°N, 90°W

Orlando, Florida: 28°N, 81°W

Hartford, Connecticut: 42°N, 72°W

Las Vegas, Nevada: 36°N, 115°W

Seattle, Washington: 47°N, 122°W

Augusta, Maine: 44°N, 69°W

Minneapolis, Minnesota: 45°N, 93°W

Richmond, Virginia: 37°N, 77°W

Pierre, South Dakota: 44°N, 100°W

Santa Fe, New Mexico: 35°N, 106°W

Helena, Montana: 46°N, 112°W

Little Rock, Arkansas: 35°N, 92°W

San Francisco, California: 38°N, 122°W

Nashville, Tennessee: 36°N, 87°W