

Algebra.

Warm up:

$$(4.43 + 3.753) + 5.57 =$$

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

$$(2.38 - 1.89) + 7.62 =$$

$$589.567 : 10 =$$

$$786 : 10 =$$

$$654.1 : 1000 =$$

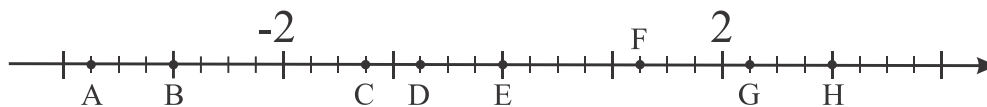
$$789.564 \cdot 100 =$$

$$654.3 \cdot 1000 =$$

$$0.45 : 1000 =$$

Coordinates.

Find the coordinates of points A, B, C, D, E, F, G, and H on the number line below:



Mark the points A(0), B(1), C $(-1\frac{1}{2})$, D(5), E(-5), F(-3), G(3)

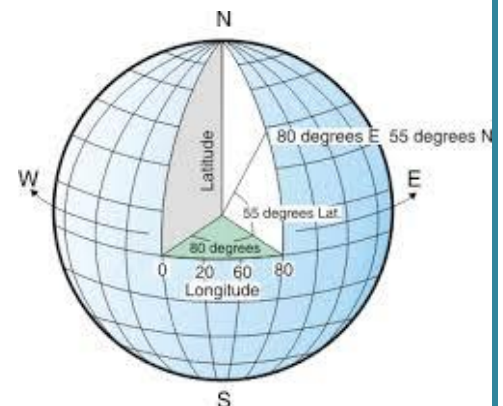


Is there anything in common between points F and G, D and E?

Earth coordinate system:

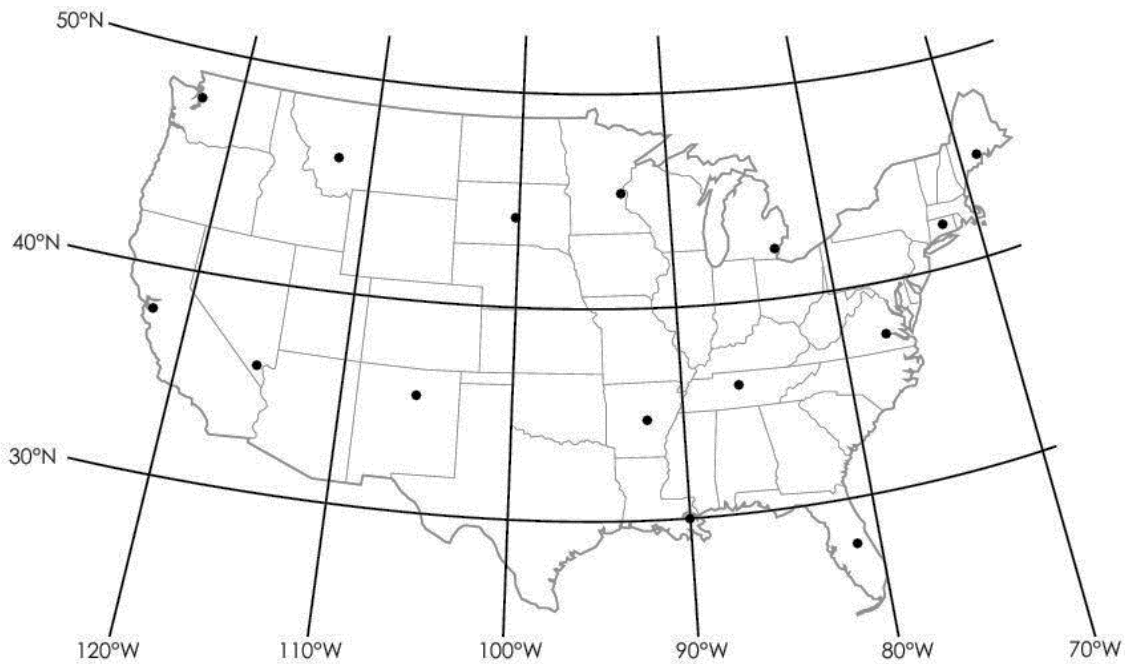
Earth coordinate system: A *geographic coordinate system* uses a three-dimensional spherical surface to determine locations on the earth. Any location on earth can be referenced by a point with longitude and latitude coordinates. The values for the points can have the following units of measurement:

- Decimal degrees
- Decimal minutes
- Decimal seconds



For example, the following figure shows a geographic coordinate system where a location is represented by the coordinates longitude 80 degree East and latitude 55 degree North

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

Richmond, Virginia: 37°N, 77°W

New Orleans, Louisiana: 30°N, 90°W

Pierre, South Dakota: 44°N, 100°W

Orlando, Florida: 28°N, 81°W

Santa Fe, New Mexico: 35°N, 106°W

Hartford, Connecticut: 42°N, 72°W

Helena, Montana: 46°N, 112°W

Las Vegas, Nevada: 36°N, 115°W

Little Rock, Arkansas: 35°N, 92°W

Seattle, Washington: 47°N, 122°W

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

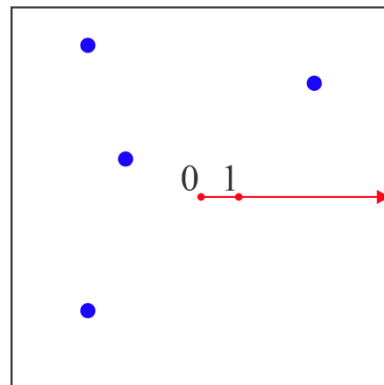
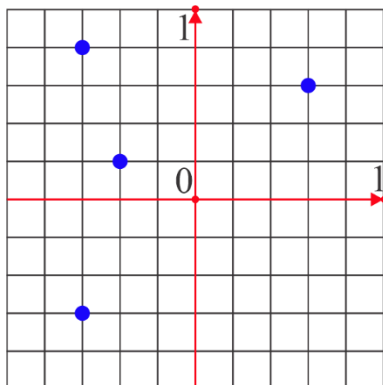
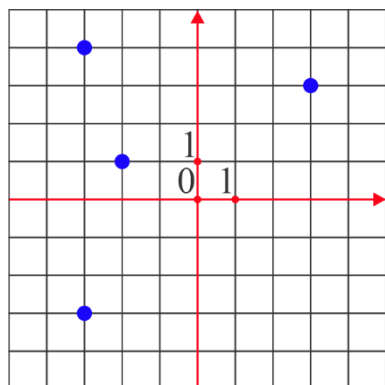
Augusta, Maine: 44°N, 69°W

Nashville, Tennessee: 36°N, 87°W

Minneapolis, Minnesota: 45°N, 93°W

Decart coordinate system.

A **Cartesian coordinate system** is a coordinate system that specifies each point uniquely in a plane by a set of numerical **coordinates**, which are the signed distances to the point from two fixed perpendicular oriented lines, measured in the same unit of length.



1. Compare (replace ... with

$>$, $<$, or $=$) if possible, if it is known that a and b are positive numbers and x and y are negative numbers:

$$0 \dots x$$

$$a \dots 0$$

$$-b \dots 0$$

$$0 \dots -x$$

$$a \dots x$$

$$y \dots b$$

$$-y \dots x$$

$$-a \dots b$$

$$|x| \dots x$$

$$-|y| \dots y$$

$$a \dots |a|$$

$$|b| \dots |-b|$$

$$|x| \dots a$$

$$|x| \dots -x$$

$$|x| \dots -|y|$$

$$a \dots |-b|$$

2. Compute:

$$1) \frac{1}{2} \cdot \frac{2}{3} \cdot \frac{3}{4} \cdot \frac{4}{5};$$

$$4) 1\frac{1}{2} \cdot 1\frac{1}{3} \cdot 1\frac{1}{4} \cdot 1\frac{1}{5};$$

$$2) \frac{6}{7} \cdot \frac{7}{8} \cdot \frac{8}{9} \cdot \frac{9}{10} \cdot \frac{10}{11};$$

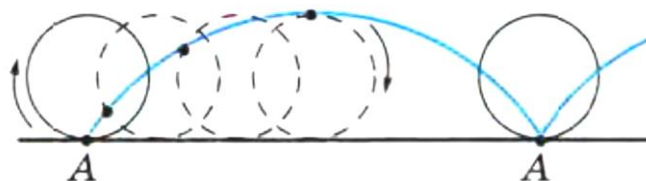
$$5) \left(1 + \frac{1}{4}\right) \cdot \left(1 + \frac{1}{5}\right) \cdot \left(1 + \frac{1}{6}\right) \cdot \left(1 + \frac{1}{7}\right) \cdot \left(1 + \frac{1}{8}\right);$$

$$3) \frac{1}{2} \cdot \frac{2}{3} \cdot \dots \cdot \frac{23}{24} \cdot \frac{24}{25};$$

$$6) \left(1 - \frac{1}{2}\right) \cdot \left(1 - \frac{1}{3}\right) \cdot \left(1 - \frac{1}{4}\right) \cdot \dots \cdot \left(1 - \frac{1}{99}\right) \cdot \left(1 - \frac{1}{100}\right).$$

Geometry.

Circle is running along the line. At a starting time point A was the point of contact of the circle and the line. The curve which point A will trace is called cicloide.



What line the center of the circle will trace?

Imagine the “square wheel” – a square which is staying on a road. Draw a line traced by the point A (vertex) in a process of “rolling”? The diagonal intersection?

