

GeoGebra Basics

Handbook 2

A Guide for Learning GeoGebra

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Input Box

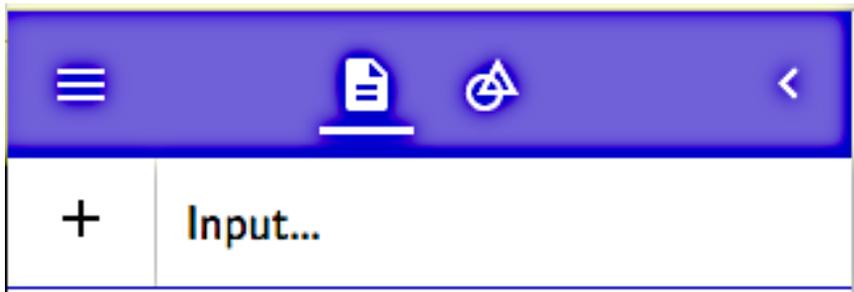


This is your **Input Box** button - . We can input equations (functions), coordinates, and a host of other cool functions. Let's input the equation $y = -2x + 3$.

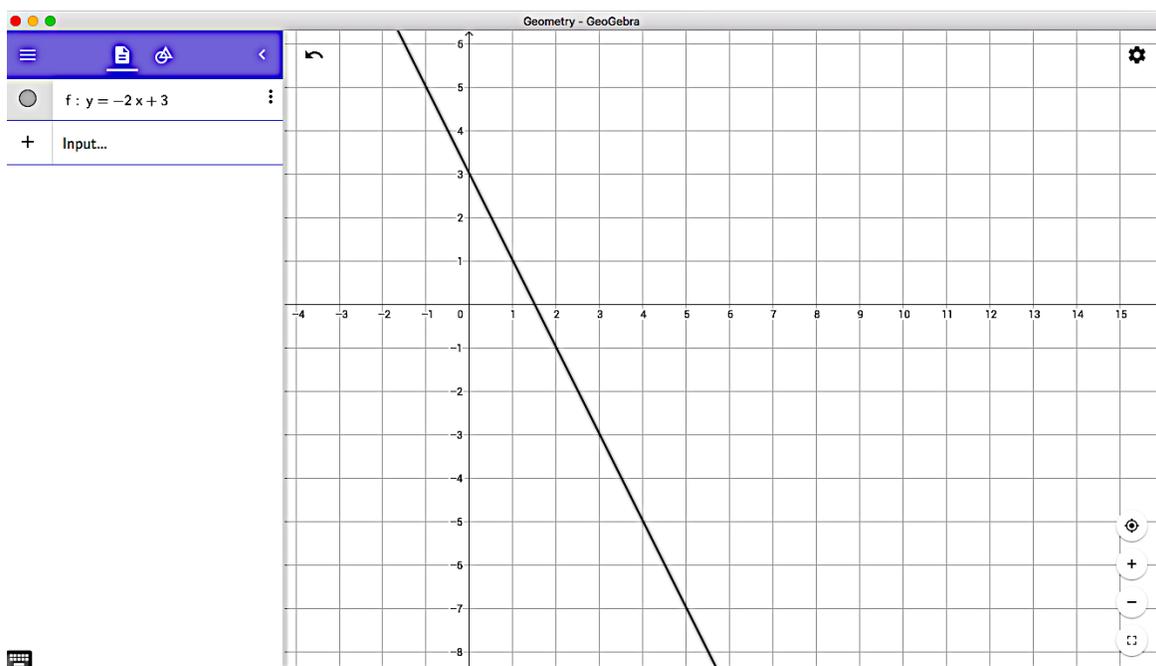
Step 1 – Make sure that the axes and grid are showing.



Step 2 – Select the input button 



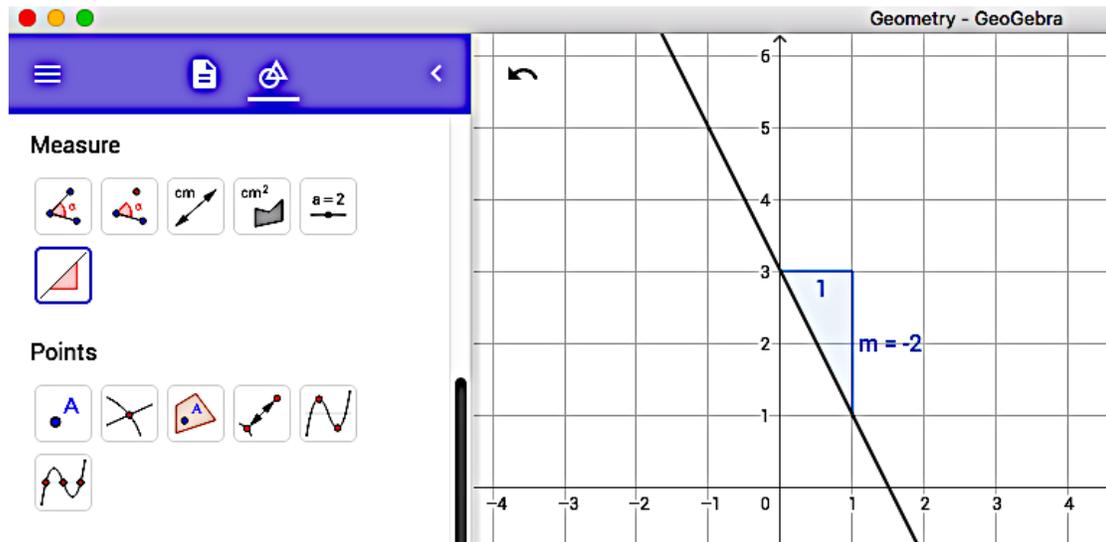
Step 3 – Input the equation $y = -2x + 3$. We get the following graph of the linear equation.



Free Play

We'll start this tour by encouraging you to explore **GeoGebra** giving you minimal instructions. Remember to write your responses in your **Toolbox**.

1. Start **GeoGebra**.
2. Draw two points on the **Graphic View**. Construct a line through them. Observe what is happening on your screen. Record this information in your Tool Box. What form of the linear equation is given. Compute the slope you your line.
3. Discover how to use **GeoGebra** to compute the slope of a line. Are they the same?



4. Does your screen look like the one above?
5. Discover how to change the equation to slope/intercept form.
6. What is the value of your slope and y- intercept?
7. Discover how to input points on the coordinate plane.

Next Level Thinking

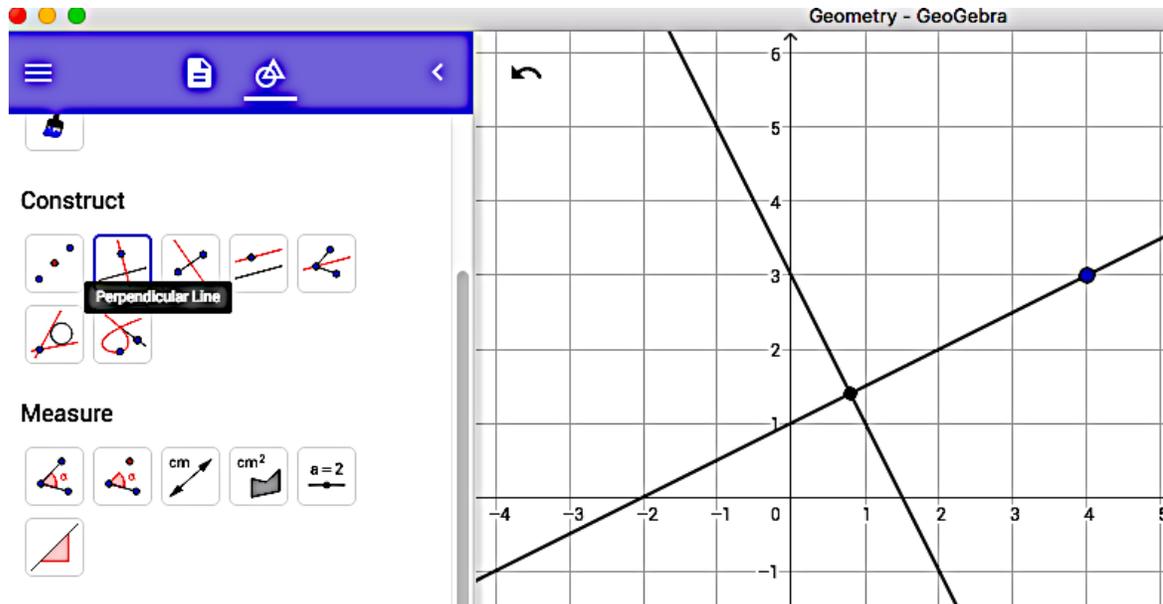
Do the mathematics by hand first.

1. Write the equation of the line that contain points $P_1(3,5)$ and $P_2(-5, 2)$ in slope/intercept form and standard form.
2. Find the coordinates of the x- and y- intercepts.
3. Find the equation of this line that is parallel to your first line slope/intercept form and standard form that contains point $(-3,5)$.
4. Find the equation of this line that is perpendicular to your first line slope/intercept form and standard form that contains point $(-3,5)$.

Now use GeoGebra to check your computations.

1. On the menu bar to the left on your screen, select all and the delete. This should clear your screen.
2. Input points $(3, 5)$ and $(-5, 2)$. Construct a line.
3. Discover how to find the coordinates of the intersection of two objects.
4. Find the coordinates of the x- and y- intercepts.
5. Place a point on your line at $(-3,5)$.
6. Construct a line parallel to your first line through point $(-3,5)$. What is the equation of this line in slope/intercept form and standard form.
7. Construct a line perpendicular to your first line through point $(-3,5)$. What is the equation of this line in slope/intercept form and standard form.

Constructing a line perpendicular to a given line and through a given point:



Construct a line segment using the Segment between Two Points tool



Construct a point on the line segment: select Point on Object tool and click on the line segment



Construct a perpendicular line: select the Perpendicular Line tool and click on the point and the line.



Constructing a line parallel to a given line and through a given point:

Construct a line segment using the Segment between Two Points tool



Construct a point on the line segment: select Point on Object tool and click on the line segment

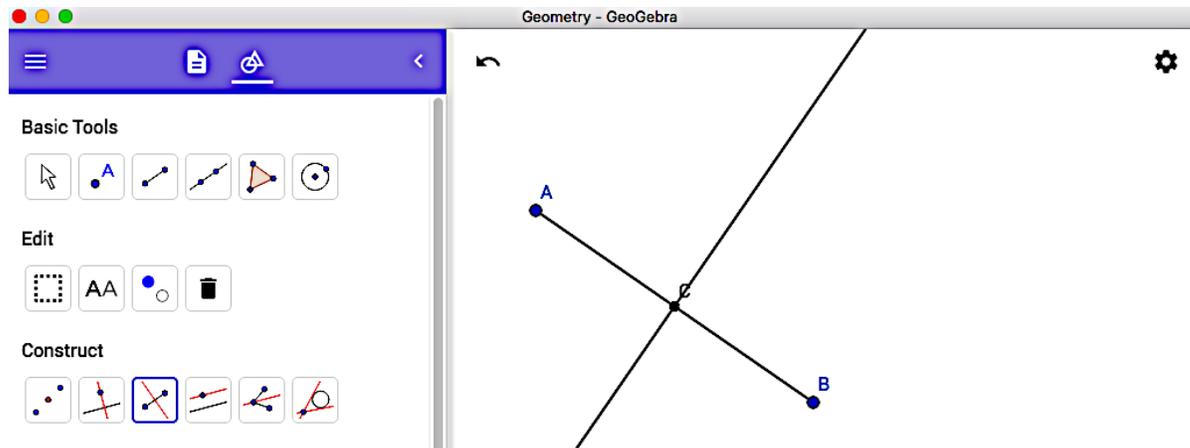


Construct a parallel line:

Select the Parallel Line tool and click on the point and the line.



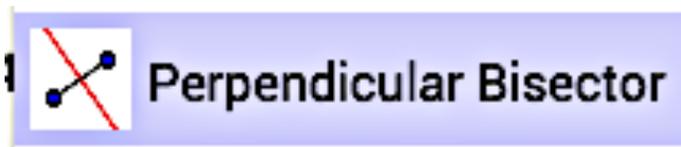
Constructing a perpendicular bisector of a line segment:



Construct a line segment using the Segment between Two Points tool



Construct the perpendicular bisector of the line segment:



Select the Perpendicular Bisector tool and click on the two end points of the line segment.

Construct the angle bisector of an angle:

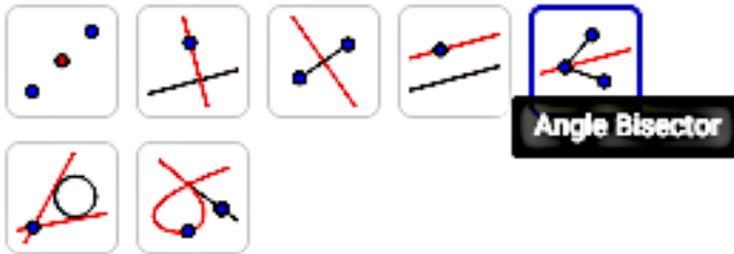
Construct a line segment using the **Segment between Two Points** tool



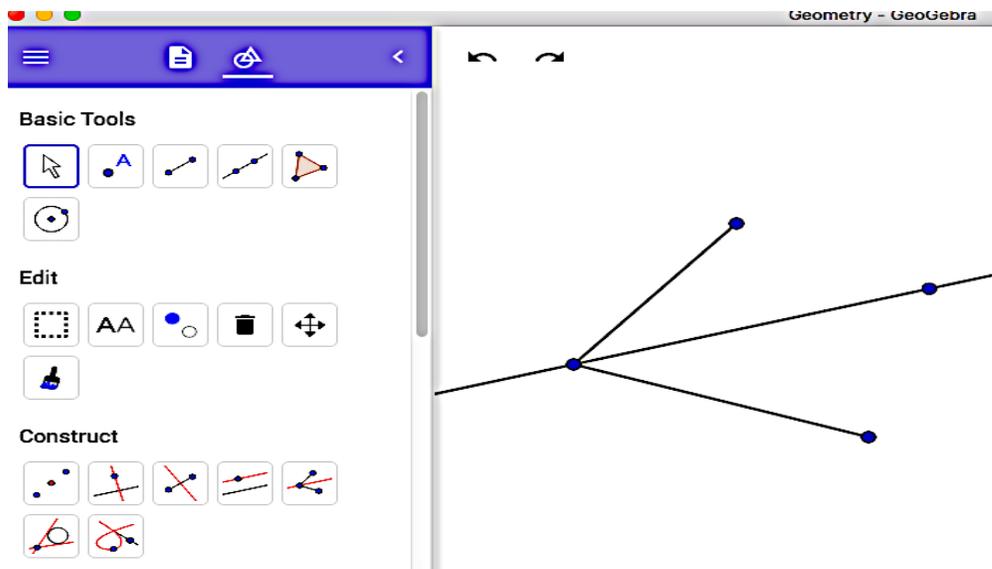
Construct the angle bisector:

select the **Angle Bisector** tool and click on the three points of the angle.

Construct



Instructions: **Select three points or two lines**



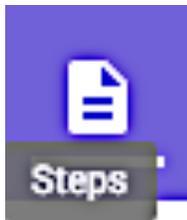
Use the **Measure Angle** tool to show that the angle are equal. Also, discover how



to label points and lines.

Drawing graphs

You can create and modify algebraic coordinates and equations by using the Input Bar at top right window in GeoGebra window. It looks like this.



Use the **Input Bar** to the following equations. Study the graphs of the following equations.

a) $3x + 2y = 6$

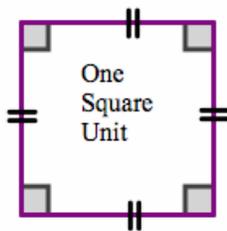
b) $y = 3x^2 - 4x - 6$

c) $y = 3/(x-2) - 3$

Deepening your Understanding of Area

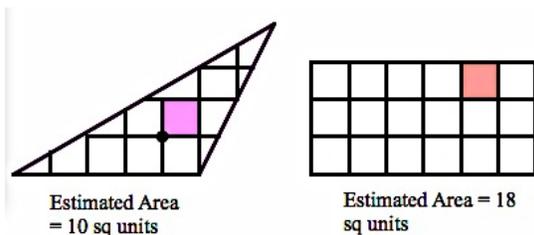
The Concept of Area

When we measure lengths of line segments, we use such standard units as meters, yards, miles, centimeters, and kilometer. These are often called linear units because they are measures of length. The standard units of area are square units such as square meters, square yards, and square miles. A square meter, for example, is the space enclosed by a square whose sides are each one meter in length – the figure below.



DEFINITION THE AREA OF A CLOSED REGION IS THE NUMBER OF SQUARE UNITS OF SPACE WITHIN THE BOUNDARY OF THE REGION.

We can estimate the area of a region by determining the approximate number of square units it would take to fill the region. In the figure below, we count the number of square units and estimate the number of partial square units.



However, counting squares is neither the easiest nor the best way to find the area of a region. This year, or perhaps next year, you will develop formulas for computing the areas of regions bounded by the common geometrical figures. Such regions are usually named by their boundaries, as when we speak of the “the area of a trapezoid.”