Geogebra: Logistic Model

We want to make a GeoGebra worksheet to explore the solution to

$$\frac{dy}{dt} = ky\left(1 - \frac{y}{L}\right)$$

where $y(t)$ is the population as a function of time t, k is the coefficient of growth, and L is the **carrying capacity**.

Theorem: The solution to the differential equation is

$$y(t) = \frac{L}{1 + be^{-kt}}$$

where b is some constant of integration.

1. Make 3 sliders: L, b, and k with the **Slider Tool** (2nd from right). You can edit these later by selecting "Object Properties eith in the graph view or the Algebra view.

    (a) Name: "L", Min:1, Max: 50, Increment: 1

    (b) Name: "b", Min:0, Max: 40, Increment: 0.5

    (c) Name: "k", Min:0, Max: 0.2, Increment: 0.01

2. In the "Input" field type: "M: y = L" to make the asymptote. You can edit it be a different color and dashed if you would like.

3. In the "Input" field type: "P: y = L/(1+b*e^ (-1*k*x))" to make the population function. You can edit it be a different color if you would like.

4. In the "Input field type "I: (0, P(0))" to make a point to show the population at time 0 (the initial population). Edit it so that under **Show Label** you select "Name and Value" or if you prefer, just "Value"

5. You can use the **Move Graphics View** button on the right to change the scale, but remember to switch back to **Move** tool when you are done to change the values on the sliders.