

Name: _____

Date: _____

Parameters in Secondary School Mathematics: Logistics Functions
The Activity

The general form of a **logistic function** is given by

$$f(x) = \frac{a}{1 + b(e)^{cx}} + d, \text{ where } a, b, c \text{ and } d \text{ are}$$

parameters. Each set of values for these four parameters determines a unique logistic function. In this activity, the focus is on the effects of d and b . The questions below parallel those that are in the TI-Nspire file that you will be using.

The word "logistic" comes from a Greek word meaning to reckon or to reason. It seems fitting that we reason about this family of functions.

0. Open the file, Logit Func Param 081229.tns. Note the starting values of the parameters from page 1.6 here:

$$a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}} \quad c = \underline{\hspace{2cm}} \quad d = \underline{\hspace{2cm}}$$

1. Answer the following questions by entering your responses in the file, Logit Func Param 081222.tns. The value of d increases as you drag slide d to the right and decreases as you drag it to the left (on page 1.6 of the tns file).
- Pre-punch:* What changes do you expect to see in the graph if you change the value of d ? Explain.
 - Post-punch:* Use the slider to change the value of d . Describe what happens to the graph as the value of d increases and decreases. How well does what happens match what you expected?
2. The second graph in the file (page 1.10) has the slider b in the prominent role.
- Pre-punch:* Think about changing the value of b . What do you expect to see? Why does your expectation make sense?
 - Post-punch:* What happened when you changed the value of b ?
 - Post-punch:* Where does a "break" appear?
 - Post-punch:* Determine a way to predict this break for any combination of a, b, c , and d . Show your symbolic work via CAS.