L4 – Properties of Exponential Functions

MCR3U

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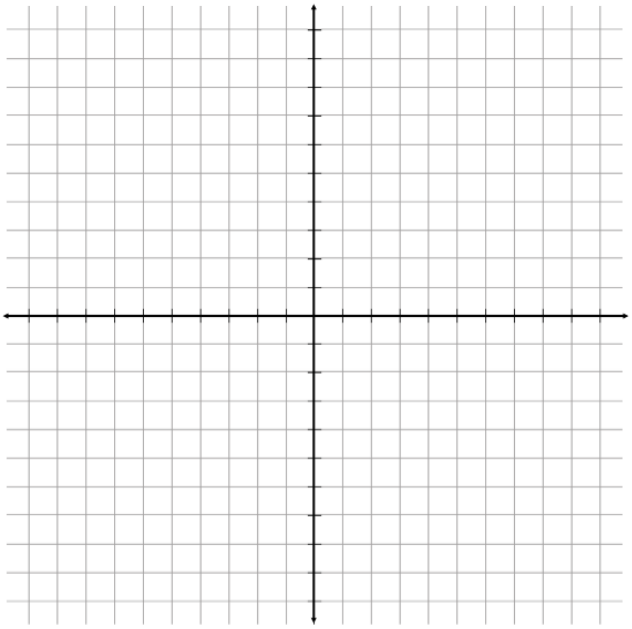
Example 1:

Graph each exponential function. Identify the domain, range, intercepts, intervals of increase/decrease, and the equation of any asymptotes.

a) $y = 4\left(\frac{1}{2}\right)^x$

x	y



Domain:

Range:

***x*-int:**

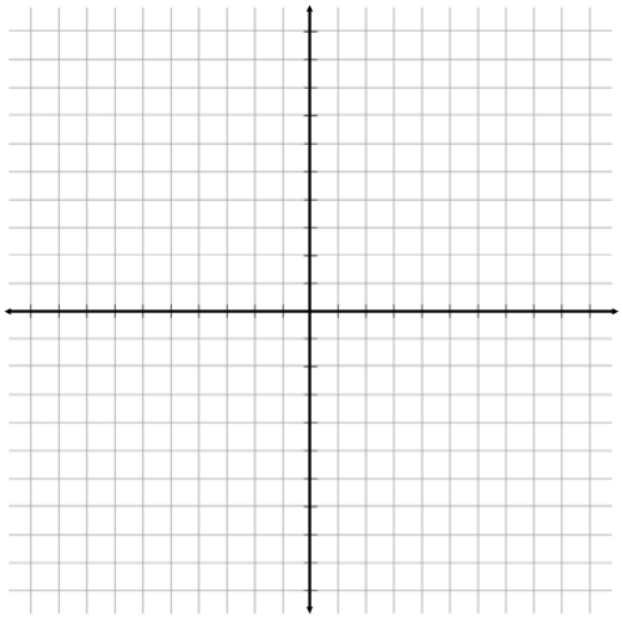
***y*-int:**

intervals of increase/decrease:

asymptote:

b) $y = -3^{-x}$

x	y



Domain:

Range:

***x*-int:**

***y*-int:**

intervals of increase/decrease:

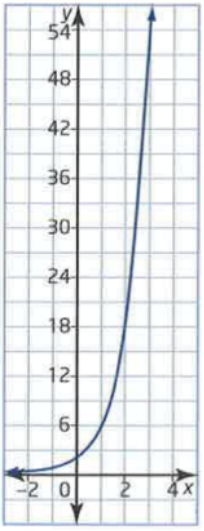
asymptote:

Example 2:

Write the equation in the form $y = ab^x$ for the graph shown.

Start by determining the growth factor (b). As x changes by 1 unit, what factor does y change by?

x	y



Next, determine the initial value (a) by plugging in the coordinates of one of the points (x, y) on the graph and the growth rate (b), then solve for a.

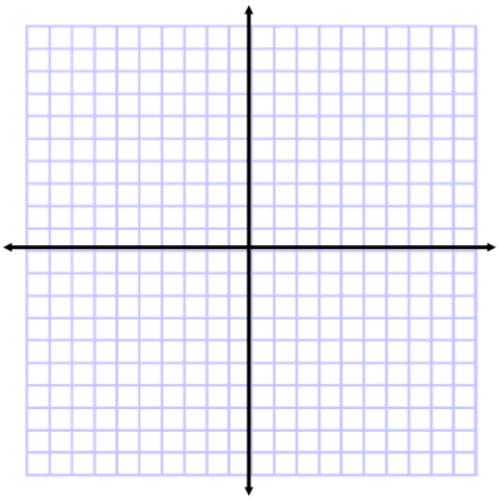
Final Equation:

Example 3: A radioactive sample has a half-life of 3 days. The initial sample is 200 mg. Write a function to relate the amount remaining, in milligrams, to the time, in days.

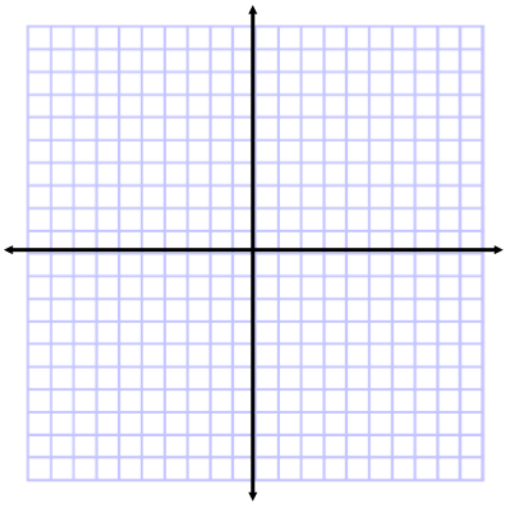
What do you know so far about when a function of the form $y = a(b)^x$ is increasing and when it is decreasing?

Example 4: Make a rough sketch of the graph of the following functions based on your knowledge of whether they are increasing or decreasing.

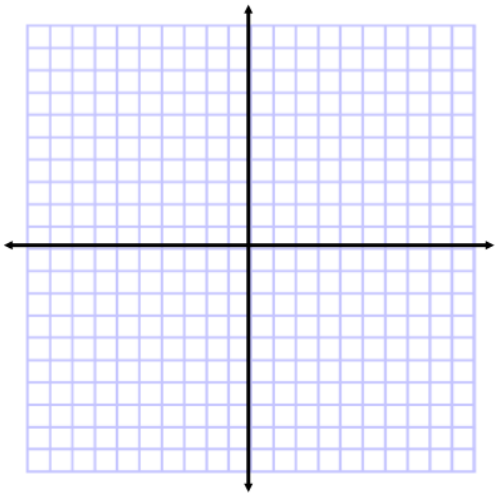
a) $y = 2\left(\frac{1}{2}\right)^x$



b) $y = 2(4)^x$



c) $y = -2(4)^x$



d) $y = -2\left(\frac{1}{2}\right)^x$