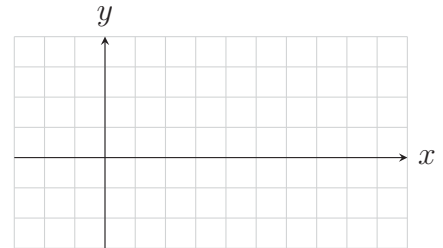
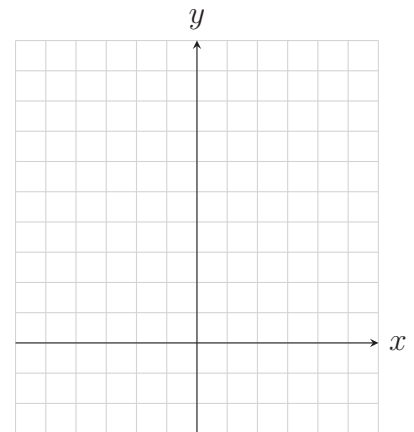


1. Given the function  $f(x) = \log_a(x)$  with  $f(5) = 1$  and  $f(125) = 3$ , graph the function and determine the value of  $a$ .



2. Solve  $e^{x+1} = x^2 - 1$  by graphing. Define a function for each side of the equation, graph them on your calculator and nicely draw the graphs here then use the intersection feature on your calculator to find the answer correct to *four* decimal places.



3. Solve the following exponential and logarithmic equations. State your conclusion as an exact answer in set notation.

a.  $\frac{2e^x + 3e^{-x}}{5} = 3$

b.  $\log_3(x + 2) - \log_3(x - 2) = -4$

4. Around 20 years ago some hikers in the Alps came across a frozen man (mummified) who has come to be known as Ötzi. Carbon dating was performed on the man and it was found that Ö had retained approximately 52.603% of the original amount of carbon-14 he would have had when he passed. Noting that carbon-14 has a half-life of about 5600 years, determine the century in which Ötzi died.

5. Suppose you start off with a fungus which occupies 3 cubic centimeters of a piece of rotting wood. After 5 days the fungus has spread to occupy 6 cubic centimeters of the rotting wood. Supposing the fungus is growing exponentially and uninhibited: a) Determine the continuous growth rate of the fungus per day. b) Write an explicit function which models the size of the fungus with respect to number of days you've been studying it. c) Find out how long it will take for the fungus to reach a size of 115 cubic centimeters.