Lesson 15

Read Chapter 12

Logarithms

Other log functions

$\log_a x$ is the inverse of a^x

properties of log

- $\ln x^y = y \ln x$
- $log_b x = \frac{\ln x}{\ln b}$
- $a^x = e^{(\ln a)x}$
- $\ln(xy) = \ln(x) + \ln(y)$
- $\ln \frac{x}{y} = \ln x - \ln y$
- $\ln 1 = 0$
- $\ln \frac{1}{x} = -\ln x$

Solve the following equations

1. $5e^{x-4} = 2$

2. $5\,3^{x-4} = 2$

Solve the following equations

1. $5\ln(5x+2) = 3$

2. $log_2(5x+2) = 3$

Exponential functions in standard form

$$f(x) = A_0\, a^x$$

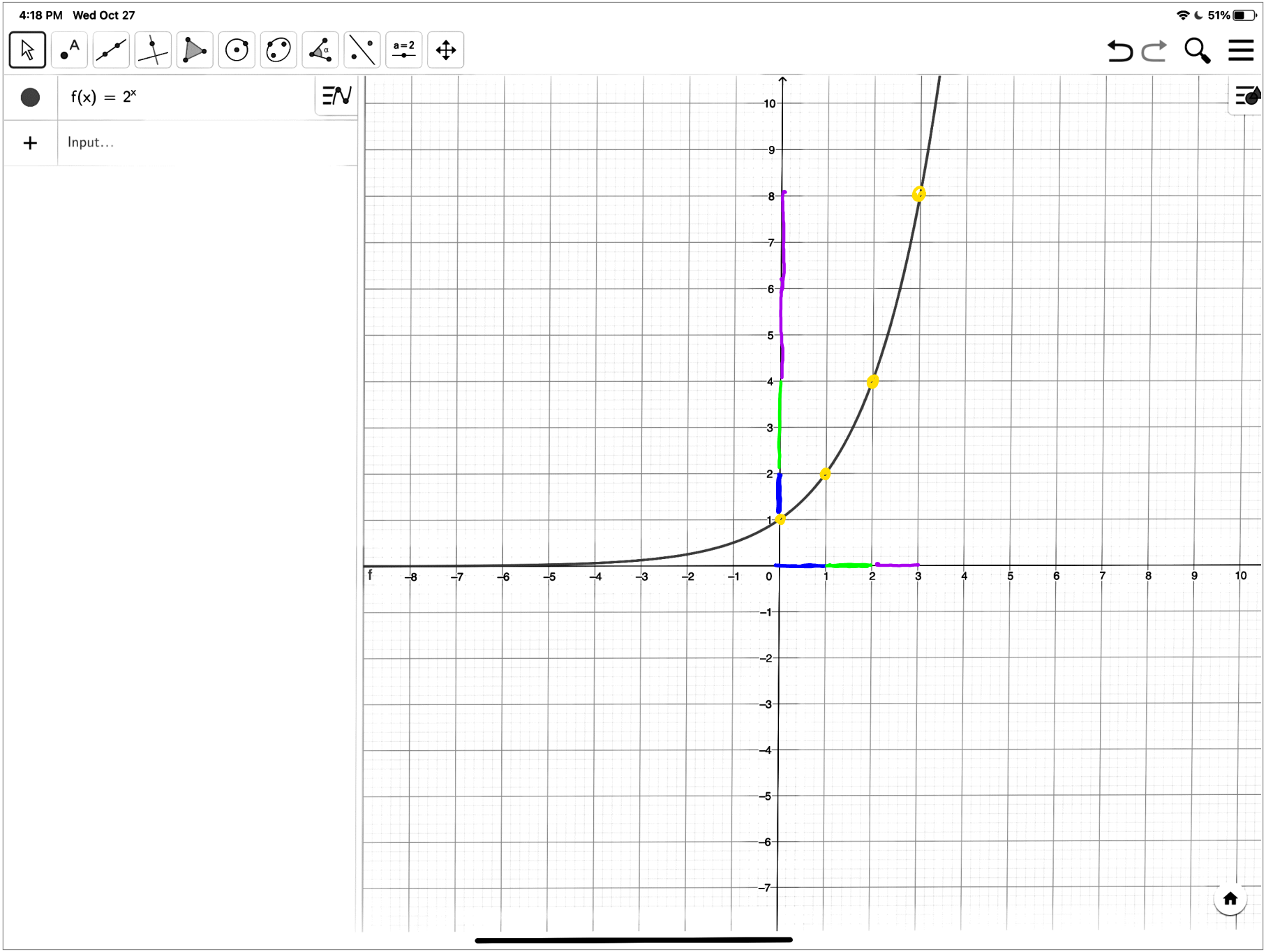
or

$$f(x) = A_0 e^{(\ln a)\, x} = e^{kx}$$

Rewrite in e form

- $y = 5\,7^{t}$

- $y = \frac{3}{2^{3t-1}}$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f(x) = 2^x
Input...
f

Doubling time

Given an exponential function $f(t) = A_0\, a^t$, its doubling time is the period of time required for f to double in value.

The doubling time for $f(x) = A_0\, a^x$ is $\frac{\ln 2}{\ln a}$

Tripling time

Given an exponential function $f(t) = A_0\, a^t$, its tripling time is the period of time required for f to double in value.
The tripling time for $f(x) = A_0\, a^x$ is

Half life

Given an exponential function $f(t) = A_0\, a^t$, its half life is the period of time required for f to half in value.

The Half life for $f(x) = A_0\, a^x$ is

Exponential modelling problems

Exponential modelling problems are problems that talk about a quantity that grows or decays exponentially. Your task is to find a formula $f(x) = A_0 a^x$ for the quantity as a function of some variable x and use the formula to answer the questions in the problem.

Usually given

1) 2 points
2) 1 point and doubling / tripling... time

Find a formula for the exponential function that passes through the points $(0, 2)$ and $(3, 5)$

Find a formula for the exponential function that passes through the points $(1, 2)$ and $(4, 5)$

Find a formula for the exponential function that passes through $(1, 2)$ and has doubling time 80.