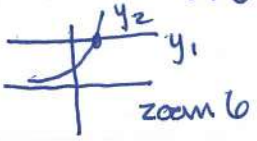
Exponential Equations Mixed Practice **Name:** Answers

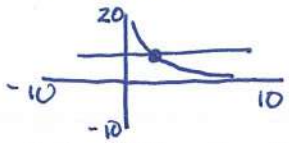
1) Solve each exponential equation below graphically. Round answers to the nearest ten-thousandth.

a) $9 = 2^x$ b) $7 = 20(.5)^x$ c) $100 = 3^{x+1}$

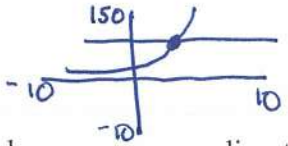
$x = 3.1699$



$x = 1.5146$



$x = 3.1918$



2) Since January 1980, the population of the city of Brownville has grown according to the mathematical model $y = 720{,}500(1.022)^x$, where x is the number of years since January 1980.

a) Explain what the numbers 720,500 and 1.022 represent in this model.

- 720,500 is the starting population in Jan 1980
- 1.022 is the growth factor. The pop grows 2.2% each year

b) What would the population be in 2000 if the growth continues at the same rate.

20 years so → $y = 720{,}500(1.022)^{20} = 1{,}113{,}402$ about people

c) If this trend continues, use this model to predict the when the population of Brownville will reach 1,000,000. (Round to the nearest tenth of a year.)

$1{,}000{,}000 = 720{,}500(1.022)^x$ → $x = 15.1$

$y_1 = 1{,}000{,}000$

$y_2 = 720{,}500(1.022)^x$

set up table to go up by .1 or look at graph

3) After an oven is turned on, its temperature, T, is represented by the equation $T = 400 - 350(3.2)^{-0.1m}$, where m represents the number of minutes after the oven is turned on and T represents the temperature of the oven, in degrees Fahrenheit.

a) What is the temperature of the oven after 5 minutes? (Round to the nearest degree.)

$T = 400 - 350(3.2)^{\wedge}(-.1 \cdot 5) = 204.344\ldots$ → 204°

b) How many minutes does it take for the oven's temperature to reach 300°F? (Round answer to the *nearest minute*.)

$300 = 400 - 350(3.2)^{-.1x}$

$y_1 = 300$

$y_2 = 400 - 350(3.2)^{\wedge}(-.1x)$ ← look at table or graph

$x = 11$ min