Homework Journal

4.2   Question 10

a. The population of city A in 2000 was 40 thousand people and the population increases by 11% each year. The function f determines the population of this city (in thousands of people) in terms of x.

i. function formula

$$f(x) = 40 \cdot (1 + 0.11)^x$$

ii. which graph above represents f?

The solid, blue graph

b. The population of city B in 2000 was 40 thousand people and the population increased by 19% each year. The function g determines the population of this city (in thousands of people) in terms of x.

i. function formula

$$g(x) = 40 \cdot (1 + 0.19)^x$$

ii. which graph above represents g?

The dashed, red graph

c. The population of city C in 2000 was 40 thousand people and the population increased by 20 thousand people each year. The function h determines the population of this city (in thousands of people) in terms of x

i. function formula

$$h(x) = 40 + 20x$$

ii. which graph above represent h?

The dotted, green graph

To start off the y intercept is 40 for all 3 lines. We deal with percentages so that means we use $(1 + \%)^x$ in the formula. For the third problem it increases by 20,000 each year meaning addition. therefore we don't multiply & our equation is addition. This problem is all about making ~~creation~~ equations & identifying it in the graph.

4.2 Question 9

The following formula gives the population of three towns in terms of the number of years t since 1995.
- $L = 7500 (1.16)^t$, where L represents the population of Linwood
- $N = 8390 (1.04)^t$, where N represents the population of Northfield
- $S = 11765 (0.92)^t$, where S represents the population of Somers Point

a) In which town(s), if any, is the population increasing?

Linwood & Northfield

b) In which town(s), if any, is the population decreasing?

Somers Point

c) Which town(s) experienced the largest 1-year percent change in population?

Linwood

d) Which town(s) had the largest population in the year 1997?

Linwood

Looking at the equations that represent the population I can tell that we are dealing with exponents. This means that $(1 + \%)$ & $(1 - \%)$ will tell us if the equation means increasing or decreasing. If I look at problem a I would say Linwood & Northfield are increasing b/c of the 1.%. Therefore, the population decreasing will be Somers Point. In order to find the answer for c I must input 1 into the equation. Once that is done the equation that has the most % change would be Linwood. For question d we must also plug in. We plug in 2 b/c it starts at 1995. In this problem we have to figure out the answer based on the equation and some calculations.

4.1 Question 5

A software company is raising the prices on all of its products to increase revenue. For each price change described below, do the following

i State the percent change in the price
ii State the number we can multiply the original price by to determine the new price.
iii Determine the new price (in dollars)

a) software A: The original price was $225 & the price increases by 7%.

i   7%.

ii   1.07

iii $240.75

b) Software B: The original price was $34 & the price increases by 13%.

i   13%.

ii   1.13

iii $38.42

    The percent change increases by 7 and 13. We know equations for percentages have always included (1 + %). In order to determine the new price it would have to be addition that's why the answers are 1.07 & 1.13. In order to get the new price we multiply the original price and multiply it by the ii answer we had gotten. In this question we have to use the contex to get the answers.

4.1 Question 3

a) In 2016 Maggie's Cafe had a total revenue of $149,800. In 2017 Maggie's Cafe had a total revenue of $169,700.

  i The revenue for Maggie's Cafe in 2017 was how many times as large as the revenue in 2016?

  1.13284 times as large

ii The revenue for Maggie's cafe in 2017 was what percent of the revenue in 2016?

  113.284

b) In 2015 Huntersville had a population of 60,100 and Wright's Park had a population of 49,500.

  i In 2015 the population of Huntersville was how many times as large as the population of Wright's Park?

  1.21414 times as large

ii In 2015 the population of Huntersville was what percent of the population of Wright's Park?

  121.414

In problem ai) the # would be $\dfrac{\$169,700}{\$149,800}$

which would give us the 1.13284 times as large. Its 2017 of 2016. Also for bi its 2015 Huntersville / Wright's Park. For b all we have to do is move the decimal 2 times to the right in order to see the percent increase from 2016 to 2017. In this equation we got to use the context to figure out the answers.