

MODELING UTAH POPULATION DATA

Math 1010 Intermediate Algebra Project

According to data from the U.S. Census Bureau, Population Division, the population of Utah appears to have increased linearly over the years from 1980 to 2008. The following table shows the population in 100,000's living in Utah according to year. In this project, you will use the data in the table to find a linear function $f(x)$ that represents the data, reflecting the change in population in Utah.

	Estimates of Utah Resident Population, in 100,000's					
Year	1980	1988	1993	2000	2004	2009
x	0	8	13	20	24	29
Population, y	14.6	16.9	19	22.4	24.4	27.8

Source: U.S. Census Bureau, Population Division

- Using the graph paper on the last page, plot the data given in the table as ordered pairs.
Label the x and y axes with words to indicate what the variables represent.
- Use a straight edge to draw on your graph what appears to be the line that "best fits" the data you plotted. You will only have one line drawn, rather than several pieces of lines
- Estimate the coordinates of two points that fall on your best-fitting line. Write these points below.

(5 , 16), (22 , 24)

Use the points that you wrote down to find a linear function $f(x)$ for the line.
Show your work!

find slope $m = \frac{24 - 16}{22 - 5}$

$m = \frac{8}{17} = 0.47$

$y = mx + b$
 $y = \frac{8}{17}x + b$

find b $y = mx + b$
 $-mx \quad -mx$

$b = y - mx$
use (5, 17)

$b = 16 - \frac{8}{17}(5)$ $16 - \frac{40}{17}$

$b = 13.64$

$f(x) = \underline{\underline{\frac{8}{17}x + 13.64}}$

7. Compare your linear function with that of another student or group.

Comparison function: $f(x) = \underline{0.39x + 14.6}$

Is the comparison function the same as the function you wrote down for part 3?

No.

If they are different, explain why.

We must have drawn our lines a little differently, which would have caused us to choose different points on those lines. The functions are similar, however.

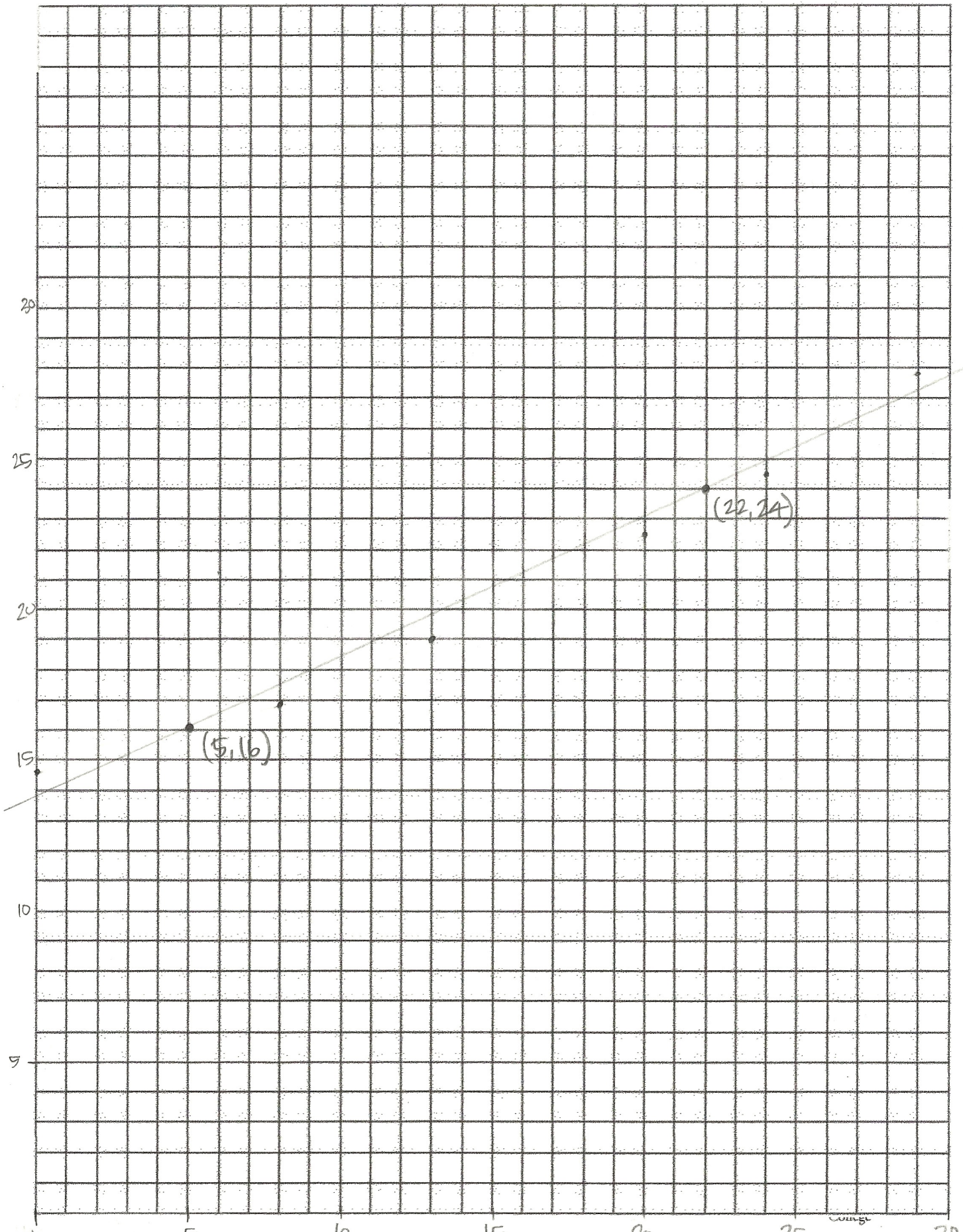
If they are the same, explain why.

NA

8. In actuality, using a linear growth model for population is not common. Most models are exponential models, due to the fact that most populations experience relative growth, i.e. 2% growth per year. Linear models for nonlinear relationships like population work only within a small time frame valid close to the time of the data modeled. Discuss some of the false conclusions you might reach if you use your linear model for times far from 1980-2008.

From this model, I would assume the population growth was very steady and that it would continue to increase by the same number each year.

POPULATION (IN 100,000'S) : Y-AXIS



YEARS AFTER 1980 : X-AXIS