Group Project #1 Cover Sheet

Choose a group of 2 – 3 people to work with on this project. You only need to turn in ONE project per group, but EACH person needs to turn in a reflection.

Names: Jennifer Berrett, Arielle Hall, Judy Hall

As you are completing this project, keep in mind that you will need to post one of the two projects we do in class to your e-portfolio. This means you want the project to be as NEAT as possible so DO NOT USE PEN!!! Your e-portfolio should reflect your best work from your general education classes and should be something you would show a potential employer.

The very last part of this project asks for a reflection about what you thought/learned during the project. This is to be done INDIVIDUALLY. A reflection means that you should actually THINK about what you are writing. Full points will NOT be awarded to thoughtless, hurried responses.

Group Project Grading Rubric: 25 pts possible 25/25

5 pts working in a group

5 pts work shown

5 pts correct numbers/graph

10 pts reflection

#9 Points make a curve, so can our like be accurate?

MODELING UTAH POPULATION DATA

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	1981	1989	1993	1999	2005	2008
x	1	9	13	19	25	28
Population, y	15.2	17.1	19	22	25	27.4

Source: U.S. Census Bureau, Population Division

1. 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. (The grid is large enough to use a 1 to 1 scale)

2. 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 and the line will NOT touch all the points you have plotted.

3. Estimate the coordinates of two points that fall on your best-fitting line. Write these points below.

(9, 19), (18, 23)

Use these points to find a linear function *f(x)* for the line. Show your work!

$\frac{23-19}{18-9} = \frac{4}{9}$

$y-(19) = \frac{4}{9}(x-9)$

$y-19 = \frac{4}{9}x-4$

$+19 \qquad +19$

$y = \frac{4}{9}x+15$

$\left(\frac{4}{9}\right)\left(\frac{9}{1}\right)\ \frac{36}{9}$

f(x) = $\frac{4}{9}x+15$

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

Comparison function: $f(x) = \frac{1}{2}x + 14.5$

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

NO

If they are different, explain why. If they are the same, explain why.

The line goes through different points.

5. What is the slope of **your** line? m = $\frac{4}{9}$

Interpret its meaning as it relates to population and years. Does it make sense in the context of this situation? Please use complete sentences to respond to these questions.

Our population increases 400,000 every 9 years approximately.

6. Find the value of *f* (45) using your function from part 3. Show your work, then write your result in the blank below.

$y = \frac{4}{9}x + 15$ $\frac{4}{9}\left(\frac{45}{1}\right) + 15$ $\frac{180}{9} = 20 + 15 = 35$

f(45) = 35

Write a sentence interpreting the meaning of *f (45)* in the context of years and population.

In the year 2025, which is 45 years after 1980, the population will be 3,500,000.

7. Use your function from part 3 to approximate in what year the residential population of Utah reached 2,000,000. Show your work. (Note: 2,000,000 is 20 * 100,000 so you will find the value of x that gives a population of 20.)

$20 = \frac{4}{9}x + 15$

$-15 \quad -15$

$x = 11.25$

$\frac{9}{4} \cdot \frac{4}{9}x = 5 \cdot 9$

$\frac{4x}{4} = \frac{45}{4}$

11.11

$4\overline{)45}$

-4

05

-4

1

$1980 + 11.25 = 1991.25$

In the year 1991 we would expect a population of 2,000,000.

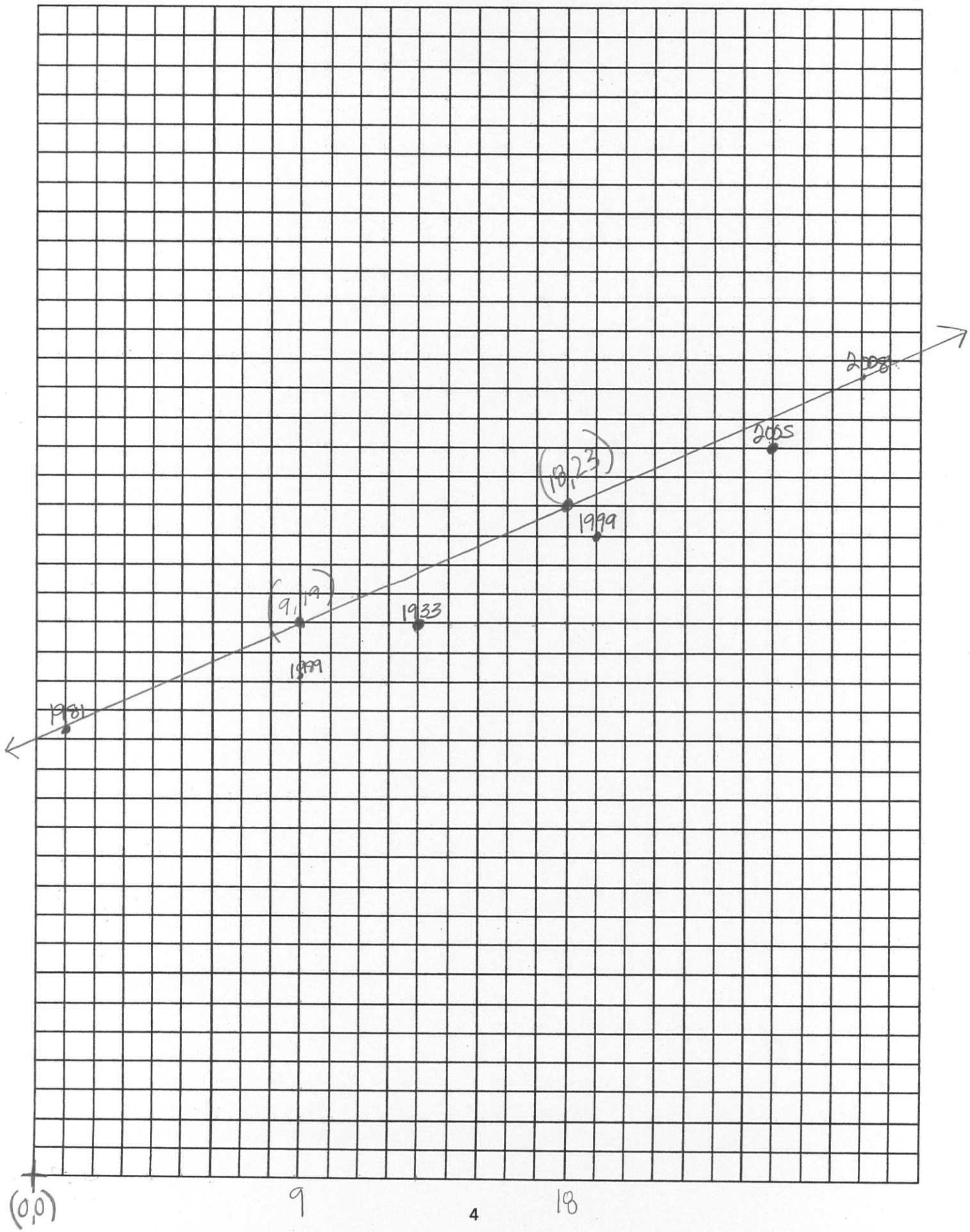
8. Compare your answer to part 7 to the chart given on page 1. Does the value you found in part 7 fit in with this data?

NO

9. If your answer to part 8 is NO, it is because 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 (such as extending out to 2020 or going back in time to 1950).

We used the lowest and highest points in our graph, therefore our slope is steeper which would make our rise in population increase at a higher rate.

10. Reflective Writing.
Did this project change the way you think about how math can be applied to the real world? Write **one paragraph** stating what ideas changed and why. If this project did not change the way you think, write how this project gave further evidence to support your existing opinion about applying math. Be specific. (Note: a paragraph is at least 5 sentences!!!) **Each person** in your group should turn in their OWN reflections attached to the back of this packet.


(0,0)
9
18
(9,14)
(18,23)
1981
1999
1933
1999
2005
2008

Jennifer Berrett

Reflection

While doing this project I became aware of how functions can be used to graph real world situations like population growth. Giving x & y a true meaing has helped me to understand graphing; the slope was an actual rise in population over a period of time. Our line did not end up being accurate, but was a close estimate to the actual numbers