MATH 1010 LAB - Linear Modeling Project Prep

The purpose of this lab is to introduce you to the linear modeling and help you get started with your first group project.

LINEAR DATA AND MATHEMATICAL MODELING

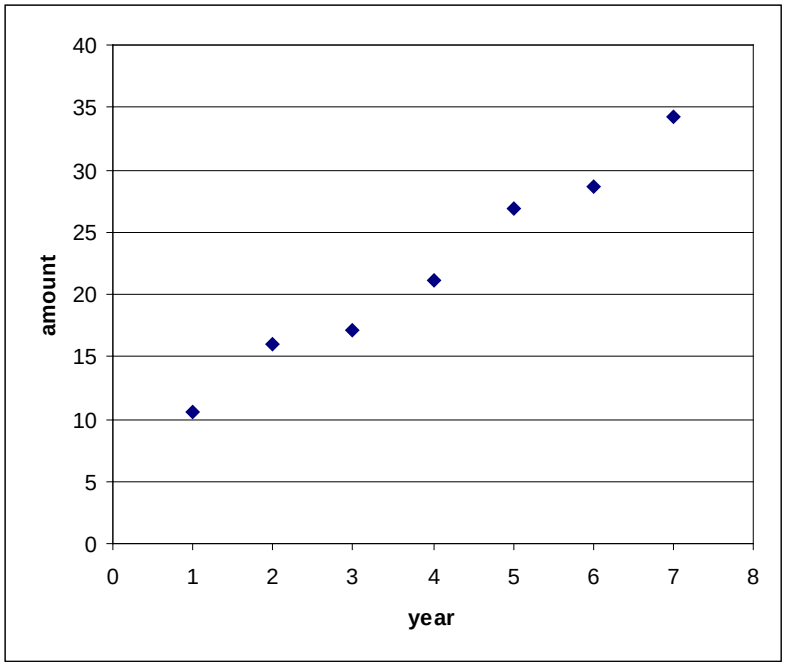
Sometimes when we graph real-world data, we can see an overall trend in the shape of the graphed points. An equation could be used to find a graph that comes as close as possible to fitting the existing data. That equation is called a mathematical model and it can be used to "fill in the gaps" or help predict values for which no real world data is available. The original points will not be an exact fit to the equation, but the idea is to come close so that the model is useful.

GRAPHING THE DATA POINTS

This activity will focus on finding linear equations that model the given data.

First let's learn a bit about creating a graph. Consider the following data and graph

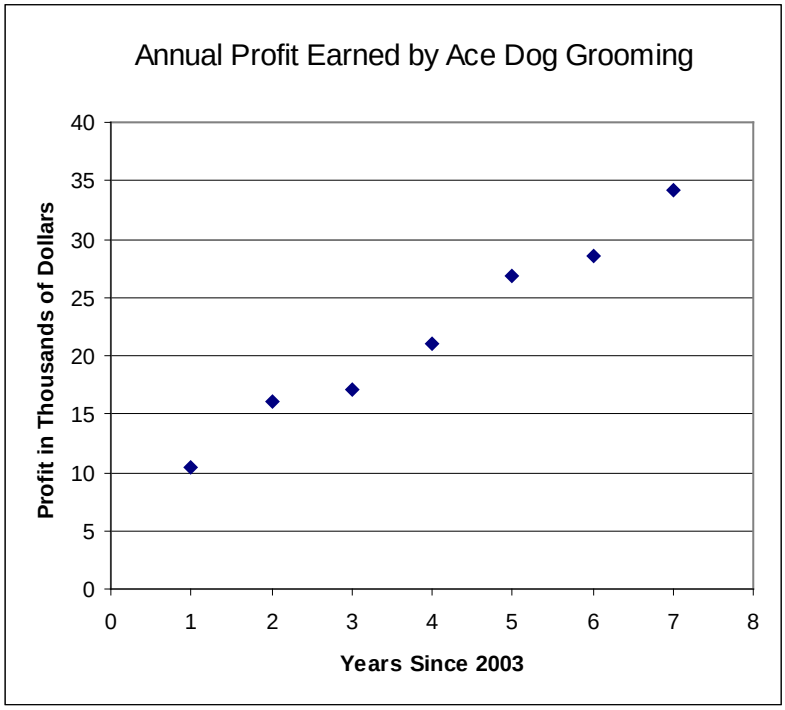
Year	Amount
1	10.5
2	16
3	17.1
4	21.1
5	26.9
6	28.6
7	34.2



You can see that the graph has an overall linear shape, but it's hard to interpret what it means. What can you say about the point (5, 26.9)?

Using the same data, let's clarify the graph:

Year	Amount
1	10.5
2	16
3	17.1
4	21.1
5	26.9
6	28.6
7	34.2



Notice that the title at the top of the graph and the labels on the axes now tell you what the graph is about.

INTERPRETING THE DATA
You should be able to explain the graphic information using ordinary English.
First, choose the best interpretation of the point (5, 26.9) from the choices below:

A. There is a dot on the graph where x = 5 and y = 26.9.

B. When the year is 5 the profit is 26.9.

C. In year 5 they made 26.9 thousand dollars.

D. In 2008 Ace Dog Grooming earned a profit of $26,900.

All of the answers attempt to make some sort of true statement about the point, but only the last statement gives a really good explaination of what that point really means. Keep this in mind when you are asked to "interpret" a graph.

FINDING AN EQUATION TO MODEL THE DATA

Our method here will be very informal. You will "eye-ball" the graph and pick a pair of points. Drawing a line through those two points should give you a line that comes close to the given data. Then using these points, find the equation of the line that passes through them.

Try the points (1, 10.5) and (4, 21.1). Find the equation of the line through these points. Show your work and round to two decimal places if necessary. Use a straight edge to draw the line on the graph above.

Now try again using the points (3, 17.1) and (4, 21.1). Find the equation of the line through these points. Show your work and round to two decimal places if necessary. Use a straight edge to draw the line on the graph above.

Either line is OK to use as your model. Is one easier than the other? Which one would you rather work with?

(There is a mathematical technique called Linear Regression in which all the data values are used to find the one unique line that best fits the data. This technique is beyond the scope of Math 1010.)

USI NG YOUR LINEAR MODEL

Write down the equation you want to use to model the profit of Ace Dog Grooming.

y = _____

Use your model to answer the following questions. Show your work.

1. What is the *y*-intercept of your linear model? Use a complete sentence to interpret its meaning.

2. How much profit can Ace Dog Grooming expect to earn in the year 2013?

3. In what calendar year would their profit reach $50,000?

GROUP PROJECT 1: MODELING UTAH POPULATION

Group Size: 3 to 4 people. One person is not a group and any projects submitted by individual students will not be graded.

Due Date:

Get in a group. Each group member needs to fill out the information below. Once you have each others names and contact information, your teacher will give you each a copy of the project.

Group names and contact information.

1.

2.

3.

4.