

Name: \_\_\_\_\_

## Skill Sheet 3.2

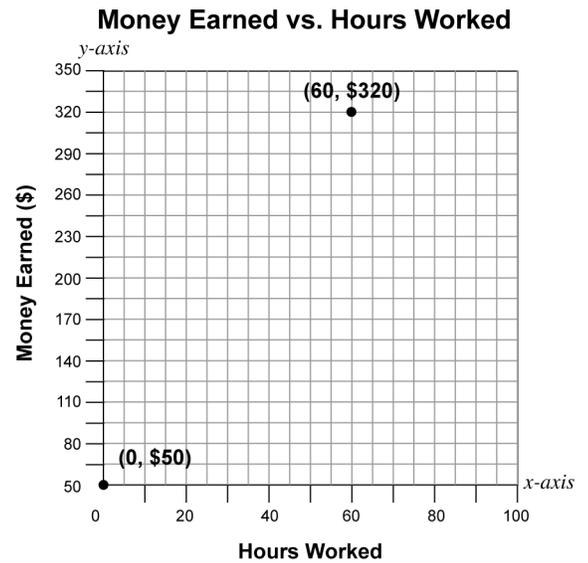
## Making Line Graphs

Graphs allow you to present data in a form that is easily and quickly understood. Graphs are especially good for describing changing data. Here is how a line graph is made.

### 1. Examine your data

Graph data consist of data pairs. Each data pair represents two variables. The independent variable will be plotted on the  $x$ - (horizontal) axis and the dependent variable will be plotted on the  $y$ - (vertical) axis. It's much easier to find the dependent than the independent variable. Test for the dependent variable by asking yourself which one depends on the other. For example, in a data set of money earned for hours worked, the dependent variable is money earned. That is because the money depends on the hours worked. Use this test to determine the dependent variable in any data set.

Next, determine the numerical range between the smallest and largest value for each variable. If you started working with zero hours and worked 60 hours to earn this money, the range for hours would be 60. During this time, if you started with \$50 and finished working with \$320, the range for dollars would be 270. Be sure to calculate the range for the independent and dependent variables separately.



### 2. Examine your graph

Check the space that you will use for your graph. If you are using a piece of graph paper, allow some space on the side and bottom for labels and other information. Now count the number of lines right from the  $y$ -axis to nearly the edge of the space. This is the maximum graph space that you have for the independent variable. Repeat this process for the dependent variable by counting the number of lines up from the  $x$ -axis to nearly the top of the space. This is the maximum graph space that you have for the dependent variable.

### 3. Determine the graph scale

You are now going to set the scale for the independent and dependent variables. It is important that you calculate the scales separately. The independent and dependent variables usually have different scales. We know that the dependent variable, money, has a range of \$270. Now imagine that the graph space has a maximum of 20 lines on the  $y$ -axis before it nearly runs off the page. The first line (the  $x$ -axis) will be labeled \$50. What will the next higher line be labeled? The point here is that if the value is too small, some of the money data will run out of the graph space. But if the value is too large, the plotted line will be small and hard to read. Divide the number of lines into the range to find a starting value. Increase the scale to an easier-to-use scale if necessary.

$$\$270 \div 20 \text{ lines} = \$13.50/\text{line}$$

Increase to an easier scale: \$15/line

Now label the y-axis at \$15 per line. It is not necessary to label each line; perhaps each fourth line as a multiple of \$60. Repeat this process for the independent variable.

- Use the above information and the graphic to help you make a graph of the following data: (0, \$50), (10, \$95), (20, \$140), (30, \$185), (40, \$230), (50, \$275), (60, \$320). Use your own graph paper or the graph paper on the last page of this skill sheet.
- Use the data and the graph to determine the amount earned per hour during the 60 hours of work time.

#### 4. Determine the independent and dependent variables

Two variables are listed in each row of the first two columns of the table below. Identify the independent and dependent variable in each data pair. Rewrite the data pair under the correct heading in the next two columns of the table. The first data pair is done for you.

Data pair not necessarily in order		Independent	Dependent
Temperature	Hours of heating	Hours of heating	Temperature
Reaction time	Alcohol consumed		
Number of people in a family	Cost per week for groceries		
Stream flow rate	Amount of rainfall		
Tree age	Average height		

#### 5. Find the data range

Calculate the data range for each variable:

Lowest value	Highest value	Range
0	28	
10	87	
0	4.2	
-5	23	
0	113	
100	1250	

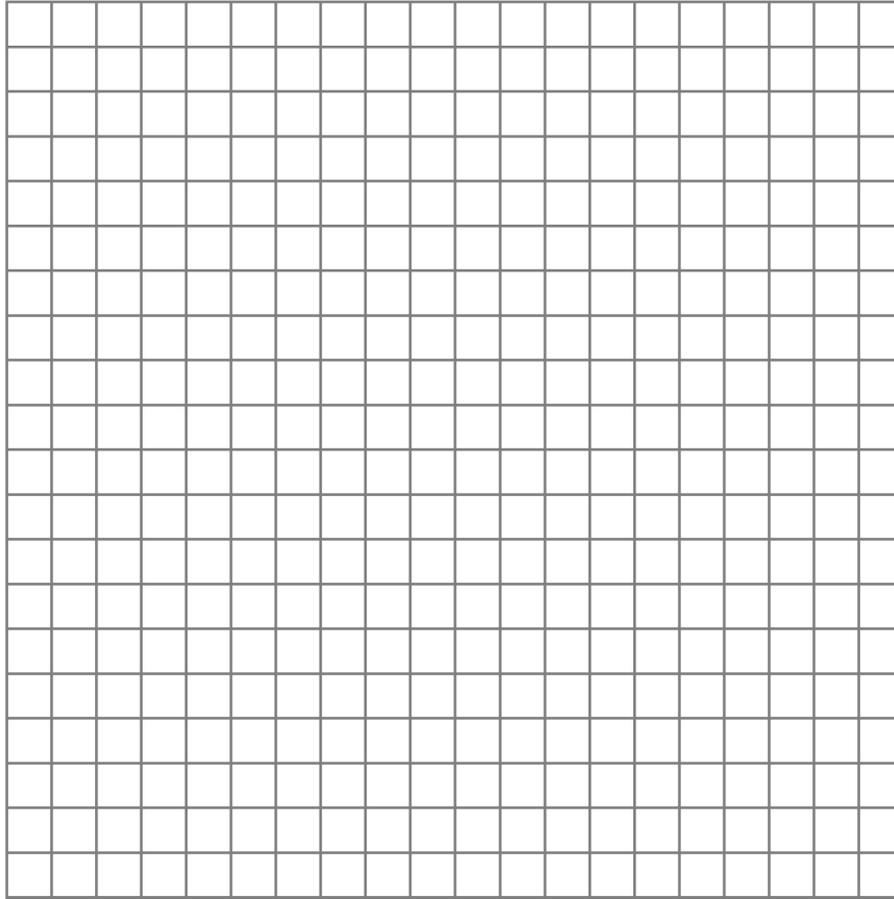
## 6. Set the graph scale

Using the variable range and the number of lines, calculate the scale for an axis and then determine an easy-to-use scale. Write the easy-to-use scale in the column with the heading “Adjusted scale.”

Range	Number of lines	Range ÷ Number of lines	Calculated scale	Adjusted scale
13	24			
83	43			
31	35			
4.2	33			
12	33			
900	15			

# Graph paper

*y-axis*



*x-axis*