MA 5B/5C	Mathematics Embedded Credit
Cape Career & Technology Center	Last Update: April 2017
Topic: Statistics	Focus: Graphs and Charts & Interpretation

Show-Me Standards: MA3, G1-8	MO Grade Level Expectations: D1C10, D3A9	NCTM Standards: 14C, 14D

OBJECTIVE: Students will be capable of defining, reading and interpreting various forms of graphs given the data.

Introduction:

X – axis: Horizontal line at the bottom of the graph. Also called the 'axis of abscissas'.
Y – axis: Vertical line to the left of the graph. Also called the 'axis of ordinates'.
Coordinate Axes: The x-axis and y-axis together.
Origin: The point at which the coordinate axes meet.

Independent Variable: generally, the value represented by the x-axis.
Dependent Variable: generally, the value represented by the y-axis.

To interpret a graph one takes the value at the point where the bar ends, or where the line passes through and determines the relationship between the independent and dependent variable. Usually, the independent variable is stated first. **TRENDS** are the general directions that the graphing data is moving on the graph.

Line Graph: a graph of data that is represented by a line. It can represent each data point, or it may be expressed as an average of the data points. The location of a data point is given by its **coordinates** [(x,y) – the x-coordinate is given first, the y-coordinate is given second].

Bar Graph: a graph of data that is represented by bars, or heavy lines [A **histogram** is an example and it is a graph that represents the frequency (number of occurrences) by groups.]

Circle Graph: a graph of data that is represented by a circle. [A **pie graph/pie chart** is an example and it is a graph that represents percentages of certain characteristics.] To assist with seeing 'portions', remember that P = B x R, where P = Portion, B = Base (360°), and R = Rate (change raw data into a percentage of the whole when necessary).

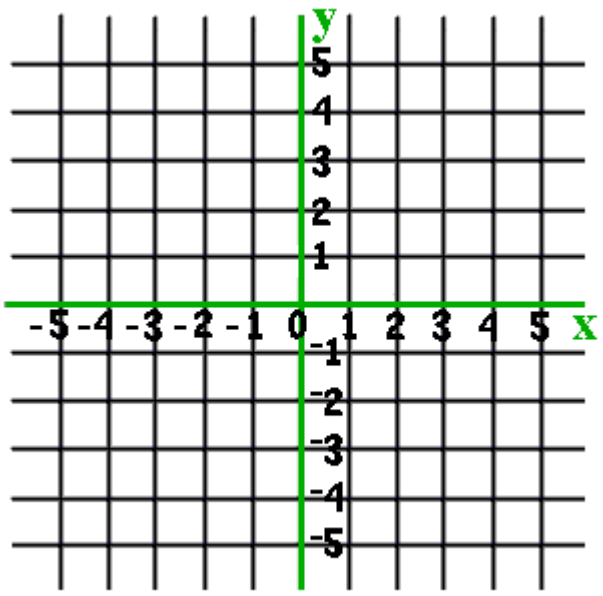
THINGS TO REMEMBER WHEN PLOTTING A GRAPH:

- First, determine the independent variable (or controlling factor). Determine what the dependent variable is also.
- Select suitable paper for drawing the graph.
- Label the graph, or axes – independent variable usually along the bottom; dependent variable usually along the left-hand side of the graph.
- Assign values to the horizontal and vertical lines. Label only the lines necessary to establish a pattern. Make increments easy to work with.

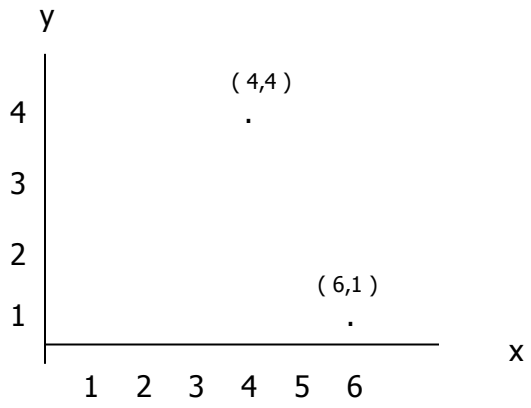
<u>Graphing Ordered Pairs:</u> ordered pairs of numbers are used to locate a point on a coordinate grid. The grid is made up of a horizontal axis, called the *x-axis*, and a vertical axis , called the *y-axis*. The point where the axes meet is called the *origin*. The pairs of numbers are called *coordinates.* The x-coordinate appears first and the y- coordinate appears second. (3,5)

↓

(x,y)



Often, the upper right *quadrant* is the only one of the four *quadrants* that is used to locate points because of the need for all the coordinate numbers to remain positive.



PROBLEMS:

1. Refer to the line graph on the following page to help answer the questions below.

Group 1	Group 2	Group 3
A = 85%	**B = 75%**	**C = 90%**
D = 93%	**E = 72%**	**F = 87%**
G = 91%	**H = 83%**	**I = 80%**

- 🕮 What is a general trend or observation for grades in this class?
- 🕮 What is the student's overall average?
- 🕮 How many student grades are below average?

2. Refer to the bar graph on the following page to help answer the questions below.

Appliance	Wattage
Hair Dryer	**380 watts**
Coffee Maker	**900 watts**
Room Air Conditioner	**860 watts**
Vacuum Cleaner	**650 watts**
Microwave Oven	**1450 watts**
Toaster	**1200 watts**

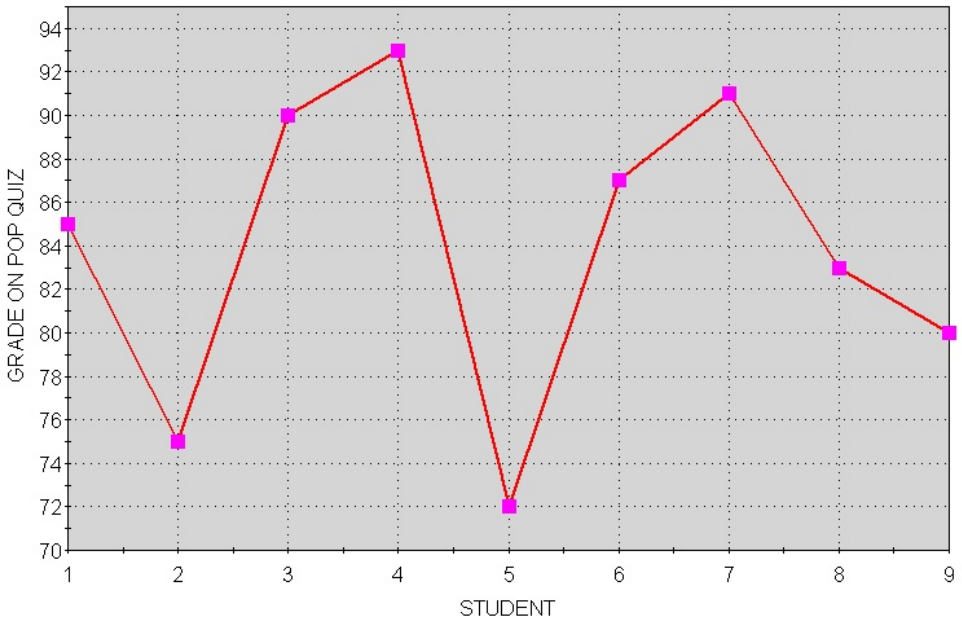
- 🕮 Which appliance listed uses the most electrical wattage?
- 🕮 Which appliance uses the least wattage?
- 🕮 What is the average wattage of the appliances listed?
- 🕮 Which appliances are above the average?

3. The budget for O'Zarcs Welding of Roselle, MO is represented below. Refer to the pie chart provided representing the information in circle graph format to answer the questions below.

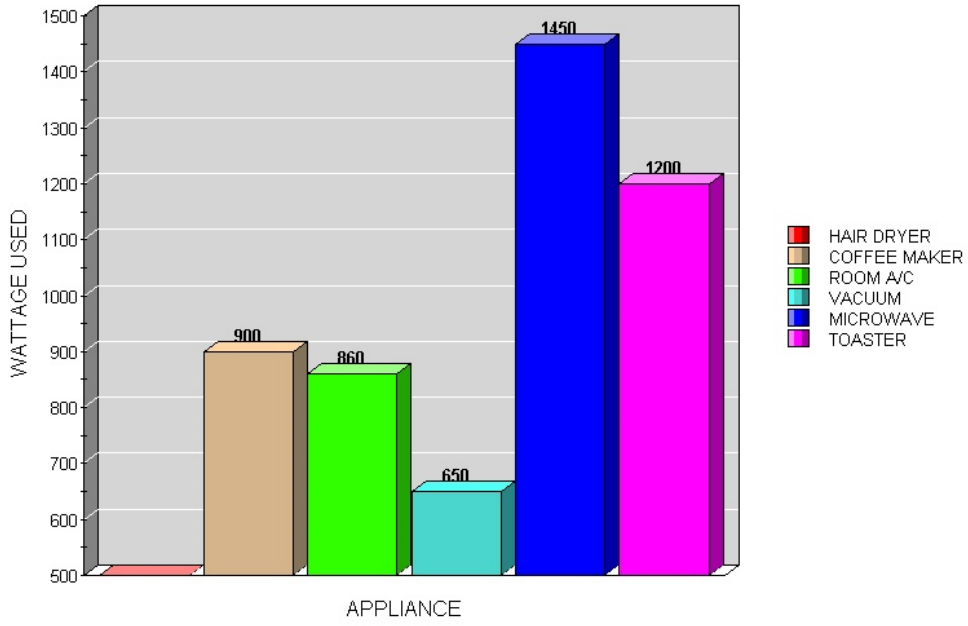
Area of Responsibility	Budgetary Amount for 2004
Engineering Payroll	**$100,000**
Management and Office Support Payroll	**$100,000**
Factory Payroll	**$300,000**
Other Business Expenses	**$250,000**
Supply Costs	**$200,000**
Profit	**$50,000**

- 🕮 Calculate the degree of the angle for each sector of the budget?
- 🕮 What percentage of the budget was spent on: engineering payroll; management and office support payroll; factory payroll; other business expenses; and supply costs?
- 🕮 What percentage of the total budget are the two (2) full-time and one (1) half-time engineers that work for O'Zarcs Welding?

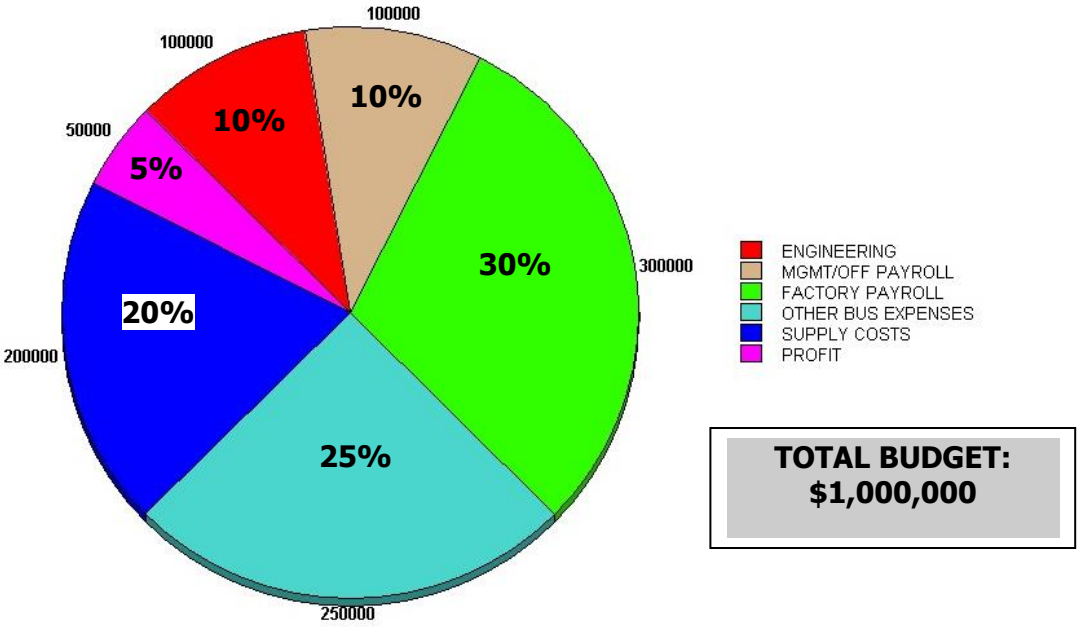
STUDENT GRADES FROM MR. INOALL'S CLASS



COMMON HOUSEHOLD APPLIANCE WATTAGE



O'ZARCS WELDING 2004 ANNUAL BUDGET



TOTAL BUDGET: $1,000,000