

**EVALUATING  
ACADEMIC READINESS  
FOR APPRENTICESHIP TRAINING**  
Revised for  
**ACCESS TO APPRENTICESHIP**

**MATHEMATICS SKILLS  
INTERPRETATION OF TABLES AND GRAPHS**

**AN ACADEMIC SKILLS MANUAL  
for**

**The Food Preparation Trades**

This trade group includes the following trades:

Baker & Cook, and  
Retail Meat Cutter

*Workplace Support Services Branch  
Ontario Ministry of Training, Colleges and Universities*

*Revised 2011*

In preparing these Academic Skills Manuals we have used passages, diagrams and questions similar to those an apprentice might find in a text, guide or trade manual.

**This trade related material is not intended to instruct you in your trade. It is used only to demonstrate how understanding an academic skill will help you find and use the information you need.**

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# MATHEMATICS SKILLS

## INTERPRETATION OF TABLES AND GRAPHS

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*An academic skill required for the study of the  
Food Preparation Trades*

### **INTRODUCTION**

Charts, tables and graphs present facts visually, making it easier to find and interpret information. You can see the relationship between different quantities, rather than having to analyse numbers to make comparisons. In the food preparation trades, you will refer to tables and charts for useful information such as the nutrient values of various foods, temperatures and cooking times for meats and baked goods as well as fat content of meats and various government regulations and standards

This skills manual looks at tables and graphs, including the following topics:

- ◆ Tables and graphs
- ◆ The co-ordinate system
- ◆ Graphing a linear relationship

### **TABLES AND GRAPHS**

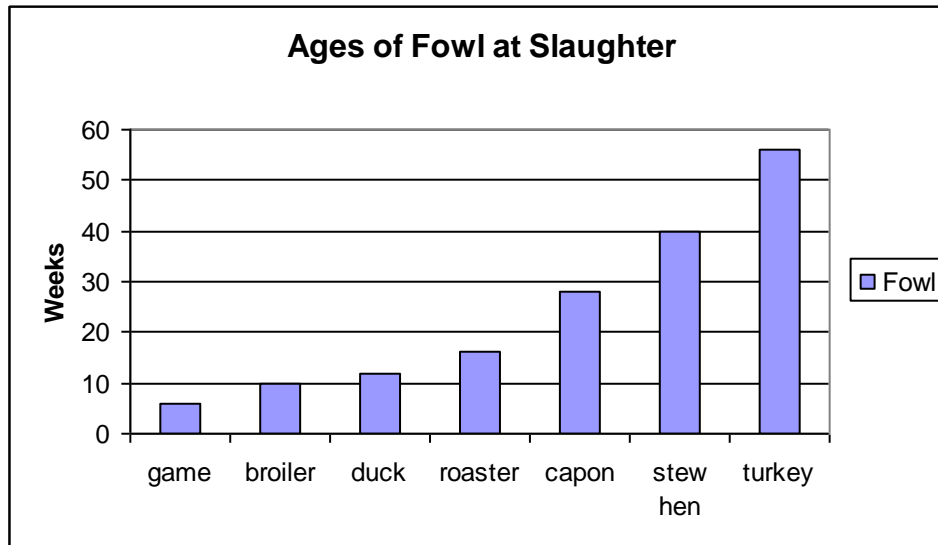
Usually the information, or *data*, presented in a graph is first organized into a table. A table lists two or more sets of quantities, numbers or measurements in a way that shows the connection between them. The data is usually arranged in rows and columns, as in Table 1.

Table 1: Ages of Fowl at Slaughter

Type of Fowl	Age at Slaughter
game	6 weeks
broiler	10 weeks
duck	12 weeks
roaster	16 weeks
capon	28 weeks
stew hen	40 weeks
turkey	56 weeks

A meat cutter who deals with the public will need to be aware of the ages at slaughter of various types of meat, in particular poultry. This information is useful when describing texture, taste and cooking times. Table I provides this information.

When numerical amounts of quantities are presented in a chart or table like Table 1, the information can be also presented as a graph. In a *bar graph* like Graph 1, information is presented as bars that can be visually compared.



Graph 1: Ages of Fowl at Slaughter

Table 1 compared the ages at slaughter of various poultry meats. The bar graph, Graph 1, illustrates this relationship.

In a *line graph*, information is plotted as points on a grid. Graph 4 is a line graph. We will look at the co-ordinate grid system before examining line graphs.

### ***THE CO-ORDINATE SYSTEM***

A ***grid*** system is used to locate points on a graph. A grid consists of a horizontal line crossed by a vertical line.

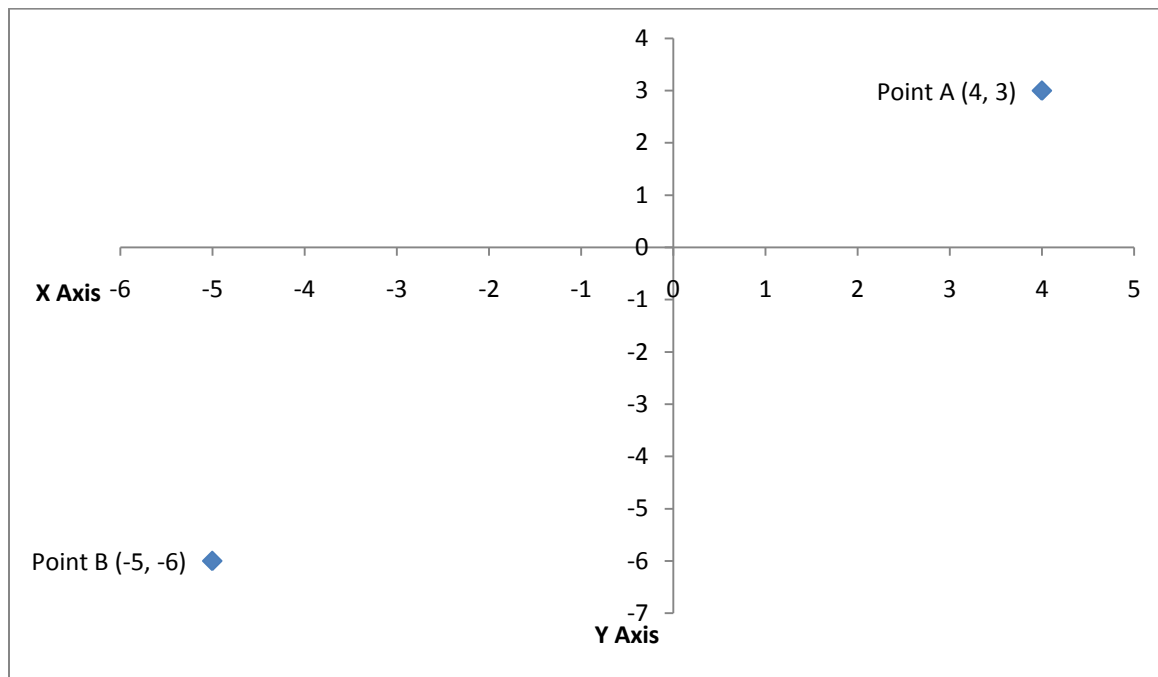
Graph 2 below, shows a grid.

- ◆ The horizontal line is called the ***x-axis***.
- ◆ The vertical line is called the ***y-axis***.
- ◆ The x-axis represents one set of measurements and the y-axis represents another set.

The x- and y-axis each have a ***scale***, a *graduated series of numbers that include the measurements of the quantities used on the graph.*

The point where the x and y-axis cross, called the point of intersection or the **origin**, usually has the value of 0.

- ◆ Numbers to the right of 0 on the x-axis are positive, while numbers to the left of the origin are negative.
- ◆ Numbers above 0 on the y-axis are positive, while numbers below the origin are negative



**GRAPH 2: A grid with an X axis and a Y axis**

Often only positive quantities are shown on a graph.

- A graph like this will not show negative numbers.
- The y-axis will be at the left hand side and the x-axis is at the bottom of the graph.

### Points on a grid

A vertical line can be drawn from any point on the x-axis to meet a horizontal line drawn from any point on the y-axis. *Where the two lines meet, a **point** is formed on the grid.*

- A point can be formed at every place where a vertical line from the x-axis crosses a horizontal line extending from the y-axis,.

### Coordinates

Every point has two **coordinates** that describe where, on the graph, each point is:

- The first coordinate shows the measurement on the x-axis.
- The second shows the measurement on the y-axis.
- Point coordinates are listed inside brackets.

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**Example:** Look back to Graph 2. Point A on the graph is listed as Point A (4, 3).

1. If you look down to the x axis below Point A, you will see the point is directly above 4 on the axis.
  - 4 is the x coordinate.
2. If you look across to the Y axis you will see that Point G is directly across from the 3.
  - 3 is the y coordinate.

Point A (4,3) is the point where 4 is the x co-ordinate and 5 is the y co-ordinate.

The origin is listed as the point (0,0). The x co-ordinate of the origin is 0, as is the y co-ordinate.

### Plotting points on a grid

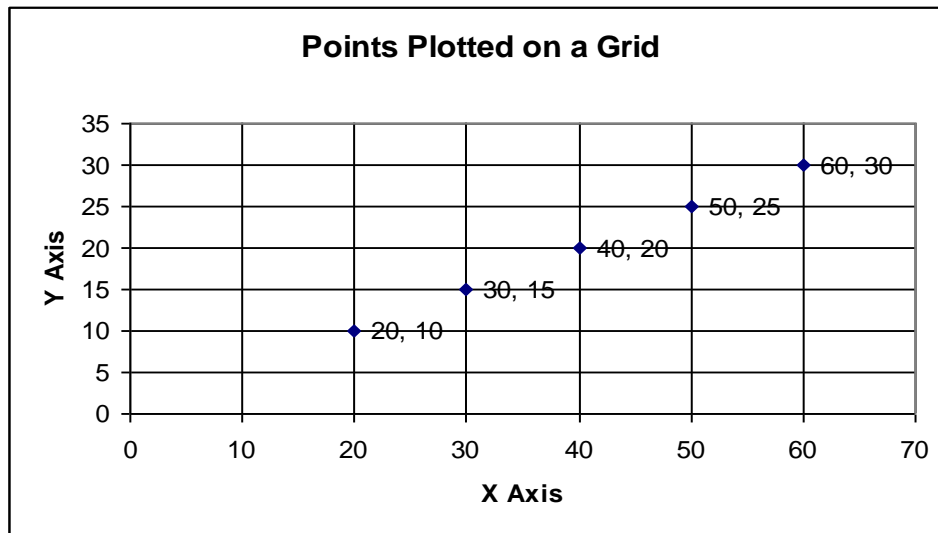
In general, the information that is used to form the points on a grid comes from a table such as Table 4. The table lists two sets of numbers or measurements in a way that shows the connection between them.

Look at Table 2, which lists related x and y values, and see how this table can be used to plot points on a grid.

**TABLE 2: List of x and y values**

x value	y value
20	10
30	15
40	20
50	25
60	30

These points can be plotted on a grid with an x and y-axis, as shown on Graph 3, by putting a point on the grid each place where the y value and the x value meet. For example, we put the point (20, 10) on the grid where the x value, 20, meets the y value, 10. The next point, (30, 15) goes where x = 30, y = 15. Another point, (40, 20) goes where x = 40, y = 20, and so on.



**GRAPH 3 Points Plotted on a Grid**

The grid in Graph 3 shows the horizontal x-axis and the vertical y-axis. The x and y scales are simple number intervals without any units such as centimeters or feet.

- Notice that the y scale is smaller or closer together than the x scale on the graph.
- Also note that only positive values are shown in this graph.

The points are plotted on the grid like this: Look at the third point on Graph 3. It has an x coordinate of 40 and a y coordinate of 20. It is named as point A (40, 20).

### ***Finding Points on a Grid***

To locate a point on a grid, use the x and y numbers listed in the co-ordinate pair for that point.

- The order of the numbers is important.
- The first number gives the x coordinate. The second number is the y coordinate.

To find the point (30,45) on Graph 3:

1. Draw a vertical line extending up from the number 30 on the x-axis.
2. Then draw a horizontal line extending over from the number 45 on the y-axis.
3. The point (30,45), is where the two lines meet.
4. Note that this point has no relation to the other points on the graph.

### ***GRAPHING A LINEAR RELATIONSHIP***

Graphs are often used to show a relationship between two quantities, such as the relationship between the numbers of hours required to charge a battery and the voltage required. If a line is drawn connecting the points, the graph is called a **line graph**.

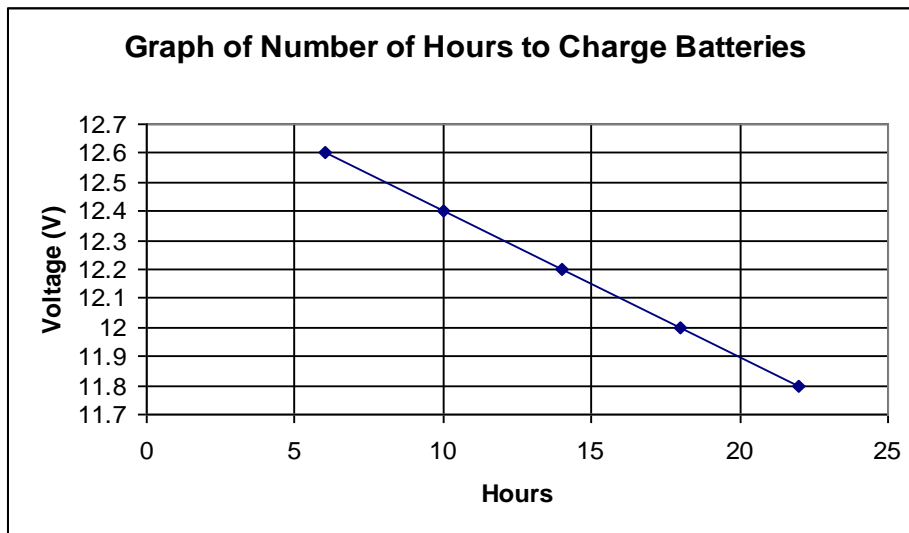
To graph the relationship between the open circuit voltage of a battery and the hours required to charge it using a 10 amp charger, follow these steps:

1. List the voltage of different batteries and the hours required to recharge each battery.
  - Table 5 lists the measurements.

**TABLE 5: Number of hours to charge batteries with a 10 amp charger**

hours to charge	open circuit voltage
6	12.6 V
10	12.4 V
14	12.2 V
18	12.0 V
22	11.8 V

2. The number of hours forms the scale on the x-axis.
  - The time scale goes from 6 to 22 hours.
3. The voltage measurements form the scale on the y-axis.
  - The voltage scale goes from 11.8 V to 12.6 V.
4. Use the quantities listed in the table to form the points on Graph 4.
5. Draw a line to link the points.



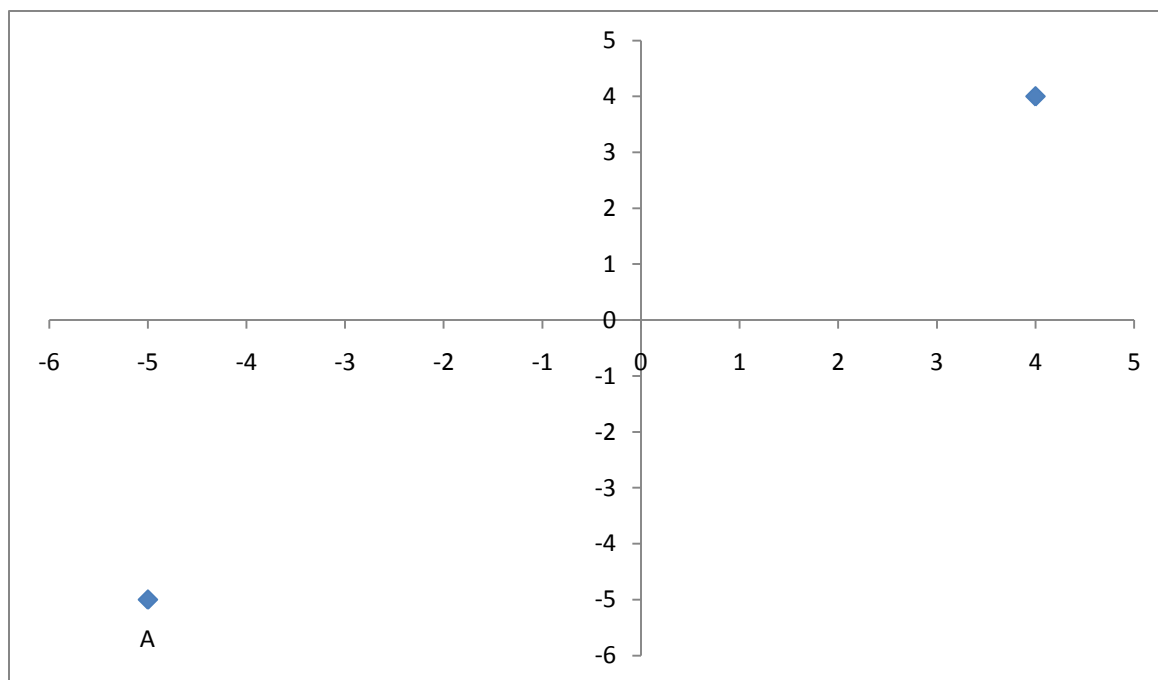
**GRAPH 4: Number of Hours to Charge Batteries**

When you look at Graph 4, you can see that the higher the voltage of a battery, the less time that is required to charge it, using a 10 amp charger. When the points are joined, a straight line is formed.

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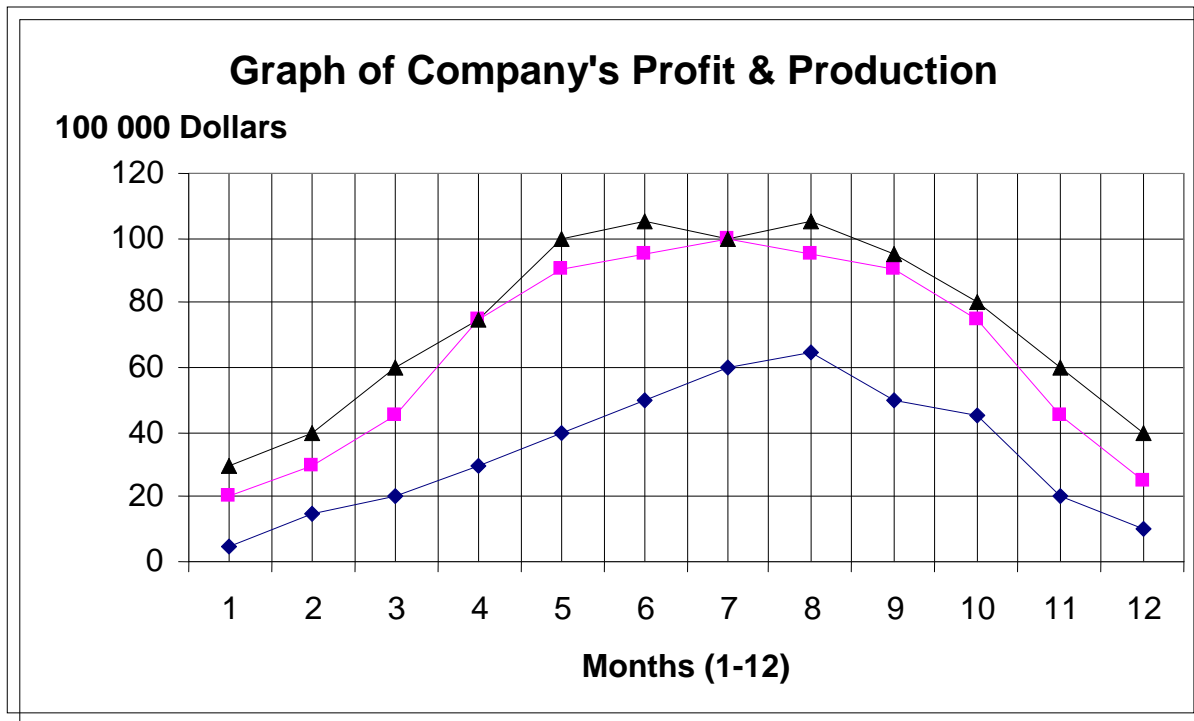
**Answer the questions based on the graphs shown. Answers are on the last page.**

1. a) Give the coordinates of Point A, located on the Graph below.  
b) Find the location and draw point C (3, -2) on the Graph below.



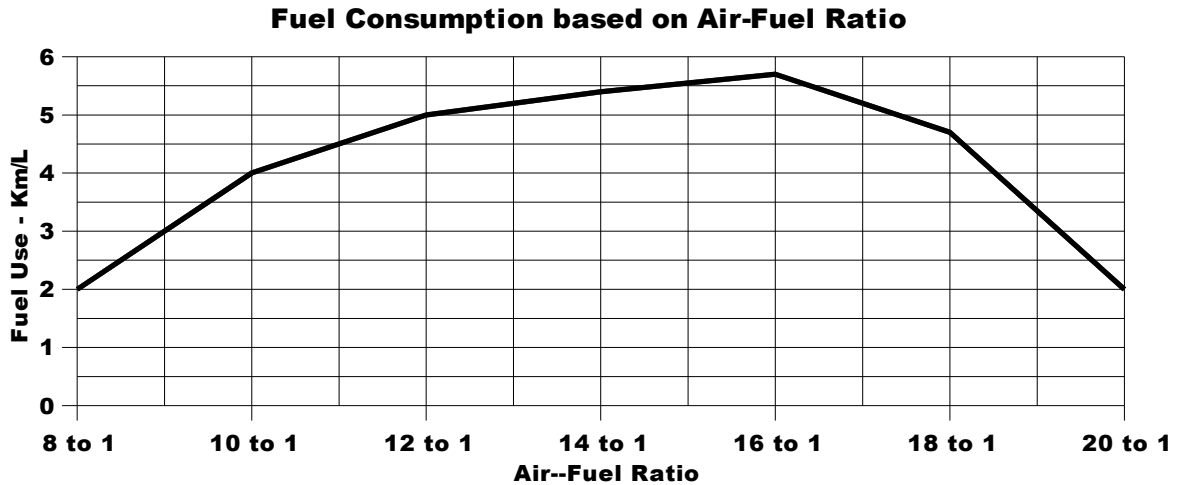
2. In the graph below:

- A company's projected production is represented by the line which has the symbol ( $\Delta$ ) at each of its points.
- Actual production is represented by the graph line with  $\blacksquare$  at its point.
- Net profit is represented by the line with the symbol ( $\diamond$ ) for each month of one year.



- What month was the value of units produced the highest?
- What months was the actual production the same as the projected production?
- What month were profits the greatest?
- Would you say that the company was fairly accurate in its prediction for the year?

3. In older vehicles with carburetors, the carburetor was set to regulate the amount of air admitted to the engine in a ratio with the amount of gasoline mixed with it. When the ratio is properly set, complete combustion takes place and the most economical fuel consumption occurs. Use the graph below to answer the questions on fuel consumption and air-fuel ratio.



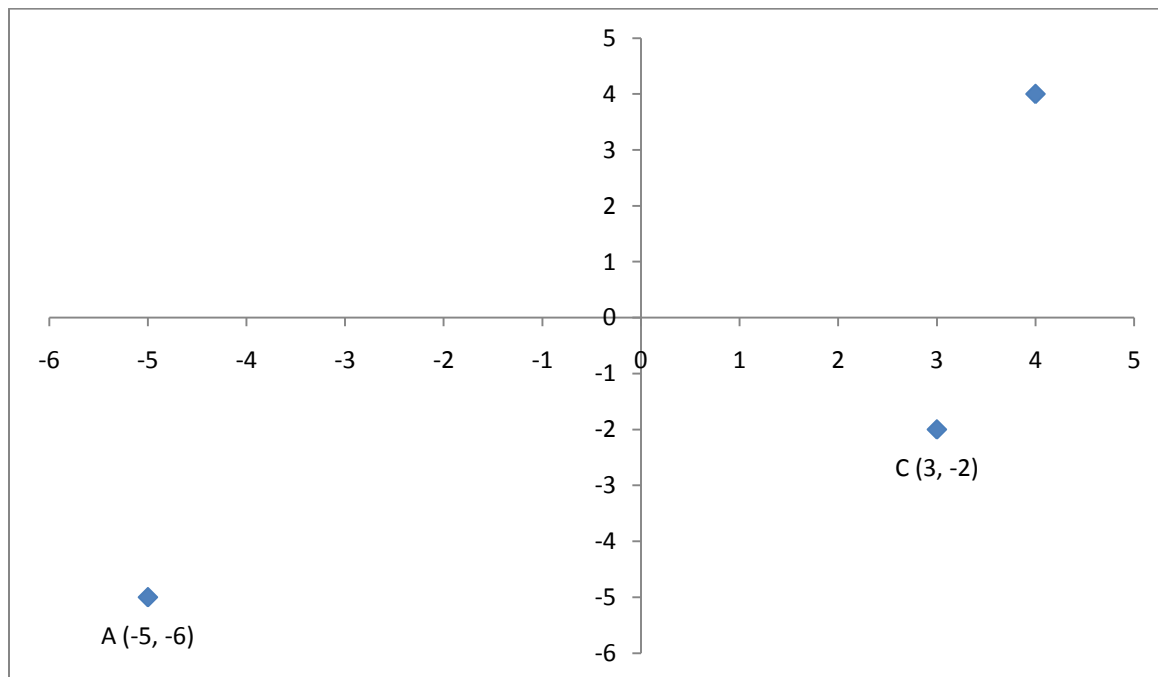
- a. What is the air-fuel ratio when the fuel consumption is 4 km/L? \_\_\_\_\_
- b. What is the fuel consumption when the air-fuel ratio is 12? \_\_\_\_\_
- c. At what air-fuel ratio is the gas consumption the most economical? (When do you get the most kilometers per liter of gas?) \_\_\_\_\_
- d. At what two ratios is fuel consumption the least economical? \_\_\_\_\_ and \_\_\_\_\_

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**ANSWER PAGE**

1. a) The x co-ordinate of point A is -5 and the y co-ordinate is -6.  
The location of Point A is (-5, -6).

b) The location of Point C (3, -2) is shown below.



2. a) The value of units produced was the greatest in June.

b) The projected value was the same as the actual production in March, July and September.

c) Profits were greatest in August.

d) This question requires you to make a value judgement. The graph lines for the value of actual units produced and the projected value are close so it would be fair to say the company made an accurate prediction for the year.

3. a. Air-fuel ratio is **10 to 1** when the fuel consumption is 4 km/L.

b. The fuel consumption is **5 km/L** when the air-fuel ratio is 12.

c. Most economical consumption is at air-fuel ratio of **16 to 1**.

d. Fuel consumption is least economical at the ratios of **8 to 1** and **20 to 1**.