Lesson Description
In this lesson, we will

- Making sense of graphs that tell a story
- Patterns and relationships
- Representation of relationships in tables, equations and graphs
- Working with two or more relationships and/or representations

Key Concepts

Graphs that tell a Story
We know that graphs show a relationship between two sets of values. Each set of values appears on a number line called an axis. There is a horizontal axis called the x axis and the values on here are called the independent variable. There is a vertical axis called the y axis and the values on this are called the dependent variable.

Various Types of Graphs
A graph represents data and can be illustrated using a diagram. These include:

- **Bar graph**
  Used to compare different (discrete) data

- **Histogram**
  Used to compare continuous data

- **Straight line graph**
  Graphically compare two variables with continuous data

- **Broken line graph**
  Graphically compare two variables with discrete data

Slope of a graph

- **Constant or fixed relationship**
  In this type of relationship the values on the vertical axis remain the same when the value on the horizontal axis changes

- **Direct proportion (constant difference) relationship**
  In this type of relationship when the value on the horizontal axis changes, then the value on the vertical axis changes by the same factor. The values are in direct proportion to each other.
Inverse proportion relationship
In this type of relationship when the value on the one axis increases, then the value on the other axis decreases.

Questions

Question 1
(Solutions of All: Maths Literacy, Grade 11, Topic 1, page 22 Question 4)
A transport hire company advertises these offers:
You plan a day trip and calculate the cost depending on the number of kilometres you might travel.

a.) Show that it would cost R600 to hire a vehicle from Wildspotters to travel 150km.
b.) Show that it would cost R900 to hire a vehicle from Fantastic Fleet to travel 300km.
c.) Complete:

<table>
<thead>
<tr>
<th>Kilometres</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fantastic Fleet cost</td>
<td>550</td>
<td></td>
<td></td>
<td></td>
<td>900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildspotters cost</td>
<td>350</td>
<td>600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The graph represents the same information

d.) Consider graph 1.
i. What type of relationship is there between the cost and the distance travelled for the first 200km travelled? How can you tell this from the shape of the graph?
ii. What type of relationship is there between the cost and distance travelled after the first 200km? How can you tell this from the shape of the graph?
iii. Which company does graph 1 refer to?
iv. Write down the co-ordinates for Point B.

e.) Consider graph 2.
i. If you travelled 430km, how many km will be charged for at a rate of R5 per km?
ii. Write the co-ordinates for the point where Graph 2 cuts the vertical axis.

f.) How did you recognise the point at which it costs the same to hire a bus from either company?

g.) Which company is cheaper to use if you were planning to travel these distances in a day:
i. 90km
ii. 200km
iii. 450km

h.) The vehicles can carry a maximum of 12 passengers.
Divide the cost of the vehicle hire equally amongst the passengers.
You plan a trip of 320km in distance.
i. Calculate the cost of the trip using Fantastic Fleet.
ii. Calculate the cost of the trip using Wildspotters.
i.) Using the number of passengers, complete the table to show what each passenger will pay for a 320km trip:

<table>
<thead>
<tr>
<th>Passengers</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fantastic Fleet: Cost per person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildspotters: Cost per person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

j.) A group of six friends decide to do the journey of 320km.
   i. Which option is best – Fantastic Fleet or Wildspotters? Explain.
   ii. What would each person pay if they divided the costs equally among themselves? Show your calculations.

Question 2
(Adapted from NCS (DBE) Nov 2011, Paper 2, Question 1)

Timothy is a newly qualified marketing graduate. He has been offered two positions, one as a medical sales representative for Meds SA and the other as a tobacco sales representative for ABC Cigs.

The formula for calculating the monthly salary for a medical sales representative is:

\[ \text{Salary} = R3\,000 + R500 \times \text{number of days worked}. \]

As a tobacco sales representative he will earn a salary of R750 per day for each day worked in a month. He will only receive a salary if he works for one or more days in a month.

a.) Write down a formula that can be used to calculate the monthly salary of a tobacco sales representative

b.) Draw TWO line graphs on the same grid to represent the monthly salaries for both the position of medical and tobacco sales representatives. Clearly label each graph.

c.) Use the graph drawn, or otherwise to answer the following:
   i. After how many working days will the two salaries be the same?
   ii. Suppose Timothy worked for Meds SA for 18 days. How many days would he have to work at ABC Cigs to earn the same salary?