**Linear Modelling /40**

1. This graph shows the time it takes to fill a gas tank from empty.



Volume (L)

a) Determine the vertical and horizontal intercepts. Write the coordinates of the point where the graph intersects the axes. Describe what the point represents. 2 marks

b) Determine the rate of change. What does it represent? 2 marks

c) Write the domain and range. 2 marks

d) About how long will it take to fill a 45-L gas tank? 1 mark

 2. This graph shows the distance, *d* kilometres, from Beijing, China, to Edmonton, Alberta, as a function of flying time, *t* hours.



a) Determine the vertical and horizontal intercepts. Write the coordinates of the points where the graph intersects the axes. Describe what the points of intersection represent. 2 marks

b) Determine the rate of change. What does it represent? 2 marks

c) Write the domain and range? 2 marks

d) What is the distance to Edmonton when the plane has been flying for 5 h? 1 mark

e) How many hours has the plane been flying when the distance to Edmonton is 6500 km? 1 mark

3. The coordinates of the vertices of GBW are G(20, 10), B(–35, 20), and W(5, –10). Is GBW a right triangle? Justify your answer. 4 marks



4. Francine runs a T-shirt company. For each order she receives, Francine charges a flat fee of $50, plus $8.95 per T-shirt .

a) Write an equation for the total cost, *C* dollars, for ordering *n* T-shirts. 1 marks

b) Marnell ordered 62 T-shirts. What was the total cost? 1 mark

c) Jakub paid a total cost of $971.85. How many T-shirts did he order? 1 mark

5. In Jay’s business, the annual cost of operating a car, *c*, is a linear function of the number of kilometres the car is driven, *k*. The annual cost of operating a car that has been driven 19 375 km is approximately $3875. The annual cost of operating a car that has been driven 20 000 km is approximately $3900.

a) Write an equation in slope-point form to represent this function. 2 marks

b) Use the equation in part a to determine how many kilometres a car has been driven when the annual operating cost is approximately $4350. 1 mark

6. Write an equation for the line that passes through B(–1, 3) and is:

a) parallel to the line  (2 marks)

b) perpendicular to the line  (2 marks)

7. Students at Tahayghen Secondary School sell punch during the school carnival. The number of cups sold, *n*, is a linear function of the temperature in degrees Celsius, *t*. The students sold 458 cups when the temperature was 25°C. They sold 534 cups when the temperature was 29°C.

a) Write an equation in slope-point form to represent this function. 2 marks

b) Use the equation in part a to determine the approximate temperature when the students sell 325 cups of punch. 1 mark

8. Write an equation in general form for the line that passes through A(3, –4) and B(11, 8). 3 marks

9. Charles’s Gas Law states that the volume, *v*, of a fixed mass of gas at a constant pressure varies directly with its absolute temperature, *t*. At 27°C, the volume of a certain amount of air is 500 mL. When the air is heated to 90°C, the volume increases to 605 mL.

a) Write an equation in general form for this relation. 3 marks

b) Determine the volume of the air when its temperature is 60°C. 1 mark

c) Determine the temperature of the air when its volume is 1010 mL. 1 mark