

1 b	6 d
2 c	7 d
3 a	8 c
4 d	9 a
5 a	10 b

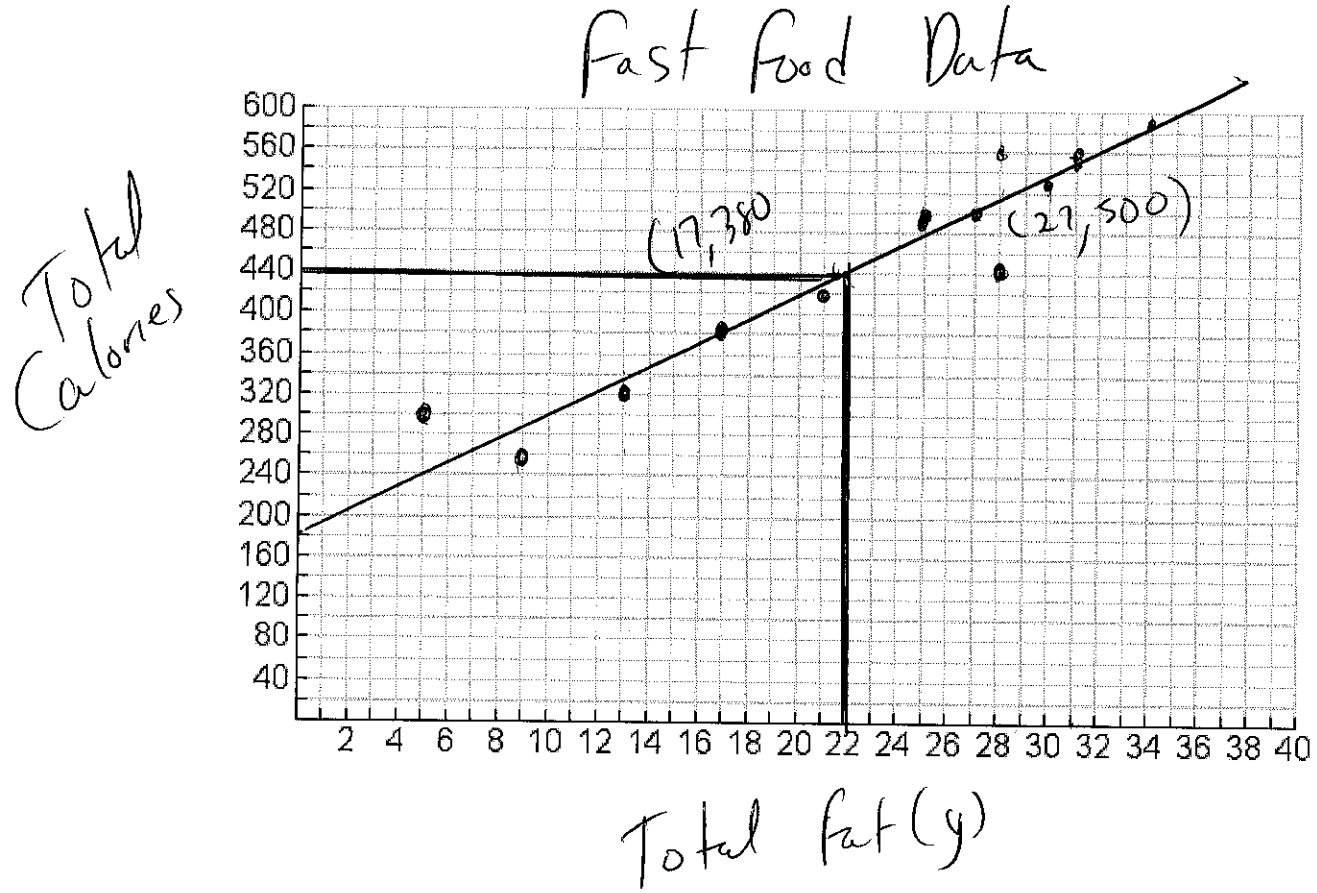
Part B Long Answer

Place all your workings on the space provided.

11) Allannah suspect there is a relationship between the grams of fat in fast food and the total calories in fast food.

Type Of Fast Food	Total fat (g)	Total Calories
Hamburger	9	260
Cheeseburger	13	320
Quarter Pounder	21	420
Quarter Pounder with Cheese	30	530
Big Mac	31	560
Arch Sandwich Special	31	550
Arch Special with Bacon	34	590
Crispy Chicken	25	500
Fish Fillet	28	560
Grilled Chicken	20	440
Grilled Chicken Light	5	300

a) Create a Scatter Plot of the data on the grid below. (4 marks)



- b) Describe the trend that you observe in the data that you have graphed? (2 marks)

Linear trend  $\rightarrow$  as the fat content increase so does the total calories

- c) Draw a line of best fit and ALGEBRAICALLY determine the equation for the line that you have drawn. (6 marks)

$$\begin{matrix} (27, 500) & (17, 380) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{380 - 500}{17 - 27} = \frac{-120}{-10} = -12$$

$$y = mx + b$$

$$500 = 12(27) + b$$

$$500 = 324 + b$$

$$500 - 324 = 324 - 324 + b$$

$$176 = b$$

$$y = 12x + 176$$

- d) Using the equation for the line of best fit you obtained in c) predict the number of total calories for a fast food item that contains 22 grams of fat? What is this type of prediction often referred to? Verify your answer using the scatter plot you created above (4 marks)

$$y = 12(22) + 176$$

$$y = 264 + 176 = 440$$

440 Total calories... Interpolation

- 12) Brian has 40m of fencing. He decides construct a rectangular pen for his pet rooster. He examines how different widths will change the area of the pen. He has produced the below table.

Width (m)	1	2	3	4	5
Area (m <sup>2</sup> )	19	36	50	64	75

- a) Fill in the blanks for each type of regression analysis. (6 marks)

Linear Regression

$r^2$  0.9945

Equation  $y = 14x + 6.8$

Quadratic Regression

$R^2$  0.9997

Equation  $y = -0.86x^2 + 19.14x + 0.8$

Exponential Regression

$r^2$  0.9297

Equation  $y = 16.2(1.39)^x$

- b) Which equation would you use to "best fit" the data. Give reasons for your answer. (2 marks)

quadratic  $\Rightarrow r^2$  closest to 1

- c) Using the equation you chose for part (b), predict the area of the enclosure if the width of the pen is 10m? What is this type of prediction called? (4 marks)

$$y = -0.86(10)^2 + 19.14(10) + 0.8$$

$$y = 106.2 \text{ m}^2$$

This is called extrapolation

13) Solve for the indicated variables. Show all possible workings.

a)  $d(7)$  for  $d(t) = -3t + 7$  (2 marks)

$$d(7) = -3(7) + 7 = -21 + 7 = -14$$

b)  $t$  when  $d(t) = -8$  for  $d(t) = -3t + 7$  (2 marks)

$$\begin{aligned} -8 &= -3(t) + 7 \\ -8 - 7 &= -3(t) + 7 - 7 \\ -15 &= -3t \end{aligned} \quad \rightarrow \quad \begin{aligned} -15 &= -3t \\ \frac{-15}{-3} &= \frac{-3t}{-3} \\ 5 &= t \end{aligned}$$

c)  $h(0)$  for  $h(t) = -5t^2 + 13t$  (2 marks)

$$\begin{aligned} h(0) &= -5(0)^2 + 13(0) \\ &= 0 + 0 = 0 \end{aligned}$$

d)  $t$  when  $h(t) = -6$  for  $h(t) = -5t^2 + 13t$  (4 marks)

$$\begin{aligned} -6 &= -5t^2 + 13t \\ -6 + 6 &= -5t^2 + 13t + 6 \\ 0 &= -5t^2 + 13t + 6 \\ 0 &= (-5t^2 + 15t) + (-2t + 6) \end{aligned}$$

$$\begin{aligned} 0 &= -5(t-3) + -2(t-3) \\ 0 &= (t-3)(-5t + -2) \end{aligned}$$

$$\begin{aligned} t-3 &= 0 \\ t &= 3 \end{aligned}$$

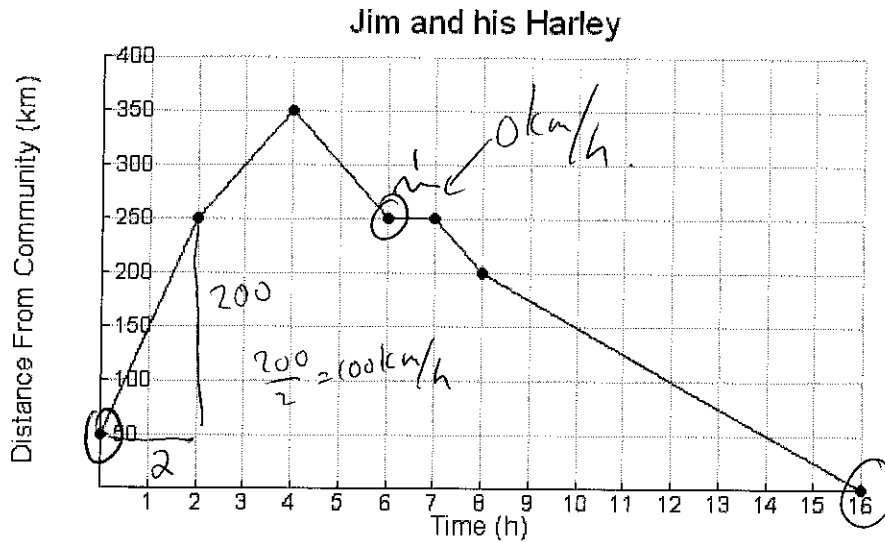
$$\begin{aligned} -5t + -2 &= 0 \\ -5t + -2 + 2 &= 0 + 2 \\ -5t &= 2 \\ \frac{-5t}{-5} &= \frac{2}{-5} \\ t &= -\frac{2}{5} \end{aligned}$$

e)  $t(-3)$  for  $t(m) = 100(0.75)^m$  (2 marks)

$$\begin{aligned} t(-3) &= 100(0.75)^{(-3)} \\ t(3) &= 237.03 \end{aligned}$$

## Part A: Multiple Choice 10 marks

Place correct answers on the sheet provided at the end of the multiple choice questions.



Jim has a passion for riding his Harley Davidson motorcycle. He leaves his community and starts to record data when he is a certain distance away. His data is included in the graph above. Use the above graph to answer questions to below.

1) How far away from the community was Jim when he started recording data?

- a) 0 km
- b) 50 km
- c) 100 km
- d) 250 km

2) How far away from the community was Jim when he stopped?

- a) 0 km
- b) 200 km
- c) 250 km
- d) 350 km

3) How long did Jim stop?

- a) 1 hour
- b) 2 hours
- c) 3 hours
- d) 4 hours

4) What was the Jim's maximum speed?

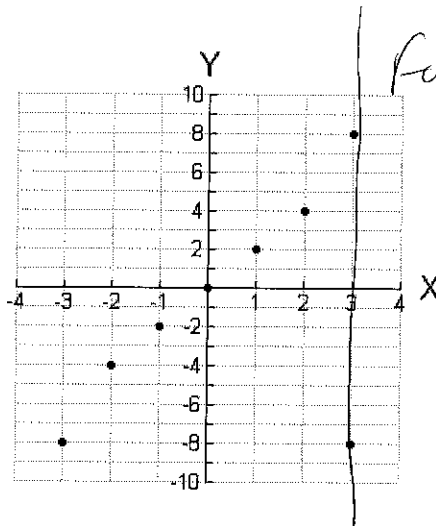
- a) 0 km/h
- b) 25 km/h
- c) 50 km/h
- d) 100 km/h

5) What was the Jim's minimum speed?

- a) 0 km/h
- b) 25 km/h
- c) 50 km/h
- d) 100 km/h

6) When does Jim return back to his community?

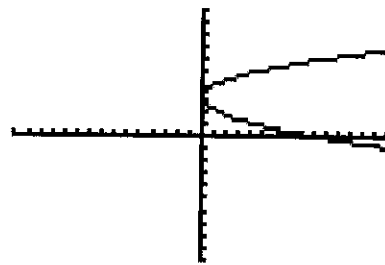
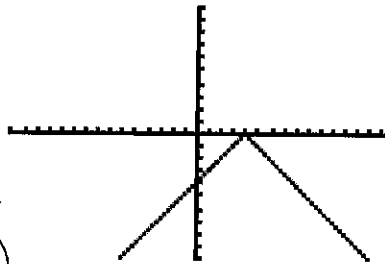
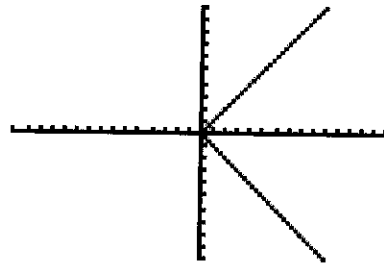
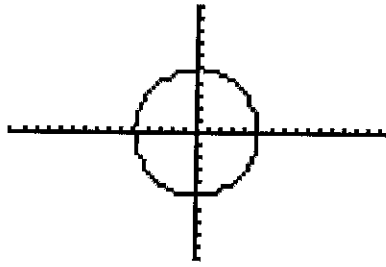
- a) Never.
- b) After 4 h hours.
- c) After 7 hours.
- d) After 16 hours.



7) Which answer below is true for the above graph?

- a) It represents a function because it passes the vertical line test.
- b) It does not represent a function because it passes the vertical line test.
- c) It represents a function because it fails the vertical line test.
- d) It does not represent a function because it fails the vertical line test.

8) Which graph below does  represent a function?



9) The formula that shows the relationship between the height of a projectile ( $h$ ) in meters over time ( $t$ ) in hours is given as  $h(t) = -4.9t^2 + 76t + 9$ . Which answer below is true?

- a)  $h$  is the dependent variable
- b)  $h$  is the independent variable
- c)  $t$  is the dependent variable
- d) There are no independent or dependent variables in this situation.

10) What are the three different ways to represent a function?

- a) transformational form, vertical line test, functional notation
- b) table, graph, equation
- c) graph, equation, transformational form
- d) table, graph, vertical line test