

Part A: Multiple Choice 8 marks

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



Snowbusters has recorded employment data since their company was formed in 1995 and placed it in the above graph. Please use the above graph to answer questions 1 to 4.

1) How many employees were there when the company first started??

- a) 0
- b) 5
- c) 6
- d) 10

2) What was the greatest rate of hiring for Snowbusters?

- a) $0 \frac{\text{employees}}{\text{year}}$
- b) $4 \frac{\text{employees}}{\text{year}}$
- c) $5 \frac{\text{employees}}{\text{year}}$
- d) $8 \frac{\text{employees}}{\text{year}}$

3) What was the greatest rate of layoffs for Snowbusters?

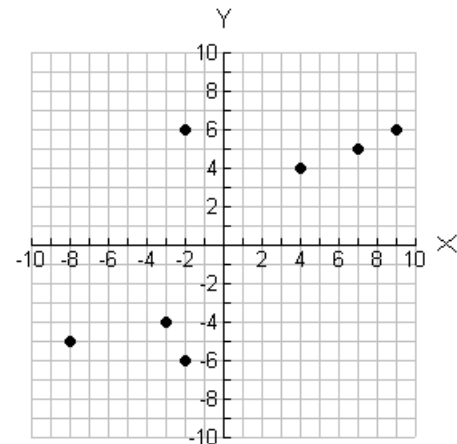
- a) $0 \frac{\text{employees}}{\text{year}}$
- b) $4 \frac{\text{employees}}{\text{year}}$
- c) $5 \frac{\text{employees}}{\text{year}}$
- d) $8 \frac{\text{employees}}{\text{year}}$

4) How many years did Snowbusters not hire or layoff employees?

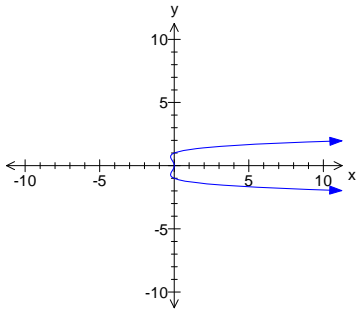
- a) 0
- b) 2
- c) 3
- d) 10

5) Which answer below is true for the graph below?

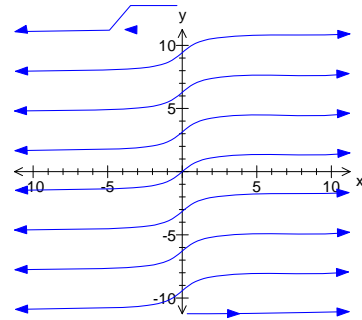
- a) It represents a function because it passes the vertical line test.
- b) It does not represent a function because it passes the vertical line test.
- c) It represents a function because it fails the vertical line test.
- d) It does not represent a function because it fails the vertical line test.



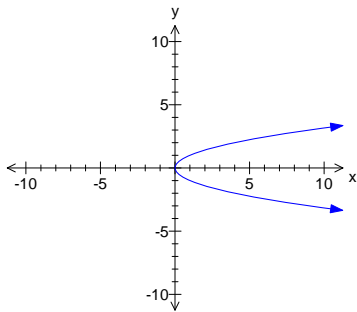
6) Which graph below represents a function?



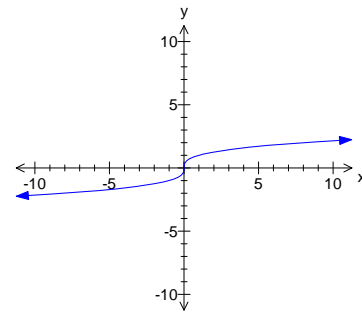
a.



c.



b.

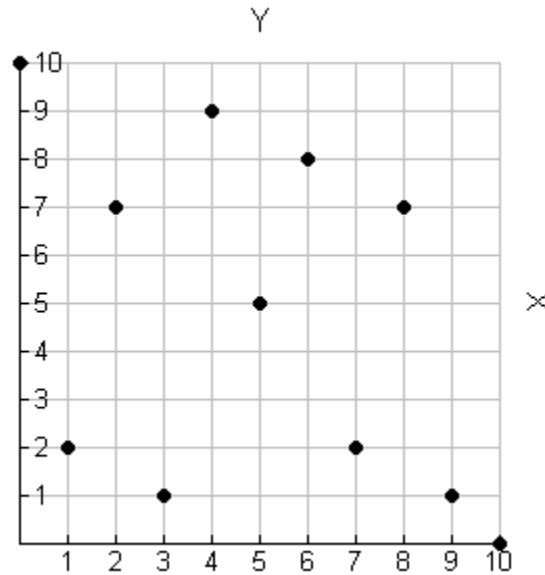


d.

7) An equation that shows the relationship between the volume of a cube (box) and the length of a side is given by $V(s) = s^3$ where V is the volume and s is the length.

Which answer below is true?

- a) s is the dependent variable
- b) V is the independent variable
- c) s is the independent variable
- d) there are no independent or dependent variables in this situation.



8) If a linear regression analysis were conducted on the above data, which answer below would best match the results?

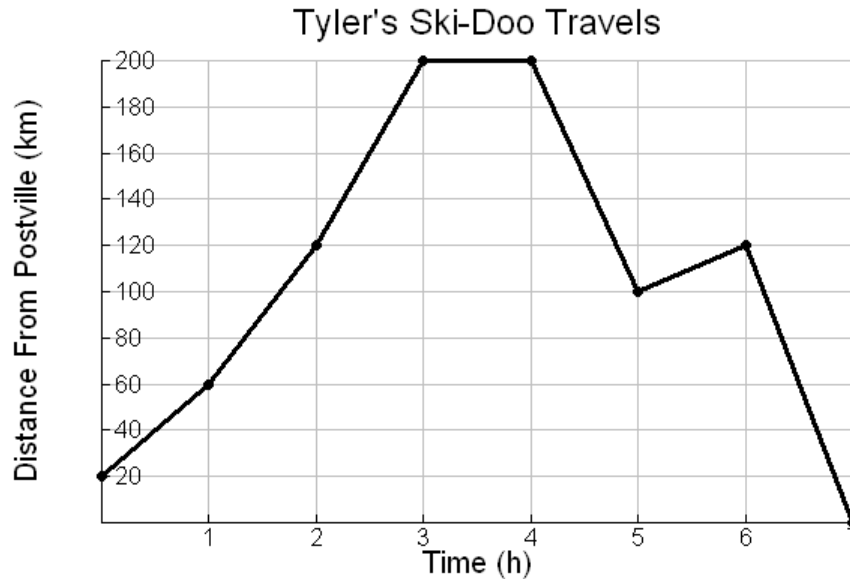
- a) The correlation coefficient is very close to 1 and a strong positive correlation with the data.
- b) The correlation coefficient is very close to -1 and a strong negative correlation with the data.
- c) The correlation coefficient is very close to 0 and a weak negative correlation with the data.
- d) The correlation coefficient is very close to 0 and a strong negative correlation with the data.

1	5
2	6
3	7
4	8

Part B Long Answer

Place all your workings on the space provided.

- 1) Tyler has decided to log his Ski-doo travels. His information is included on the graph below.



Write a paragraph describing his trip. Include in your discussion any relevant information like speeds, times and initial/final positions. (8 marks)

2) The speed of sound changes as the altitude (height above sea level) changes. Below is a table which contains the speed of sound at various altitudes. Assume h represents the altitude in thousands of feet and V represents the speed of sound in feet per second.

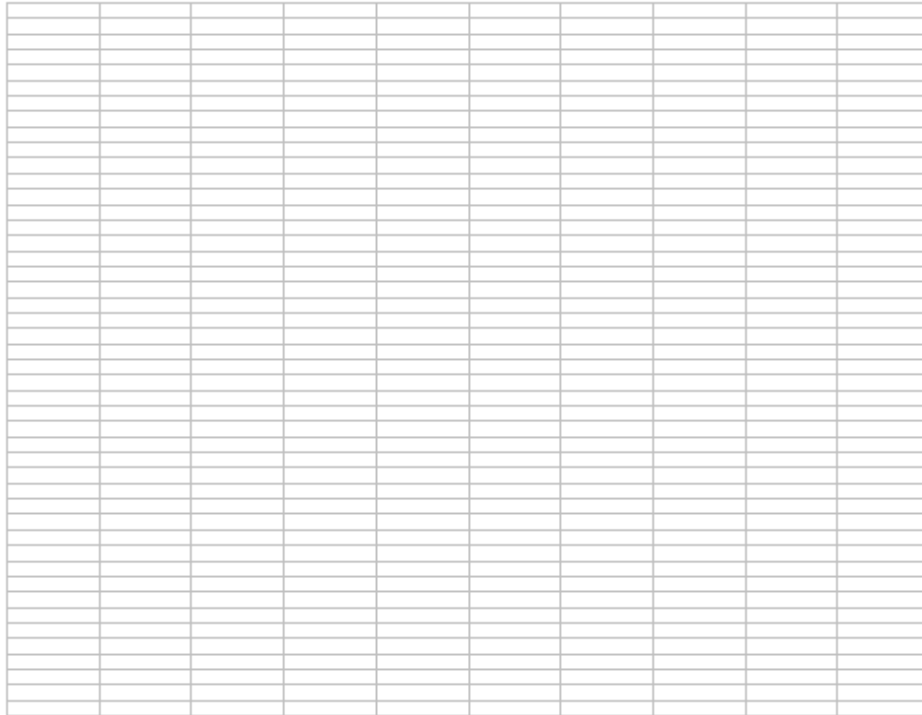
Altitude (h)	0	5	10	15	25	30	35
Speed of Sound (V)	1116	1097	1077	1057	1015	995	973

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

b) Draw a line of best fit and algebraically determine its equation. (6 marks)



- c) Reproduce the scatter plot from part a. Construct the median-median line for the data and show all workings. (8 marks)



- d) Using the equation for the line of best fit you obtained in part (b), find the speed f sound at 20,000 feet. What is this type of prediction called? (2 marks)
- e) Using the equation for the line of best fit you obtained in part (b), find the altitude at which the speed of sound will be 900 ft/sec. What is this type of prediction called? (2 marks)
- f) Find the equation for the line of best fit using the graphing calculator. Be sure to include all information that is obtained when you use the graphing calculator. (4 marks)

- 3) Below are two tables of data. For each table use linear, quadratic and exponential regression analysis to determine the best line or curve of best fit. Be sure to write 3 equations for each table and explain, using correlation coefficients, why the equation that you choose is the best. (18 marks)

Table 1

x	y
1	
2	
3	
4	
5	
6	

Linear Regression

r _____

r^2 _____

Equation _____

Quadratic Regression

R^2 _____

Equation _____

Exponential Regression

r^2 _____

Equation _____

Table 2

x	y
1	4
2	12
3	28
4	50
5	76
6	111

Linear Regression

r _____

Equation_____

r^2 _____

Quadratic Regression

R^2 _____

Equation_____

Exponential Regression

r^2 _____

Equation_____

- 4) A cup of coffee was placed inside a refrigerator whose temperature was slightly above 0°C . The temperature of the coffee was recorded over time and placed in the table below. Let T represent temperature in $^{\circ}\text{C}$ and m represent time in minutes.

Temperature $^{\circ}\text{C}$	100	54	35	21	12	7	4
Time (min)	0	5	10	15	20	25	30

- a) What is the independent variable? Dependent variable? (1 mark)
- b) Is the relationship linear, quadratic or exponential? Give reasons for your answer. Hint: Use the results from the regression analysis on the graphing calculator. (4 marks)
- c) What is the equation of the line of best fit? Write the equation using functional notation. (3 marks)
- d) Use your equation in part (b) to determine when what the temperature will be at 3 minutes. Show all workings. (3 marks)

5) For $f(x) = 2x + 1$ solve the following: (3 marks)

a) $f(8)$

b) x if $f(x) = 3$

6) For $m(w) = -3w^2 - 2w$ solve the following: (3 marks)

a) $m(-5)$

b) w if $m(w) = -8$

7) For $p(y) = 3(2)^y - 5$ solve the following: (3 marks)

a) $p(2.7)$

b) y if $p(y) = 19$