Title	Writing in the mathematics class
Author(s)	Berinderjeet Kaur
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Writing in the Mathematics Class

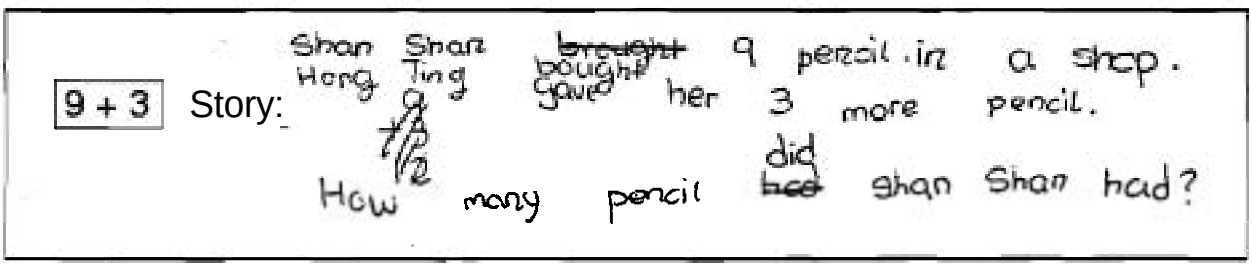
BERINDERJEET KAUR

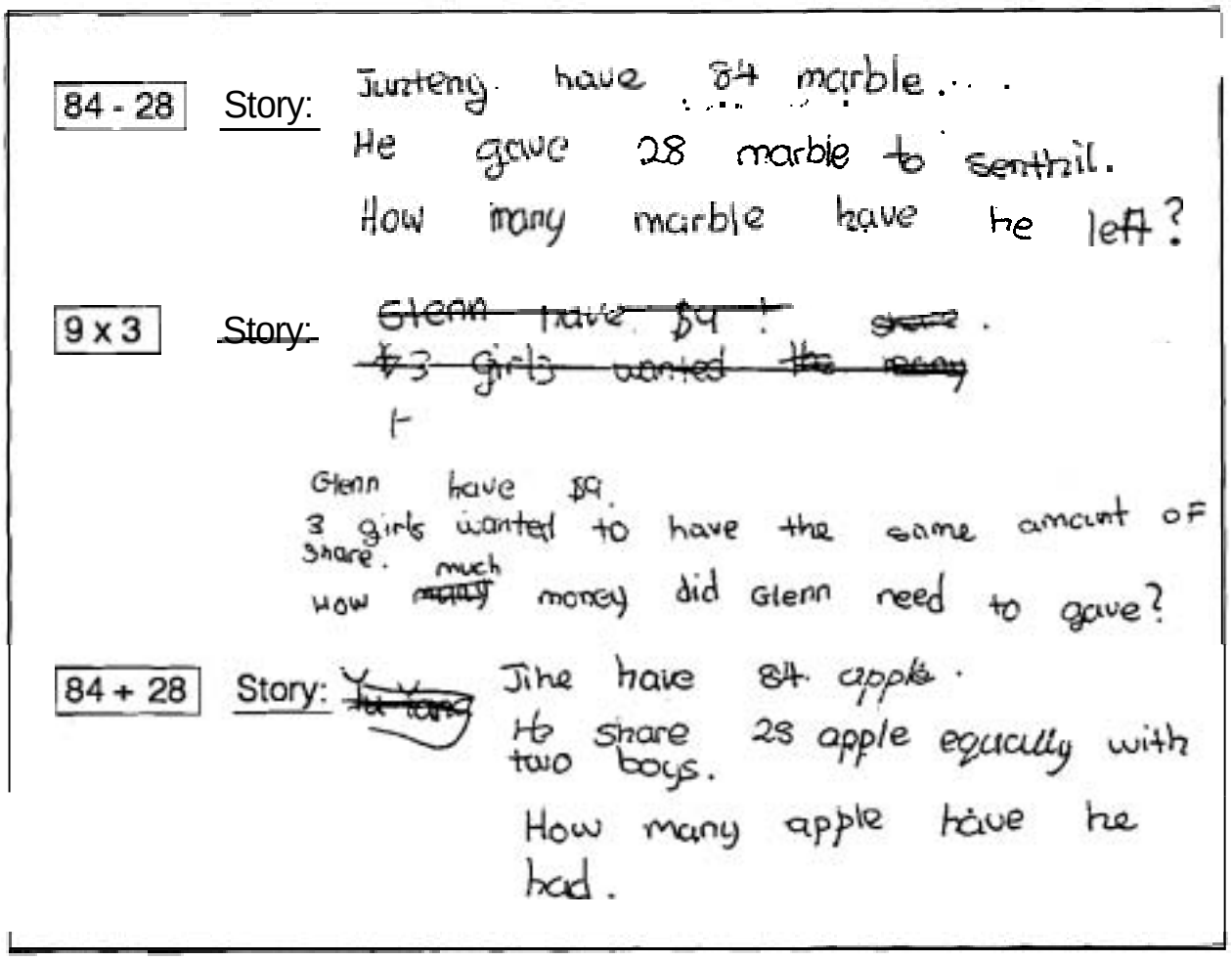
Mathematics is a powerful language for describing and analysing many aspects of our environment. Like any language, it involves learning new symbolic notations, and new 'grammatical rules' by which these symbols may be manipulated. Unfortunately, in mathematics, it is possible to learn these rules without understanding the underlying concepts to which they refer, and this often results in mathematics becoming a dull and unusable subject. When learning a language, pupils are indeed asked to learn a certain amount of grammar, but they are also given opportunities to express themselves using the language, both orally and through 'free' writing. In a similar way, it is often helpful to set aside the mechanical, grammatical side of mathematical language and spend some time during which the emphasis is on using *mathematics as a means of communication.*

Teachers can create possibilities for writing in Mathematics classes at all levels. The following are examples of some such occasions.

Level : Primary

Topic : Number Operations



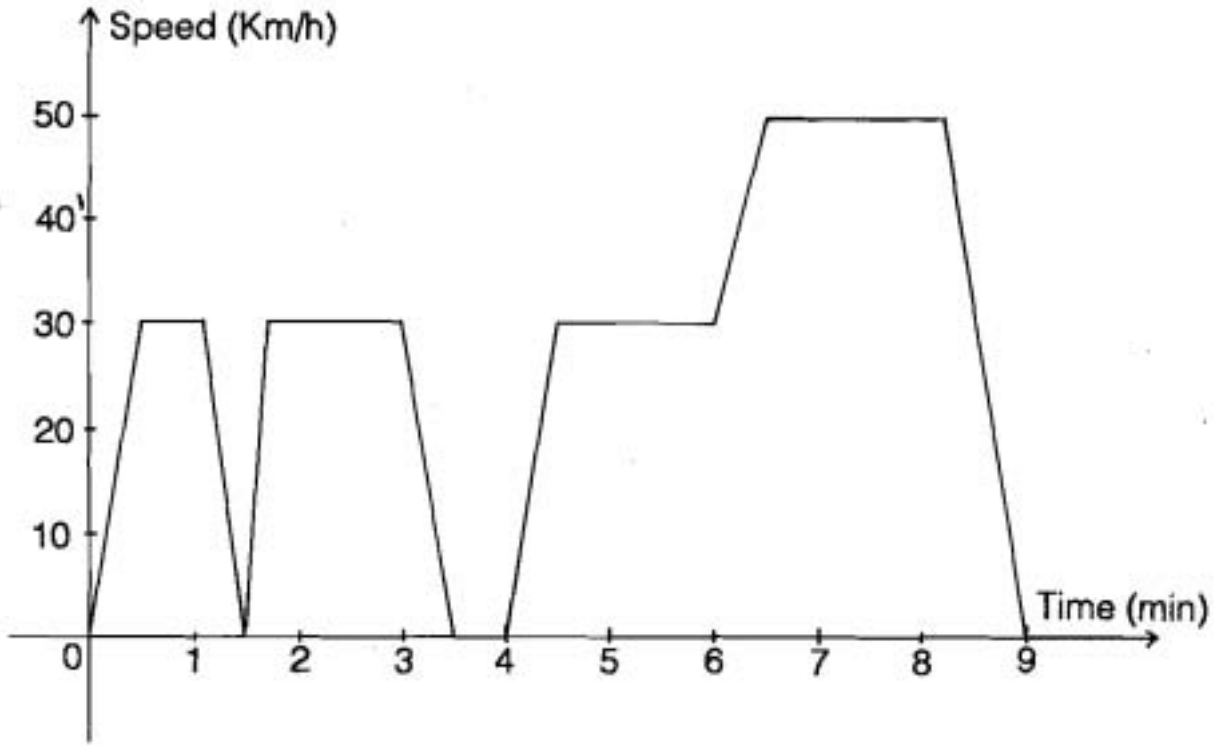


Level : Secondary

Topic : Graphs (Linear)

Question

A man is driving from home to work. The graph shows his speed at any time during his nine minute trip. Make up a story about his trip to explain the graph.



Mr. Test-tube, the famous biologist, was on his way to work one morning. He started his car and increased his speed to 30m/h and drove consistantly for about $1^1/_2$ min before stopping his car at a traffic junction. He started his car again and drove at a constant speed for 2 minutes, when he went over a bump, so he stopped his car to have a lookoutside. He saw an injured tortoise under his car and decided to bring it to his laboratory for an experiment. He started his car again and drove for 2 minutes at aconstant speed of 30m/h before spotting an eagle in the sky. He decided to bring the eagle down for yet another experiment so he accelerated to 50m/h and drove at that pace for about 2 mins before he shot the eagle. **As** he was driving an uncovered convertible, the eagle fell right on the car and he slowed down till he finally reached his workplace 9 min after leaving home.

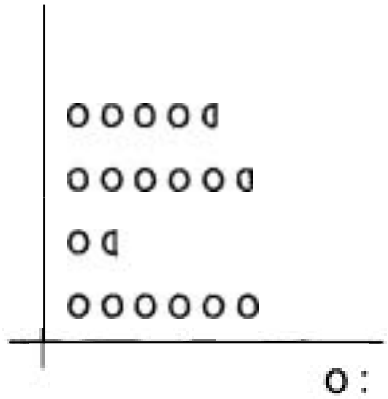
Level : Upper primary/Secondary

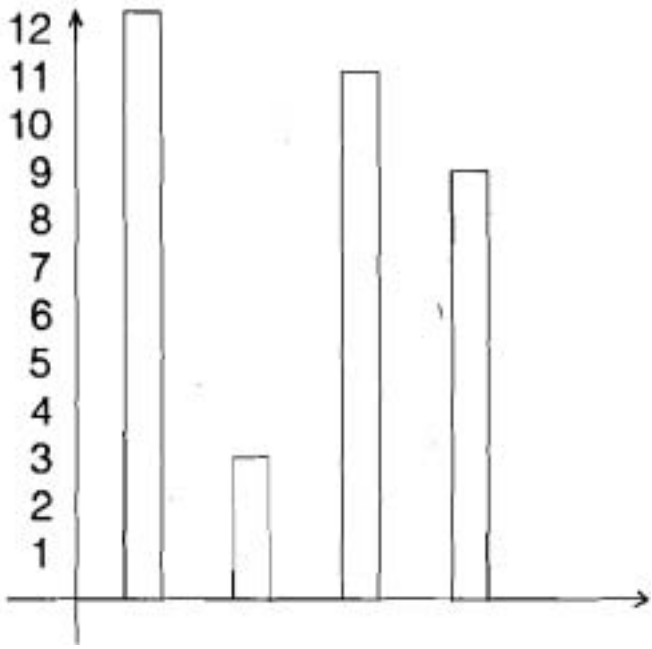
Topic : Data Handling – descriptive statistics

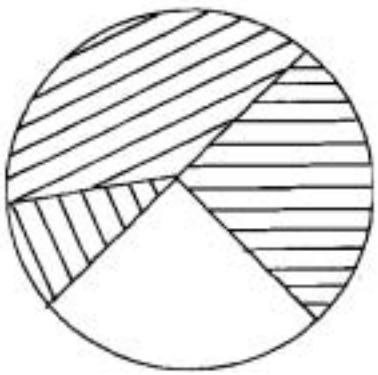
Question

Your group is given the following 3 graphical representations of some survey carried out by your teacher. Try to describe as best as you can the survey.

The graphical representations:



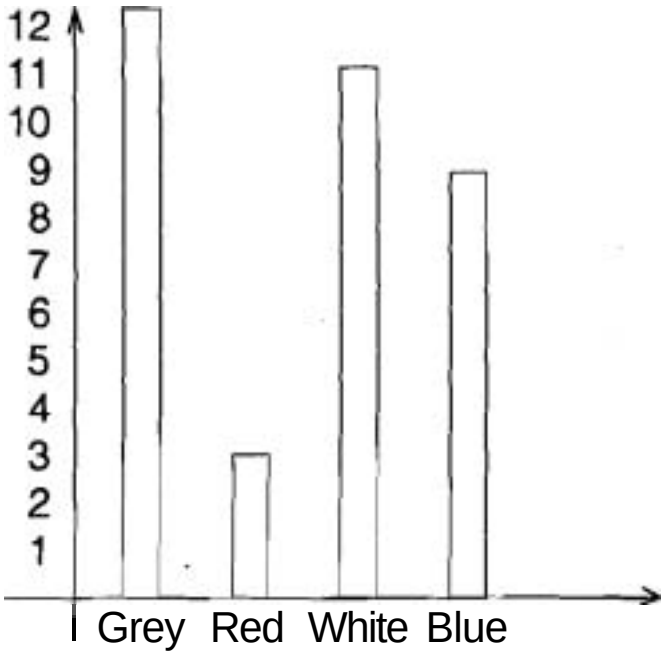




Group A : Response

Experiment: The number of cars at the carpark (near Block B) are counted according to colours, namely, red, white, blue and grey. The time was 9.30a.m. and date was 3-10-91

Results : grey : 12
red : 3
white : 11
blue : 9



Group B: Response

The pie chart reminded us of food and so we took a trip to the SRC canteen to see if we are able to collect data that would correspond to the statistics given to us.

The canteen consists of 4 main stalls. They are the Malay food stall, the Indian food stall, the fruits stall and the Chinese food cum drinks stall. From 11.30am to 11.40am on that particular day, we counted the number of students who patronised the various stalls and the data collected was closely related to that given to us. The following table is a summary of the results of our findings.

Stall	Number of customers
Chinese food/drinks	13
Fruits	4
Malay food	11
India food	8

Base on the data, we feel that it is highly probable that the statistics presented to us reflect the number of customers patronising the stalls at SRC canteen during a particular interval of time.

Level : Post-secondary (Junior College)

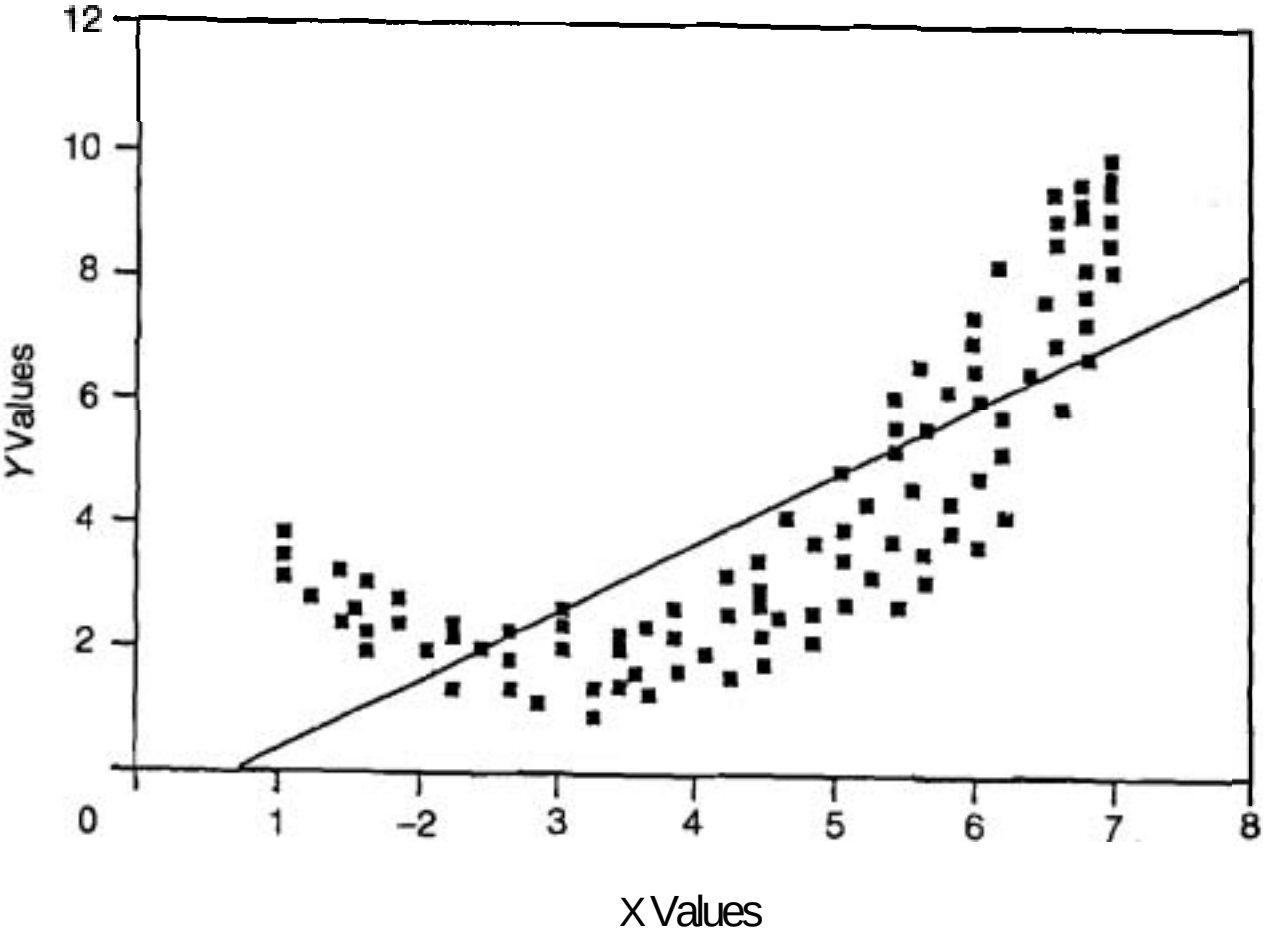
Topic : Statistics (Scatter Graphs)

Storey Writing with Scatter Graphs

Directions:

1. Label the X values and Y values with identifiers.
2. Write a brief newspaper story using the data.

Graph I



Story 1

Water Shock!

A recent survey by PUB showed that households with monthly income of $6000 and more chalk up a whopping sum of more than $600 per month on water bill (refer to Graph 1).

This is an alarming wastage of water in view of the recent drought in Singapore and neighbouring countries. Meteorologists predict that the drought will persist for the next few months. Hence there is an urgent need to educate people to conserve water.

Based on the survey, efforts to promote water conservation will be directed towards households with monthly income of $6000 and more. Tentative strategies include water rationing and additional charges for excessive usage. Details are still being looked into.

X-axis: PUB Bill (water) (in $100)
Y-axis: monthly household income (in $1000)

Story 2

Cure For Aids Suffer Setback

Bangkok– Last year's Nobel Prize winners Dr Leong Kok Kee and Dr Harvinder Singh of Singapore who won the prize for their drug "Cancero" in treating Cancer victims, are at it again finding a cure for Aids. Their new drug "Aido" have been tried here in the Royal Hospital of Bangkok on 100 Aids victims, but have not yielded any conclusive results.

To test the effect of the new drug, 100 patients infected by the Aids virus were examined before the drug was administered and given an initial score depending on the severity of the symptoms. After taking the drug they were examined again and given a final score. An increase in score represented an improvement. Results show that the "Aido" drug was successful for those who had low initial score or high initial score. In some cases it even had adverse effects.

In a brief Television interview, Dr Harvinder said, "We are very disappointed but the results have shed some new light into the complexities involved in treating the Aids virus." They said that they are returning to the Laboratory after the interview to work on the drug. Dr Leong added, "We can't let this setback stop us now especially when we feel we are almost there. Anyway, where would we be if we had let every setback stop us from carrying on, certainly "Cancero" would not have been discovered."

The preceding examples all illustrate how writing in the mathematics class can be made a part of the mathematics curriculum across all levels.

'Tell a Story' (Kaur 1992) type of sessions can help create a classroom environment which encourages thoughtful discussions as pupils try to comprehend or communicate information presented in mathematical form.

Group and pair work is suggested for such exercises as pupil-pupil discussion is a vital part of mathematics teaching at all levels (Cockcroft 1982).

However when pupils are individually made to write in learning logs or their journals (McIntosh 1991) the purpose is for them to reflect on what they are learning and to learn while they are reflecting on what they are learning.

The written work produced will inevitably vary in creativity, accuracy of interpretation and language presentation thereby making the whole exercise a fruitful one. Unlike computational exercises there are no complete right or wrong answers to be marked in such exercises but rather insights to be gained as to the conceptual understanding and application of knowledge taught.

For pupils to be able to relate mathematics taught in the classroom to the environment and living, they must be given the opportunities to use mathematics as a means of communication. The Cockcroft report emphasises the need for such skills in many of its recommendations, one of which is paragraph **34;** "Most important of all is the need to have sufficient confidence to make effective use of whatever mathematical skill and understanding is possessed, whether this be little or much".

References

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McIntosh, M.E. (1991) No Time for Writing in Your Class? ***Mathematics Teacher,*** U.S.A., 84:6 pp 423-433.