DEPARTMENT OF EDUCATION

UPPER SECONDARY SCHOOL CERTIFICATE EXAMINATIONS

GENERAL MATHEMATICS

PAPER 2

Friday

25 October 2013

Time allowed:

2 hours 30 minutes

(8:00am – 10:30 am)

NO EXTRA TIME

(NO OTHER TIME)

MG_2

INSTRUCTIONS TO CANDIDATES

To be read by the external invigilator to all candidates

1. The subject code for **General Mathematics** is **4**.
2. There are **4** printed pages in the question booklet and **6 printed** pages in the answer booklet.
3. The answer booklet is enclosed in the centre of this booklet. Take out the answer booklet now.
4. Check that you have the correct number of pages.
5. Write your 10 - digit candidate number, your name and your school name in the spaces provided in the answer booklet.
6. This paper contains 10 Questions worth 5 marks each.

   Total: 50 marks

   Answer **ALL** questions.

7. Calculators, rulers and protractors are allowed.
8. Answer all questions on the answer sheet. Answers on any other paper including rough work paper and the question paper **will not be marked**
9. ALL working must be shown step by step to get full marks. Students may lose marks for writing down final answers only.
10. Enough space has been allocated for the answer to every question. Questions must be answered in the spaces allocated on the Answer booklet. Answers all over the answer booklet may not be marked.
11. Rubbers and Correctional Fluid are not allowed on the answer sheet. Where you have made an error, cross out all the working and start again on a new line.
12. Graphical Calculators are not permitted.

Penalty For Cheating Or Assisting To Cheat In National Examinations Is Non-Certification.

DO NOT TURN OVER THE PAGE

AND DO NOT WRITE

UNTIL YOU ARE TOLD TO START.

QUESTION 1

Twenty men are to go on a foot patrol. Food rations for them will last ten days. The team leader changes his mind and now 40 men will patrol with the same amount of rations.

a) Let y equal the number of days and x the number of men.

Find the formula that connects these two variables.

(3 marks)

b) How long will the food last with 40 men?

(2 marks)

QUESTION 2

The revenue function of a business is $R(x) = 50x$ where x is the number of units sold. The expenditure function is $E(x) = 40x + 200$.

a) Write the expression for the profit function. Let $P(x)$ be the profit function.

(2 marks)

b) If 100 items were sold, what is the profit?

(1 mark)

c) Sketch the graph of the profit for $x = 20$ and $x = 50$.

(2 marks)

QUESTION 3

Willy's gross pay is K850.

a) He is taxed 12%. How much is it?

(1 mark)

b) He contributes 7% to Nasfund. How much is it?

(1 mark)

c) His loan deduction is 5%. How much is it?

(1 mark)

d) He spends K500 on food and other items for the family. How much is left from all these expenses and deductions?

(2 marks)

QUESTION 4

Boyd collects data on the time taken to complete a task by 56 persons and constructs the following frequency distribution.

Time taken (Minutes)	Number of Persons
16	7
17	11
18	14
19	13
20	8
21	3

a) How many persons took less than or equal to 20 minutes to complete a task?

(2 marks)

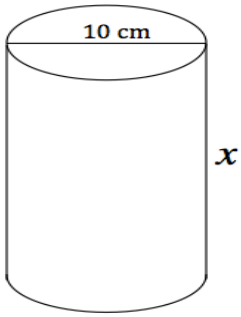
b) What is the average time taken to complete a task?

(3 marks)

QUESTION 5

a) If the volume of the cylinder shown below is 854 cm^3.

What is x?

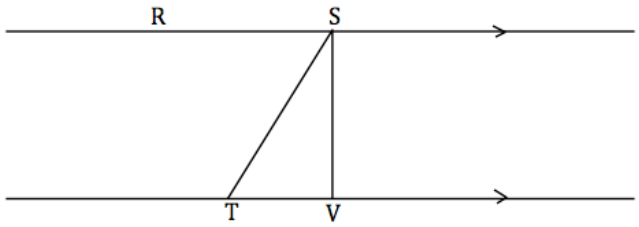


(2 marks)

b) In this figure, RS is parallel to TV.

$\angle$ RST = 69.4 degree, $\angle$ TSV = 20.6 degree

VS = 40 metres and TV = 15 metres.



What is TS?

(3 marks)

QUESTION 6

a) The scale on a map is 1 : 10, 500. If the distance from point A to point B is 62, 000 km, what is the distance from point A to point B on the map?

(2 marks)

b) A tourist standing on top of a building 23 meters high near Hong Kong harbour observes that the angle of depression of a boat on the water is 38 degrees.

How far is the boat from the base of the building?

(3 marks)

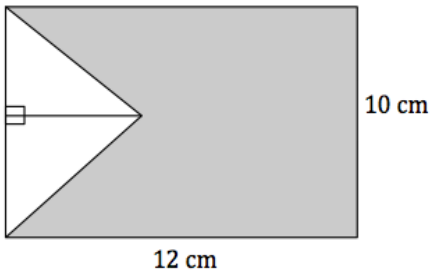
QUESTION 7

a) Ale loses 2.1kg of his weight in the first week of his diet. This was a 2.5% loss in weight.

What was his weight before he went on diet?

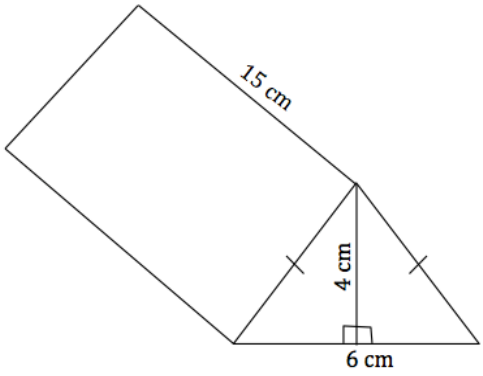
(1 mark)

b) Find the area of the shaded region.



(2 marks)

c) Calculate the surface area of the triangular prism.



(2 marks)

QUESTION 8

a) Martin has taken a bank loan of K500, 000 at a flat interest rate of 2% per annum for 15 years to buy a new house. The loan application fee is K750 in addition to the loan amount requested.

(i) How much interest will he pay the bank?

(1 mark)

(ii) How much will he repay monthly?

(1 mark)

b) The compound interest formula is $A = P(1+r)^n$ where: -

A = investment return after n years
r = interest rate per year
P = Principal

(i) If the investment return is K19, 000 at the end of 5 years and the principal amount is K15, 000, what is the interest rate compounded per annum? (*Answer to 3 decimal places*).

(1 mark)

(ii) How long will it take to make an investment of K25, 000 at the rate of 7% compounded annually if the principal is K12, 500? (*Answer to 1 decimal place*)

(2 marks)

QUESTION 9

Refer to the data in the table to answer the questions that follow:

x	y
5	21
10	22
12	28
15	31
19	30
25	36

$\sum x = 86$, $\sum y = 168$, $\bar{x} = 14.3$, $\bar{y} = 28$,

$\sum xy = 2,596$, $\sum x^2 = 1,480$, $\sum y^2 = 4,866$

a) Compute the regression coefficient. The formula is:

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum x\right)^2}$$

(1 mark)

b) Plot the data on the grid provided and comment on the diagram.

(2 marks)

c) Compute the correlation coefficient using the formula

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{\left(n\sum x^2 - \left(\sum x\right)^2\right)\left(n\sum x^2 - \left(\sum x\right)^2\right)}}$$

(2 marks)

QUESTION 10

a) Solve the inequality;

$$\frac{x}{2} - \frac{4x}{3} \geq 5$$

(1 mark)

b) Sketch the exponential function $y = 2^x - 8$. Show the intercepts and the asymptote(s).

(2 marks)

c) Find the points of intersection of the line $y = x - 1$ and the parabola $y = x^2 - 3x - 6$

(2 marks)

END OF EXAMINATION