DEPARTMENT OF EDUCATION

UPPER SECONDARY SCHOOL CERTIFICATE EXAMINATIONS

GENERAL MATHEMATICS

PAPER 2

Friday

30th October 2015

Time allowed:

2 hours 30 minutes

(8:00am – 10:30 am)

NO EXTRA TIME

(NO OTHER TIME)

MG2

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 using either black or blue ink only.
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 written 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. Correctional Fluid is 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

a) When 9 is subtracted from 3 times a certain number, the result is 36.

What is this number?

(1 mark)

b) The sum of two numbers is 49 and the difference between these two numbers is 9.

What are these two numbers?

(4 marks)

QUESTION 2

w is directly proportional to t^2 and inversely proportional to z^3. When $t = 2$ and $z = 4$, $w = 14.4$.

Find w when $t = 7$ and $z = 11$.

(5 marks)

QUESTION 3

Calculate the standard deviation of this distribution, which relates to the ages of a company's employees.

Age (yrs)	25 - 34	35 – 44	45 - 54	Total
Frequency	17	41	53	111

(5 marks)

QUESTION 4

The table shows a week's wages of a company to her employees. The normal weekly hours is 45.

Name	Hours worked	Rate/hour
Norman	45	10
Joyce	40	15
Jeff	42	20
Vincent	39	18
Flora	44	8

a) What is the company's normal weekly wages to its employees?

(2 marks)

b) How much did the company pay in wages to all its employees this week?

(2 marks)

c) How much less did the company pay its employees this week?

(1 mark)

QUESTION 5

A hunter leaves point A and walks 120 metres due West to a point B. He then walks 150 metres due North to a point C, and finally 80 metres on a bearing of 320° to a point D.

a) Sketch the path of the hunter.

(2 marks)

b) What is the angle BCD?

(1 mark)

c) What is the distance between points B and D to the nearest metre?

(2 marks)

QUESTION 6

The radius of a right circular cone is 100 mm and its height is 24 cm.

Calculate its

a) base area in cm squared correct to one decimal place.

(2 marks)

b) curved surface area correct to a whole mm squared.

(2 marks)

c) volume correct to a whole mm cube.

(1 mark)

QUESTION 7

An item purchased for K85, 000 depreciates at a flat rate of 10% each year.

a) Calculate the amount the item would depreciate each year.

(1 mark)

b) Calculate the book value of the item after 4 years.

(2 marks)

c) Calculate the scrap value of the item if it has a useful life of 8 years.

(2 marks)

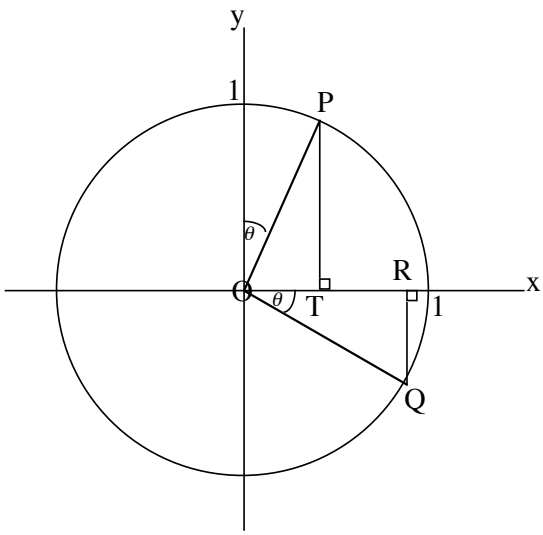
QUESTION 8

a) Find the sum of the internal angles and the sum of the external angles of a regular polygon.

(2 marks

b) Prove that in this diagram where O is the centre of a unit circle, the triangles POT and QOR are congruent.

(3 marks)



QUESTION 9

On the same coordinate axis, sketch the line $y - 5x - 2 = 0$ and the parabola $y = 2x^2 - 4x - 30$.

Shade the region bounded by the line, the parabola and $x \leq 0$.

(5 marks)

QUESTION 10

As an economics project, Peter collected data on the prices (P kina per kilogram) and quantities (Q kilograms) of rice sold by the four stores in his village during one week. He then summarised the data as follows:

$$\sum P = 15.88, \qquad \sum Q = 419$$

$$\sum PQ = 1{,}657.92 \qquad \sum P^2 = 63.0950$$

$$\sum Q^2 = 44{,}549 \qquad n = 4$$

a) Find the regression equation of quantity sold on price by using the formulae:

$$b = \frac{n\sum PQ - \sum P \sum Q}{n\sum P^2 - \left(\sum P\right)^2} \text{ and } a = \overline{Q} - b\overline{P}$$

where $Q = a + bP$.

(4 marks)

b) Predict the quantity of rice that would be sold by a new store that begins selling at K3.75 per kilogram.

(1 mark)

END OF EXAMINATION

HIGHER SCHOOL CERTIFICATE EXAMINATIONS 2015

FORMULAE SHEET FOR GENERAL MATHEMATICS

MENSURATION

Arc Length $L = \frac{\theta}{360} 2\pi r = \frac{\theta}{360} \pi d$

Area of Sector $A = \frac{\theta}{360} \pi r^2$

Surface Area of Cylinder $A = 2\pi r^2 + 2\pi rh$

Surface Area of Sphere $A = 4\pi r^2$

Curved Surface Area of Cone $A = \pi rl$

Volume of Sphere $A = \frac{4}{3} \pi r^3$

Volume of Cone $V = \frac{1}{3} \pi r^2 h$

Volume of Pyramid $V = \frac{1}{3} Ah$

Interior Angle Sum of Polygon $S_n = (n-2) \times 180$

TRIGONOMETRY

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $c^2 = a^2 + b^2 - 2ab\cos C$

Area of Triangle $A = \frac{1}{2} ab\sin C$

Conversion $\pi^c = 180°$

Arc Length $L = r\theta^c$

Area of Sector $A = \frac{1}{2} r^2 \theta^c$

Area of Minor Segment $A = \frac{1}{2} r^2 \left(\theta^c - \sin\theta°\right)$

ALGEBRA

Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

INTEREST

Compound Interest $A = P\left(1 + \frac{r}{100}\right)^n$

Depreciation $A = P\left(1 - \frac{r}{100}\right)^n$

STATISTICS

Mean Deviation $\frac{\sum |x - \bar{x}|}{n}$

Variance $\sigma^2 = \frac{\sum \left(x - \bar{x}\right)^2}{n-1} = \frac{\sum fx^2}{\sum f - 1} - \left(\bar{x}\right)^2$

General Mathematics '15
PAPER 2 Answer Booklet

Write your province and school codes, candidate number, your name and school name in the space provided below.

Year		Province		School Code			Candidate No.			
1	5									

Candidate Name. _____

School Name. _____

This answer booklet has sections created for each question.

All answers must be written in this booklet and in the appropriate spaces provided.

	SCORE	Marker 1	Marker 2
Question 1			
Question 2			
Question 3			
Question 4			
Question 5			
Question 6			
Question 7			
Question 8			
Question 9			
Question 10			
TOTAL			

QUESTION 1

a)

(1 mark)

b)

(4 marks)

total for this question Marker 1 Marker 2

QUESTION 2

(5 marks)

total for this question Marker 1 Marker 2

QUESTION 3

(5 marks)

total for this question [ ] Marker 1 Marker 2

QUESTION 4

a)

(2 marks)

b)

(2 marks)

c)

(1 mark)

total for this question [ ] Marker 1 Marker 2

QUESTION 5

a)

(2 marks)

b)

(1 mark)

c)

(2 marks)

total for this question ☐ Marker 1 Marker 2

QUESTION 6

a)

(2 marks)

b)

(2 marks)

c)

(1 marks)

total for this question ☐ Marker 1 Marker 2

QUESTION 7.

a)

(1 mark)

b)

(2 marks)

c)

(2 marks)

total for this question ____ Marker 1 Marker 2

QUESTION 8.

a)

(2 marks)

b)

(3 marks)

total for this question ____ Marker 1 Marker 2

QUESTION 9.

(5 marks)

total for this question Marker 1 Marker 2

QUESTION 10

a)

(4 marks)

b)

(1 mark)

total for this question Marker 1 Marker 2