DEPARTMENT OF EDUCATION

UPPER SECONDARY SCHOOL CERTIFICATE EXAMINATIONS

GENERAL MATHEMATICS

Paper 1

Monday

13th October 2014

Time allowed:

2 hours and 30 minutes

(8:00am – 10:30 am)

NO EXTRA TIME

(NO OTHER TIME)

Candidates are advised to fully utilise the allocated time

MG1

INSTRUCTIONS TO CANDIDATES

To be read by the external invigilator to all candidates.

1. The code for General Mathematics is **4.**
2. There are **7** printed pages in the question booklet.
3. An Electronic Answer Sheet for Part A, 2 pages Part B Answer Booklet and a 1 page formula sheet are inserted in the question booklet.
4. There are two parts to this paper. Answer **ALL** questions

   Part A: Multiple Choice (Questions 1 – 30) 30 marks

   This section will be electronically marked.

   All answers to the Multiple Choice Part MUST be answered on the ELECTRONIC ANSWER SHEET provided.

   Carefully following the instructions, fill in your Candidate Information and Subject Information.

   Choose A or B or C or D from the alternatives given and use a HB pencil to shade in the correct letter to each question on the Electronic Answer Sheet.

   If you make a mistake, rub the shading out completely using an eraser and shade in your correct alternative clearly.

   Part B: Short Answer (Questions 31 – 50) 20 marks

   Write your name, your school name and your 10-digit candidate number on the Part B Answer Sheet provided.
5. You are required to write only the correct answer in the space provided on the Answer Sheet
6. Calculators may be used.
7. Answer all questions on the answer sheet. Answers on any other paper including rough work paper and the question paper **will not be marked**.
8. Correction Fluid is not allowed on the answer sheet. Where you have made an error, cross it out and start on a new line.
9. 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.

PART A: MULTIPLE CHOICE (QUESTIONS 1 to 30) 30 MARKS

Answer each question by shading in with HB pencil, the circle directly under the correct alternative A, B, C or D. If you make a mistake, rub it out completely using an eraser rubber and shade the correct answer on the Electronic Answer Sheet.

QUESTION 1

520 metres is equivalent to

A. $0.52\ km$ B. $520\ cm$

C. $5.2\ km$ D. $5{,}200\ mm$

QUESTION 2

The graph of the equation $g^2 + 3h = 11$ is

A. exponential B. linear

C. parabolic D. hyperbolic

QUESTION 3

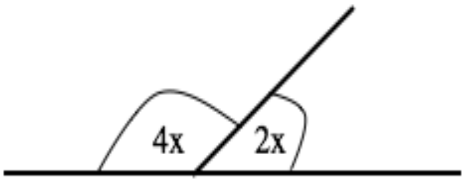
Which of the following PNG artefacts cannot be tessellated?

A. Bilum B. Basket

C. Bamboo blind D. Wood carving

QUESTION 4

The value of x in the diagram is



A. 180° B. 90°

C. 45° D. 30°

QUESTION 5

A car depreciated at an annual rate of 10%. If the car cost K75, 000 when new, how much is the car worth after 4 years?

A. K25, 792.50 B. K34, 807.50

C. K49, 207.50 D. K109, 807.50

QUESTION 6

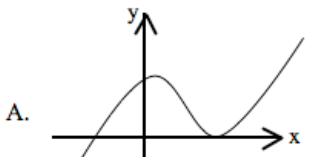
Jacob's base salary for 80 hours is K720. Overtime is paid for at time-and-a-half. If he is paid K828 in a certain pay period, how many overtime hours did he work?

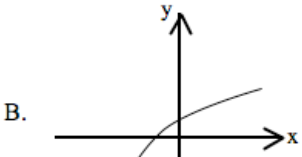
A. 9 hours B. 8 hours

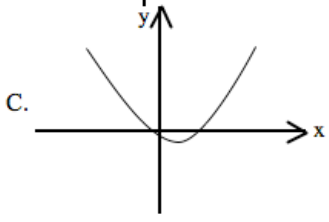
C. 7 hours D. 6 hours

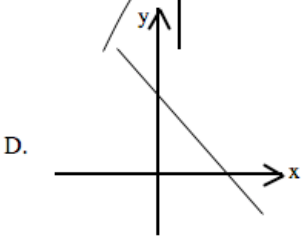
QUESTION 7

Which of the following graphs relates to an exponential equation?

A.


B.


C.


D.


QUESTION 8

A car travels 6 km on two litres of petrol. How far will the car travel on 5 litres?

A. 3 km B. 6 km

C. 12 km D. 15 km

QUESTION 9

What is the actual distance in metres between two points that are 6.3 cm apart on a map whose scale is 1:1000 is

A. 6, 300 B. 630

C. 63 D. 6.3

QUESTION 10

The range of the data set {11, 32, 17, 41, 19, 8, 63, 28} is

A. 17 B. 63

C. 8 D. 55

QUESTION 11

Kosta earns K1, 400 per month. His expenditure per month is

Phone bill:	K100
Water bill:	K100
Insurance:	K50
Rent:	K400
Food:	K400

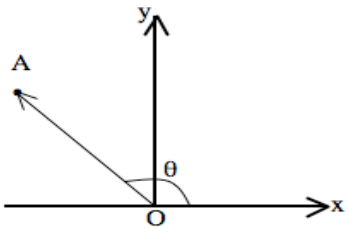
His annual saving is

A. K420 B. K1, 200

C. K350 D. K4, 200

QUESTION 12

In the diagram θ = 135°, the vector $\overline{OA}$ is



A. $-i+j$

B. $-i-j$

C. $i-j$

D. $i+j$

QUESTION 13

For the following frequency distribution,

Class	30-39	40-49	50-59	60-69	Total
Frequency	17	26	82	30	155

the percentage of values below 60 is

A. 53 B. 68

C. 81 D. 90

QUESTION 14

A woman borrows K80, 000 to start a business. The bank charges 20% interest for the duration of the loan repayment period. How much would she pay per month if she is to repay the loan in two years?

A. K400 B. K2, 400

C. K4, 000 D. K16, 000

QUESTION 15

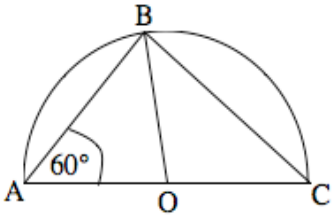
A class of 53 students has 31 males. If a student is selected at random from the class, the probability that the selected student is female is

A. 21 percent B. 50 percent

C. 42 percent D. 58 percent

QUESTION 16

In the given semi-circle, centre O, $\angle BAO = 60°$. The triangle ABC is



A. right-angled

B. isosceles

C. equilateral

D. scalene

QUESTION 17

From a point on a power post 9 metres above ground level, the angle of depression of Fred's head is 30 degrees. How far is Fred from the power post, if he is 1.6 metres tall.

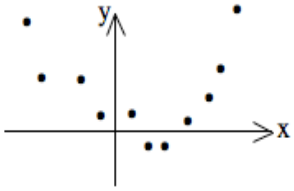
A. 8.54 m B. 10.39 m

C. 12.82 m D. 15.59 m

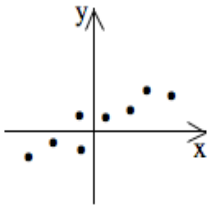
QUESTION 18

Which of the following scatter diagrams relates to a data set in which the variables are negatively linearly correlated?

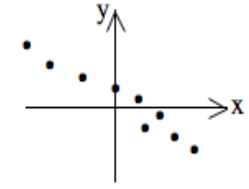
A.



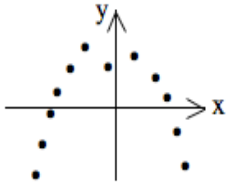
B.



C.



D.



QUESTION 19

In a sale, a discount of 30% was allowed on the marked price of a mattress. A customer paid K250 for the mattress. What was its price before the discount?

A. K833.33 B. K75

C. K175 D. K357.14

QUESTION 20

The solutions of the simultaneous equations $6m + 5n = 28$ and $7 - m = 2n$ are

A. $m = 2$ *and* $n = 3$

B. $m = -3$ *and* $n = 2$

C. $m = 3$ *and* $n = 2$

D. $m = 3$ *and* $n = -2$

QUESTION 21

If a card is drawn at random from a standard pack of 52 playing cards, the probability that it is a Jack OR a Diamond is

A. 0.25 B. 0.31

C. 0.02 D. 0.75

QUESTION 22

K2, 000 is invested at 5% compounded annually.

What is the investment value after 5 years?

A. K2, 540 B. K1, 255

C. K255 D. K2, 552.56

QUESTION 23

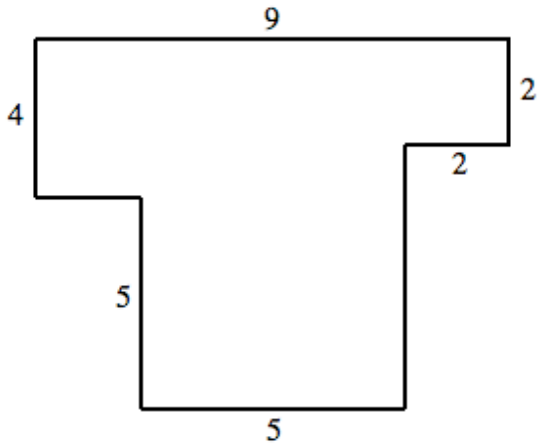
The sum of the roots of $x^2 - 3x - 18 = 0$

A. – 3 B. 3

C. 6 D. 9

QUESTION 24

The lengths in this diagram are in centimetres. The area of the shape is



A. 43 cm^2 B. 49 cm^2

C. 57 cm^2 D. 58 cm^2

QUESTION 25

The solutions of the equation $t^2 + 4t = 21$ are

A. $t = 3 \ \ or \ \ t = -7$

B. $t = 7 \ \ or \ \ t = -3$

C. $t = 3 \ \ or \ \ t = 7$

D. $t = -3 \ \ or \ \ t = -7$

QUESTION 26

The mean of the data set (42, 53, 16, 21, 31) is

A. 32.6 B. 18.9

C. 2.4 D. 66.6

QUESTION 27

An equivalent expression of $y = 5^x$ is

A. $y = \log_5 x$ B. $x = \log_5 y$

C. $5 = \log_x y$ D. $x = \log_y 5$

Question 28

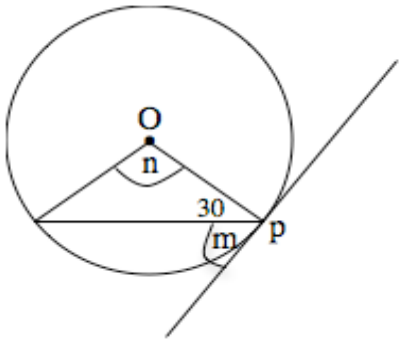
In rectangle ABCD, $\overline{CB}$ and $\overline{AB}$ represents vectors u and v respectively and vector $\overline{AC}$ is represented in terms of u and v as

A. $v + u$ B. $v - u$

C. $-v - u$ D. $-v + u$

QUESTION 29

In the diagram O is the centre of the circle. The size of the angle labelled 'm' is

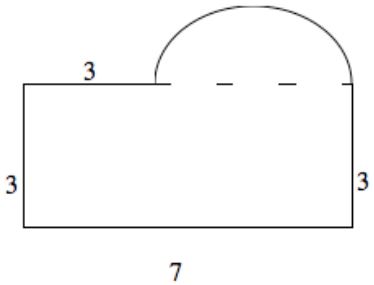


A. 30° B. 60°

C. 90° D. 110°

QUESTION 30

The perimeter of this figure with a semi circular top is



A. $16 + \pi$ B. $16 + 2\pi$

C. $16 + 3\pi$ D. $16 + 4\pi$

SECTION B: SHORT ANSWERS

Carefully work out your answers and write down your final answers only in the space provided on your Section B Answer booklet.

QUESTION 31

The standard deviation of a data set is 4.2. What is the variance of the data set?

QUESTION 32

Express 0.00052 in standard index form.

QUESTION 33

If $w = 42 - 6.1\left(8^{v}\right)$, what is the value of w when $v = 3$?

QUESTION 34

The estimated regression of s on t is: $s = 15 - 2.4t$. Predict the value that s would have if $t = 3.8$.

QUESTION 35

Find three consecutive whole numbers whose average is 27.

QUESTION 36

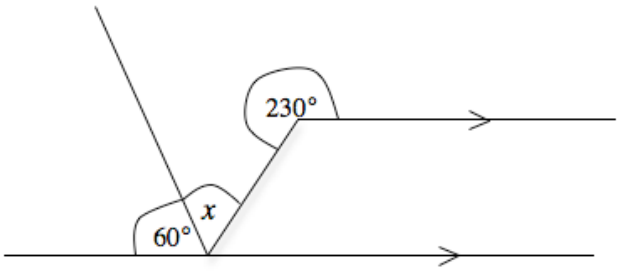
The principle of K2, 000 is invested at the rate of 8% per annum. How many years of investment will return a simple interest of K720?

QUESTION 37

The first quartile and the inter-quartile range of a data set are 17.1 and 28.3 respectively. What is the third quartile?

QUESTION 38

Find the value of x in the diagram below.



QUESTION 39

Solve the simultaneous equations $2g + 7h = 13$ and $6h - 4g = 14$. Write your answers as decimals.

QUESTION 40

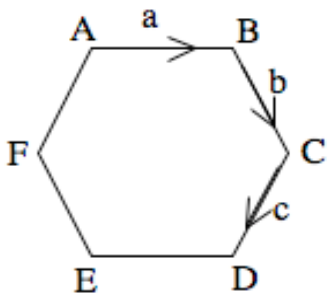
The incomes of Jude and Jake are in the ratios of 2:5. If Jake earns K800, how much does Jude earn?

QUESTION 41

A young man buys a motorbike for K2, 500 on instalment. A deposit of 20% is paid and interest of 15% is charged on the balance. How much interest will he pay?

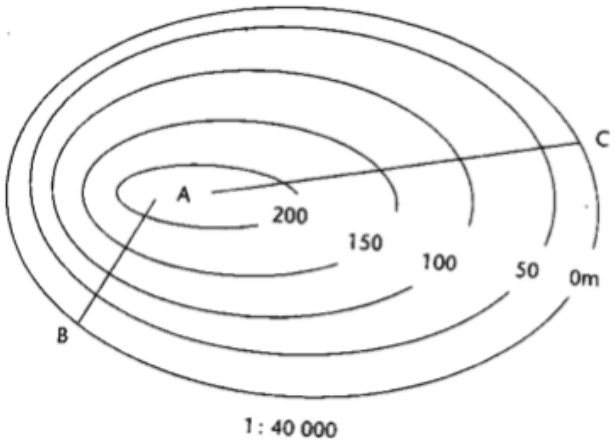
QUESTION 42

Let ABCDEF be a regular hexagon.



Express vector DF in terms of a, b and c.

Question 43 and 44 refer to the diagram below.



A contour of top town is shown above. Points B and C are at sea level and the top of the hill A has a altitude of 210 metres.

To reach the top of the hill, Tom has the choice of two paths BA and CA.

QUESTION 43

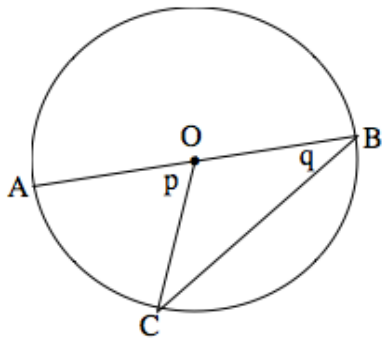
Which part would be the steepest walk to the top of the hill?

QUESTION 44

Justify your answer to **Question 43**.

QUESTION 45

Find the size of angle p, given q = 30°. O is the centre of the circle.



QUESTION 46

K1, 000 is invested at 5% compounded per annum. Calculate the interest earned after four years.

QUESTION 47

A bag contains three red, two blue and four black marbles.

One marble is drawn at random from the bag. What is the probability that the selected is blue?

QUESTION 48

Shade the region $z \leq 2p + 5$, showing where the boundary cuts the axes.

QUESTION 49

Jeff makes a loss of 20% as a result of selling his car for K15, 000. How much did he pay for the car?

QUESTION 50

A ship sails for 100 km on the bearing 030°. It sails for another 200 km on the bearing of 170°.

Draw the diagram showing the path of the ship.

END OF EXAMINATION

GENERAL MATHEMATICS - PAPER 1
PART B - ANSWER BOOKLET

Write your name, your province and school code and your candidate number correctly and clearly in the space provided below.

Year		Province		School			Candidate No		
1	4								

Candidate Name: _____

School Name: _____

This answer booklet is for you to write the answers to Part B only.

All Multiple Choice Answers should be on the Electronic Mark Sheet.

All answers must be written neatly in the appropriate spaces in this booklet. **Answers written elsewhere on the question paper (or any other paper) will not be marked.**

TOTAL SCORE

Recorded by: _____

Checked by: _____

ANSWERS TO PART B ONLY

Question 31	
Question 32	
Question 33	
Question 34	
Question 35	

Question 41	
Question 42	
Question 43	
Question 44	
Question 45	

Question 36	
Question 37	
Question 38	
Question 39	
Question 40	

Question 46	
Question 47	
Question 48	
Question 49	
Question 50	

HIGHER SCHOOL CERTIFICATE EXAMINATIONS 2014

FORMULAE SHEET FOR GENERAL MATHEMATICS

MENSURATION

Arc Length	$L = \frac{\theta}{360} r = 2\pi r$
Area of Sector	$A = \frac{\theta}{360} 2\pi r^2$
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	$V = \frac{4}{3}\pi r^3$
Volume of Cone	$V = \frac{1}{3}\pi r^2 h$
Volume of Pyramid	$V = \frac{1}{3}Ah$
Interior Angles of Polygon	$s_n = (n-2)\text{x } 180^o$

TRIGONOMETRY

Sin 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	$\pi^c = 180^o$
Arc Length	$L = r\theta^c$
Area of Sector	$A = \frac{1}{2}r^2\theta^c$
Area of Minor Segment	$A = \frac{1}{2}r^2\left(\theta^c - sin\,\theta^\circ\right)$

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	$\frac{\sum\lvert x-\bar{x}\rvert}{n}$
Variance	$\sigma^2 = \frac{\sum(x-\bar{x})^2}{n-1} = \frac{\sum fx^2}{\sum f} - \bar{x}^2$
Standard Deviation	$\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$