



DEPARTMENT OF
EDUCATION

UPPER SECONDARY
SCHOOL
CERTIFICATE
EXAMINATIONS

GENERAL
MATHEMATICS

Paper 1

Monday

19th October 2015

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

M₁G₁

INSTRUCTIONS TO CANDIDATES

To be read by the external invigilator to all candidates.

1. The code for General Mathematics is **4**.
2. There are **8** 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

The expression $\frac{3}{\sqrt{6}}$ is equivalent to

- A. $\frac{3}{\sqrt{2}}$ B. $\frac{\sqrt{6}}{2}$
 C. $\frac{1}{2}$ D. $\sqrt{\frac{1}{2}}$

QUESTION 2

The number of significant digits in the number 0.0307 is

- A. 4 B. 3
 C. 2 D. 5

QUESTION 3

The range of the data set $\{6, -13, 20, 14, 27\}$ is

- A. 40 B. 21
 C. 5 D. 27

QUESTION 4

The variance of a data set is 49, what is the standard deviation of the data set?

- A. 98 B. 24.5
 C. 7 D. 94

QUESTION 5

The recurring decimal $0.7\dot{7}$ is equivalent to

- A. $\frac{777}{1000}$ B. $\frac{7}{8}$
 C. $\frac{1}{7}$ D. $\frac{7}{9}$

QUESTION 6

How much tax does Joyce pay if her gross pay is K2, 240?

Her other deduction is worth K295.60 and her net pay is K1, 750.

- A. K194.40 B. K1, 949.40
 C. K1, 454.40 D. K490.00

QUESTION 7

The expression $\frac{3}{x-1} - \frac{2}{x+1}$ can be simplified to

- A. $\frac{x+5}{x^2-1}$ B. $\frac{1}{(x-1)(x+1)}$
 C. $\frac{x+5}{x^2+1}$ D. $\frac{x-1}{x+1}$

QUESTION 8

The area of a triangle whose base is 40 cm and whose height is half of its base is

- A. 800 cm^2 B. $1,600 \text{ cm}^2$
C. 200 cm^2 D. 400 cm^2

QUESTION 9

Sai's normal hourly salary rate is K15. His overtime is paid for at time-and-a-half. How much is Sai's overtime earning if he worked 15 overtime hours?

- A. K225.00 B. K112.00
C. K337.50 D. K450.00

QUESTION 10

A data set has 300 values. The numbers of values between the first and the third quartiles is

- A. 300 B. 150
C. 75 D. 100

QUESTION 11

A marble is drawn at random from a bag containing 4 red, 2 green and 3 blue marbles. What is the probability that it is green?

- A. 0.1 B. 0.22
C. 2.20 D. 0.50

QUESTION 12

John borrowed K5,000.00 from the bank at an interest rate of 8% per annum. If he is to repay the loan in one year, how much should he repay each month?

- A. K400.00 B. K450.00
C. K383.30 D. K250.00

QUESTION 13

From the top of the building 100 metres high, the angle of depression of a parked car on the road below is 35° . How far in metres is the car from the base of the building?

- A. 142.8 B. 174.3
C. 122.1 D. 46.6

QUESTION 14

The equation $3v^2 + 10v - 8$ has

- A. No roots B. One root
C. Two roots D. More than two roots

QUESTION 15

K15,000.00 is invested at 6% compounded annually. What is the investment value after 4 years?

- A. K3,937.15 B. K18,937.15
C. K1,200.00 D. K16,200.00

QUESTION 16

A fair die is rolled and a 10 toea coin is tossed.

The probability that the die shows 3 and the coin shows a cuscus is

- A. 0.667 B. 0.333
C. 0.830 D. 0.083

QUESTION 17

A triangle has two angles of 60° each. The side between them is 13 metres.

The area of this triangle in metre squared is

- A. 26
- B. 84.5
- C. 73.2
- D. 98.1

QUESTION 18

Which vectors are not parallel?

- A. $\mathbf{u} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}, \mathbf{v} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$
- B. $\mathbf{u} = \begin{pmatrix} 10 \\ 15 \end{pmatrix}, \mathbf{v} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$
- C. $\mathbf{u} = \begin{pmatrix} 7 \\ 3 \end{pmatrix}, \mathbf{v} = \begin{pmatrix} 21 \\ 27 \end{pmatrix}$
- D. $\mathbf{u} = \begin{pmatrix} 11 \\ 3 \end{pmatrix}, \mathbf{v} = \begin{pmatrix} 44 \\ 12 \end{pmatrix}$

QUESTION 19

The cost of an item is expected to increase by 4% each year.

If the item cost K25.00 this year, how much will it cost in 5 years?

- A. K24.00
- B. K26.00
- C. K30.42
- D. K5.42

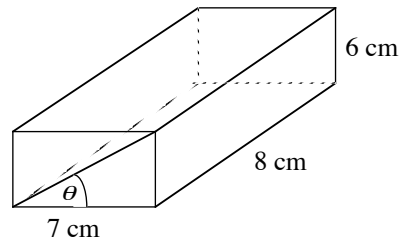
QUESTION 20

A fair die is rolled. What is the probability that it shows more than 4?

- A. $\frac{1}{6}$
- B. $\frac{2}{6}$
- C. $\frac{3}{6}$
- D. $\frac{4}{6}$

QUESTION 21

The angle θ in the diagram to the nearest degree is



- A. 41
- B. 37
- C. 40
- D. 39

QUESTION 22

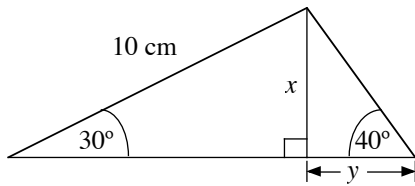
A boy bought some bottles of drinks for K2.00 each and some packets of chips for K1.00 each.

If he spent K20.00 and the number of bottles of drink he bought was half the number of packets of chips, how many bottles of drink did he buy?

- A. 5
- B. 2
- C. 10
- D. 3

QUESTION 23

The length marked y in the diagram below to the nearest centimetre is



- A. 5
- B. 9
- C. 6
- D. 8

QUESTION 24

The insurance company has the following insured amounts and premiums for a term life insurance policy for an employed person under the age of 50 years.

Insured amount (K)	20, 000.00	30, 000.00
Annual premium (K)	220	300

Dan has insured his life for K30, 000.00 but wants premium deducted from his wage each fortnight. His fortnightly payment is

- A. K220.00
- B. K11.54
- C. K300.00
- D. K8.46

QUESTION 25

The height and the diameter of a closed cylinder are both 5 metres. What is its surface area in metre squared?

- A. 37.5π
- B. 137.5π
- C. 62.5π
- D. 112.5π

QUESTION 26

The region described by the inequality $3w \geq 2v - 1$ is represented by a graph of the form.

- A.
- B.
- C.
- D.

QUESTION 27

Charges for every transaction on a BSP savings bank account are:

- withdrawal from the counter: K3.00
- deposit: K4.00
- withdrawal from ATM: K0.75

If you deposit 20 times, withdraw from the ATM 376 times and do 6 counter withdrawals in one year, how much will you be charged that year?

- A. K300.00
- B. K369.00
- C. K380.00
- D. K80.00

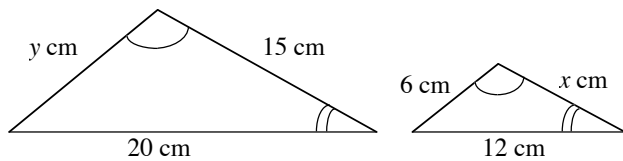
Question 28

The graph of the equation $z = 17 \times 8^{-2y+1}$ is

- A. hyperbolic
- B. linear
- C. exponential
- D. parabolic

QUESTION 29

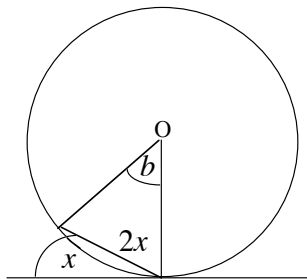
The length x in the following pair of similar triangles is



- A. 12 cm
- B. 10 cm
- C. 7 cm
- D. 9 cm

QUESTION 30

O is the centre of the circle. The angle b in the diagram is



- A. 30°
- B. 60°
- C. 120°
- D. 90°

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

If the exchange rate is US\$1 = 3 Kina, how much is 1, 800 Kina in US\$?

QUESTION 32

Draw a diagram to represent the inequality $3v \leq 12$.

QUESTION 33

If it takes 3 hours for 2 men to mow a sport field, how long would it take 5 men working at the same rate to do the job?

QUESTION 34

How much commission can Jeff earn from K5, 400.00 if his commission rate is 15%?

QUESTION 35

Factorize $3t^2 - 19t - 14$.

QUESTION 36

Calculate the mean of the data set, {6, 11, 14, 18, 7, 22, 6}.

QUESTION 37

Calculate the simple interest on K8, 000.00 at a rate of 5% per annum over five years to the nearest Kina.

QUESTION 38

Calculate the total dividend paid on 800 bank shares that earn a dividend of 30 toea per share.

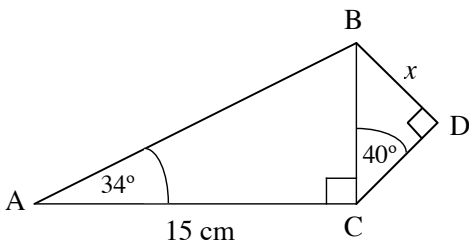
QUESTION 39

A container for storing grain consists of a circular cylinder capped by a right circular cone.

If the heights of the cylinder and the cone are 23 metres and 4 metres respectively and both have diameter of 6 metres, what is the volume of the container?

QUESTION 40

Find the length marked x correct to one decimal place.



QUESTION 41

The probability that it rains on any day in a certain day in a village is 0.857. If the probability of rain falling on any particular day does not depend on whether rain falls on any other day.

What is the probability that rain falls on two consecutive days?

QUESTION 42

Two birds, A and B flew off from a tree at the same time. A flies 40 metres north and B flies 25 metres on a bearing of 320° .

How far apart are the two birds? Write your answer in metres correct to one decimal place.

QUESTION 43

A car depreciates at a rate of 15% per year. How much will a car purchased this year for K135,000.00 be worth in three years?

QUESTION 44

From a point 50 metres from the base of a building, the angle of elevation of the top of the building is 50° .

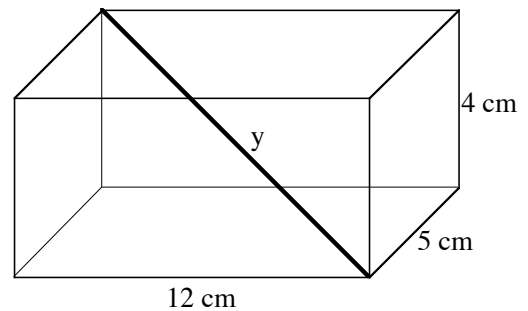
How high in metres correct to one decimal place is the building?

QUESTION 45

Sketch the graph of $t = \log u$.

QUESTION 46

Find the diagonal labelled y of the rectangular box below.



QUESTION 47

What is the equation of the asymptote to the graph of the function $w = 7 + (0.6)^y$?

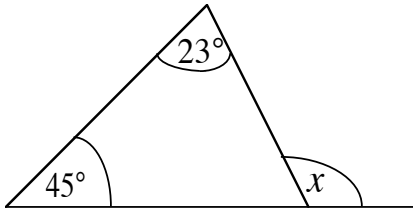
QUESTION 48

David is offered a hire-purchase agreement, charging at a flat interest rate of 12% to buy a LCD TV that has a purchase value of K4,500.00.

If he pays a deposit of K300.00 and pays the remainder plus interest in 12 months, how much will he repay each month?

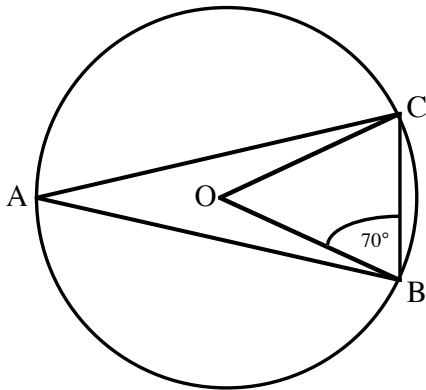
QUESTION 49

Find the value of the angle marked x .



QUESTION 50

Find the angle BAC, where O is the centre of the circle drawn below.



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		
1	5								

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

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

ALGEBRA

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

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

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