



DEPARTMENT OF
EDUCATION

HIGHER SCHOOL
CERTIFICATE
EXAMINATIONS

MATHEMATICS B

Thursday

22 October 2009

Time allowed:

2 hours and 15 minutes

(8:00am – 10:15 am)

NO EXTRA TIME

(NO OTHER TIME)

Candidates are advised to fully
utilise the allocated time

MB

INSTRUCTIONS TO CANDIDATES

To be read by the external invigilator to all candidates

1. There are **6** printed pages in the question booklet and **8 printed** pages in the answer booklet. The formula sheet is in pages 6 of the question booklet.
2. The answer booklet is enclosed in the centre of this booklet. Take out the answer booklet now.
3. Check that you have the correct number of pages.
4. Write your 10 digit candidate number, your name and your school name in the space provided in the answer booklet.
5. This paper contains 14 questions in 2 sections:
Section A has 7 questions worth 3 marks each. (21 marks)
Section B has 7 questions worth 7 marks each. (49 marks)

Total : 70 marks

Answer **ALL** questions.

6. Calculators, rulers and protractors are allowed.
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. **ALL** working must be shown step by step to get full marks. Students may lose marks for writing down final answers only.
9. Enough spaces have been allocated for answers to every question. Questions must be answered in spaces as allocated. Answers all over the answer booklet may not be marked.
10. Rubbers and Correctional Fluid are not allowed on the answer sheet. Where you have made an error, cross out all the working and start on a new line.
11. 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 1 (QUESTIONS 1 TO 7)

These questions are worth 3 marks each

QUESTION 1

4 bananas and 3 coconuts cost K3.20. 12 bananas and 2 coconuts cost K4.00.

Find the cost of each item.

QUESTION 2

Joe buys a TV and musical set for K8094.

- (i) If the set was offered on a 15% discount, what was the original price?
(2 marks)
- (ii) How much was the discount?
(1 mark)

QUESTION 3

The table below shows enrolment data for 3 schools over 3 years.

Year	School A	School B	School C
2003	684	417	209
2004	782	483	241
2005	811	461	222

- (i) Which school is likely to be a new school? (1 mark)
- (ii) What is the mean enrolment of school B for the 3 years? (1 mark)
- (iii) Of all the data provided, what is the median enrolment record? (1 mark)

QUESTION 4

What is the probability of getting:

- (i) a red ten (10) from a pack of cards. (1 mark)
- (ii) 2 boys born to a couple. (1 mark)
- (iii) A sum of 6 on two dice thrown together (1 mark)

Note: Write All answers as simplest fractions.

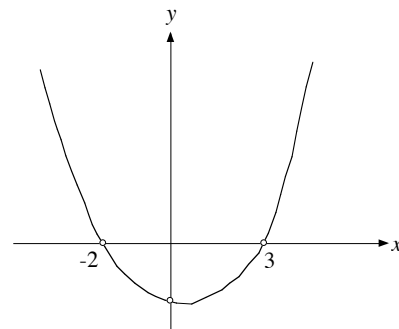
QUESTION 5

A bank pays 7% pa interest on Interest Bearing Accounts. The interest is compounded annually. If John invested K10,000.00. Calculate the interest for 4th year.

Note: Show all working for full marks

QUESTION 6

The graph below is a parabolla.



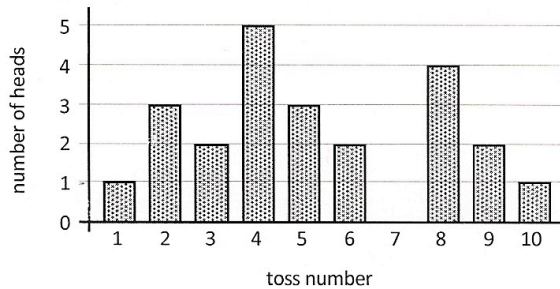
- (i) Write the equation of the graph in the form $y = ax^2 + bx + c$ (2 marks)
- (ii) What are the coordinates of the y intercept of the parabola? (1 mark)

PART 2 (QUESTIONS 8 TO 14)

These questions are worth 7 marks each

QUESTION 8

Five (5) coins were tossed together ten times. The number of heads appearing on each toss were recorded as shown on the bar graph below.



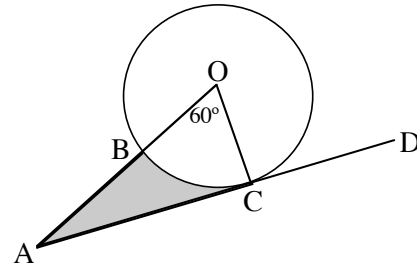
- (i) Complete the frequency distribution table on the answer sheet (4 marks)

number of heads x	tally	frequency (f)	$f \times x$
0			
1			
2			
3			
4			
5			
TOTALS			

- (ii) Calculate mean (1 mark)
 (iii) How many tails appeared on toss number 7? (1 mark)
 (iv) In this exercise of tossing the coin, what are the other possible outcomes? (1 mark)

QUESTION 9

The diagram below shows a circle with the centre O . Angle $AOC = 60^\circ$. AD is a tangent and OC is the radius and meets AD at the point C . Length $OC = 6$ cm.



- (i) Calculate the area of sector BOC ? (2 marks)
 (ii) Using trigonometry and Pythagoras theorem, find the exact values of:
 (a) length AO (1 mark)
 (b) length AC (1 mark)
 (iii) Calculate the area of triangle AOC . (2 marks)
 (iv) Calculate the area of the shaded region. (1 marks)

QUESTION 10

15,000 people attended a concert. Adults paid K5 and children paid K3 for tickets for the concert. A total of K55,800 was raised for selling the tickets.

- (i) Let c be the number of children. Write the expression for the number of adults that attended the workshop in terms of c . (1 mark)
 (ii) Write the expression for the total amount of money collected using c . (1 mark)
 (iii) Solve the equation in (ii). (3 marks)
 (iv) How many adults attended the concert? (1 mark)
 (v) What is the ratio of adults to children. (Answer in simplest form) (1 mark)

QUESTION 11

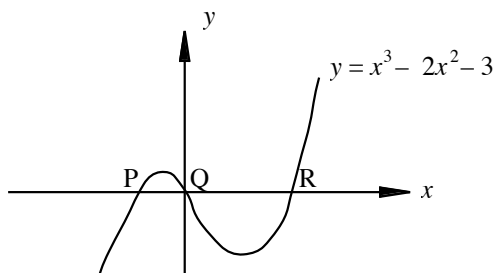
Customer Order

Customer Order	Wholesale Price list
4 Bales of 20 x 1Kg Trukai rice	K80.00 per bale
3 cartons of 48 x 425g Besta tinned fish	K144.00 per carton
1 carton of 48 x 200g Besta tinned fish	K96.00 per carton
2 bales of 20 x 1Kg flame flour	K48.00 per carton
1 carton x 24 x 250mL cooking oil.	K24.00 per carton.

- (i) Complete the quotation on your answer sheet and include K100 for transport and delivery cost in one quotation. (5 marks)
- Note:** All costs are inclusive of 10% GST
- (ii) If the trade store owner sells a tin of 425g Besta tinned fish, what is the percentage of profit to be made on that alone? (2 marks)

QUESTION 12

Below is the graph of $y = x^3 - 2x^2 - 3x$.



- (i) Find the solutions to the equation below by factorising the right side of the equation first. ... (3 marks)
- $$0 = x^3 - 2x^2 - 3x.$$

- (ii) Find the coordinates of the point P and point R. ... (2 marks)
- (iii) At what point will the line $x = 2$ cut the graph of $y = x^3 - 2x^2 - 3x$ (1 marks)
- (iv) Sketch the line of $x = 2$ on the grid on your answer booklet. ... (1 mark)

QUESTION 13

Q is on a bearing of 135° from P. R is 40 km directly north of Q. The shortest distance between P and QR is 30 km.

- (i) Sketch the information above. (3 marks)
- (ii) Use **Pythagoras theorem** to calculate the distance PR and leave your answer in simplified surd form. (1 mark)
- (iii) What is the bearing of P from R? (2 marks)
- (iv) If Wasmande travelled directly from Q to R at the constant speed of 120 km/hr, how many hours would the journey be? (1 mark)

QUESTION 14

Below is a rectangular office space for rent at K10.20 per meter per month. The dimensions are drawn to scale.

Scale: 1:500



- (i) Measure the dimensions and give your answer to the nearest meters.
- (a) Length: _____ m
- (b) Width: _____ m
- (1 mark if both correct)*

(ii) What is the cost of renting the office space in 1 month? *(2 marks)*

(iii) Assume that you have a business and are operating from this office.

Your weekly earnings is K3000.

Your other expenses per week excluding rent is K1,500 per week.

Is it worthwhile to rent the space if your business operating in this office space makes K3000 per week for making sales of that office space? *(1 mark)*

(iv) Justify your answer. *(3 marks)*

END OF EXAMINATION

HIGHER SCHOOL CERTIFICATE EXAMINATIONS, 2009 FORMULAE SHEET FOR MATHEMATICS B

MENSURATION

Arc Length	$L = \frac{\theta}{360} 2\pi r$
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	$V = \frac{4}{3} \pi r^3$
Interior Angles of Polygon	$S_n = (n - 2) \times 180^\circ$

INTEREST

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

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

Distance between two points	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Mid-point of Interval	$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
Gradient of a Line	$\frac{y_2 - y_1}{x_2 - x_1} = m = \tan \theta$

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	$A = \frac{1}{2} r^2 (\theta^c - \sin \theta^c)$