

AHMAD IBRAHIM SECONDARY SCHOOL GCE N-LEVEL PRELIMINARY EXAMINATION 2024

SECONDARY 4 NORMAL (ACADEMIC)

Name:	Class:	Register No.:
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MATHEMATICS SYLLABUS A

Paper 1

4045/01 30 July 2024 2 hours

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in. Write in dark blue or black pen. You may use an HB pencil for any diagrams or graphs. Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.

The number of marks is given in brackers [] at the end of each question or part question.

If working is needed for any question it must be shown with the answer. Omission of essential working will result in loss of marks. The total of the marks for this paper is 70.

The use of an approved scientific calculator is expected, where appropriate. If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place. For π , use either your calculator value or 3.142.

For Examiner's Use			
/ 70			

Mathematical Formulae

Compound Interest

Total amount =
$$P\left(1 + \frac{r}{100}\right)^n$$

Mensuration

Curved surface area of a cone = πrl

Surface area of a sphere = $4\pi r^2$

Volume of a cone =
$$\frac{1}{3}\pi r^2 h$$

Volume of a sphere
$$=$$
 $\frac{4}{3}\pi r^3$

Area of triangle $ABC = \frac{1}{2}ab \sin C$

Arc length = $r\theta$, where θ is in radians

Sector area = $\frac{1}{2}r^2\theta$, where θ is in radians

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$
$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$Mean = \frac{\sum fx}{\sum f}$$

Standard deviation =
$$\sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f}\right)^2}$$

[Turn Over

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Answer all the questions.

1 Calculate $\frac{\sqrt{4.9}+2}{5.8^{0.7}-3}$, leaving your answer to 4 significant figures.

2 Write these numbers in order of size, starting with the smallest.

$$\frac{21}{50}$$
, $0.25^{\frac{2}{3}}$, 0.412 , $\sqrt{0.16}$, 39%

3 Find the largest integer satisfying 3x < -22.5.

4 (a) Steven makes a candy salad.
He uses gummy bears, candy corn and jellybeans in the ratio 7 : 3 : 5 respectively.
He uses 1.4 kg of jellybeans.
How much gummy bears does he use?

Answer kg [1]

(b) Irene makes a candy salad using fruit pastilles, mints and liquorice. The ratio of fruit pastilles : mints is 2 : 3. The ratio of mints : liquorice is 4 : 9. Find the ratio of fruit pastilles : mints : liquorice.

5 *y* is inversely proportional to the square of *x*. Given that y = 15 when x = 3, find *y* when x = 5.

6 Simplify (a) $8x^2 \times 3x^4$,

Answer[1]

(b) $(27y^6)^{\frac{2}{3}}$

7 Given that $2^{-a} \times \frac{1}{8} = 32$, find *a*.

8 Daniel has a bag of marbles.

 $\frac{3}{10}$ of the marbles are red.

40% of the remaining marbles are orange.

The other 21 marbles are yellow.

How many marbles are there in the bag?

9 The graphs of y = x - 5 and 3x + 4y = 29 meet at point *P*. Find the coordinates of point *P*.

Answer (.....)[3]

10 Solve 5(x-4) = 6 - (2-x).

11 Simplify
$$\frac{4y^2 - 1}{6y^2 - 13y + 5}$$
.

Answer[3]

- **12** The scale of a map is given as 1 : 50 000.
 - (a) A road on the map is 19 cm long.Find the actual length of the road in kilometres.

Answer km [1]

(b) A farm has an area of 35 km².Find the area of the farm on the map in square centimetres.

Answer cm² [2]

13 The diagram shows an equilateral triangle of side 10 cm and three identical sectors.Calculate the shaded area.



Answer cm² [3]

Bhutia invested \$5000 in an account paying compound interest at *r*% per year.After 3 years, she earned an interest of \$800.Calculate the value of *r*.

Answer[3]

15 The expression $x^2 - 18x + 19$ can be written in the form $(x - 9)^2 + n$. (a) Find the value of *n*.

(b) Hence solve $x^2 - 18x + 19 = 0$.

Answer $x = \dots$ or $x = \dots$ [2]

16 $a = \frac{13bc+1}{2b+c}$

(a) Calculate a when b = 1.5 and c = -1.2.

Answer $a = \dots$ [1]

(b) Rearrange the equation to make *b* the subject.

Answer $b = \dots [2]$

17 Solve $\frac{2}{x+7} - \frac{1}{x} = 5$, giving your answer correct to 2 decimal places.

Answer $x = \dots$ or $x = \dots$ [4]

- **18** The first five terms of a sequence are 4, 7, 10, 13, 16.
 - (a) Find an expression, in terms of *n*, for the *n*th term of the sequence.

(b) Find the 15th term of the sequence.

Answer[1]

(c) Chye Joo says that 547 is a term in this sequence. Is he correct? Explain your answer. *Answer*

(d) The first five terms of another sequence are 5, 11, 19, 29, 41.Using part (b), deduce the expression, in terms of n, for the nth term of the sequence.

19 The diagram shows a parallelogram *PQRS*.



PT = ST, angle $SPT = 65^{\circ}$, and angle $TUR = 121^{\circ}$. Find

(a) reflex angle *PSU*,

A model of a mushroom is made using a solid hemisphere and a solid cylinder.
 The solid hemisphere has a volume of 170 cm³.
 The solid cylinder has a radius 1.5 cm.



(a) Calculate the radius of the hemisphere.

Answer cm [2]

(b) The total volume of the model is 190 cm³.Calculate the height of the cylinder.

(c) Calculate the total surface area of the model.

Answer cm² [3]

21 In the diagram, AE = 13 m, BC = 29 m, BE = 20 m, CE = 21 m and angle $DCE = 50^{\circ}$.



(a) Find the length of *AB*.

Answer m [2]

(b) Prove that triangle *BCE* is a right-angled triangle.*Answer*

[2]

(c) Calculate angle *CBE*.

Answer^o [2]

(**d**) Find *CD*.

Answer m [2]

22 Wai Yean recorded the eye colour and gender of 75 students.

	Brown	Black	Blue	Total
Male		17		
Female	13	18		38
Total	25	35	15	75

The results are shown in the table below.

(a) Complete the table.

Wai Yean displays his results for each eye colour in a pie chart.

The sector angle for brown eyes 120°.

(b) Calculate the angle sector for black eyes.

Answer^o [1]

[2]

(c) Complete the pie chart.



End of Paper Setter: Miss Melody Ho

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