iame:		Index Number:	Class:
	HUA YI SECO	NDARY SCHOOL	
4NA	Preliminar	y Examination	4NA
MATHEMATIC	CS		4045/1
Paper 1			4 August 2020
Car	ididates answer on the Q	uestion Paper.	2 n
READ THESE INS	RUCTIONS FIRST		
Write your Name, C	Class and Index Number i	n the spaces provided at	the top of this page.
Write your answers	in the spaces provided of	n the question paper.	
Write in dark blue o You may use a pen	r black pen. cil for any diagrams or gr	aphs.	
Answer all question If working is needed	is. I for any question it must	be shown in the space b	elow that question.
The use of an appro	oved scientific calculator i	s expected, where appro	opriate.
If the degree of acc the answer to three	uracy is not specified in the significant figures. Give y	he question, and if the ar /our answers in degrees	nswer is not exact, give to one decimal place.
For π , use either yo terms of π .	ur calculator value or 3.14	42, unless the question r	equires the answer in
The number of mark	ks is given in brackets []	at the end of each quest	tion or part question.
The total number of	marks for this paper is 8	D.	
			For Examiner's
			Use
			80

[Turn Over

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

19994" MILT'"

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

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

Sec 4NA Preliminary Examination 2020 Mathematics Paper 1

		Answer	all the questions.	
1	(a)	Express 0.013 as a percentage.		
			Answer	0/ [1]
	(ው)	Express 56.6% as a fraction		[1]
	(-)	Express 50.076 as a fraction.		
	Antra		Answer	[1]
		2 (1977) 2 (1977)		
		Without using a calculator, find t in index notation.	he square root of 18225, leaving your answ	wer
			Answer	[1]
	(ኬ)	Explain why the and but of a		• J
	(0)	Explain why the product of 5 and	18225 is a perfect cube.	
		Answer		
				[1]
				L - J
3	(a)	Solve $\frac{5}{3} = 3$		-
	-	(2x-6) (2x-6)		
			Answer	[2]
	(b)	Express $\frac{1}{(x^2-9)} + \frac{2}{(x+3)}$ as a single f	raction, in its simplest form, .	
		т.	Answer	[3]

ž.i,

4 John said that the following is part of a regular polygon. Is he correct? Support your explanation with workings.



Answer

[2]

5 (a) A is inversely proportional to B^2 . When B = 4, A = 2. Find the value of A when B = 2.

Answer A = [2]

(b) Given that $125^{\frac{2}{3}} = 5^{2m}$, find *m*.

Answer m = [3]

- 30 20 >Time (s)

5

The figure shows the speed time graph of an object during a duration of 14 seconds.

Given that the total distance travelled by the object during the first 10 seconds is 270 **(a)** metres, find the average speed of the object.

Answer _____ [1]

Given that the area under the graph gives the distance travelled, find the distance **(b)** travelled during the last 4 seconds.

> Answer [1]

Find the acceleration from t = 2 to t = 10 s. (c)

Amarrian		
Answer		
	dealer and the	- 1 - L

[2]

6

7 The following shows a rectangle of where the diagonals intersect to form an acute angle of 48°.



(a) Find the values of x and y.

Answer x = [1]y = [1]

(b) Write down one pair of congruent triangles.

	þe,					Answer		[1]
	Sec.							
F.								

(a) Given that siny = 0.25, find two possible values of y.

Answer y = or [2]

(b)

8

BCD is a right angled triangle.





(ii) _____ [1]

- E is on the perpendicular bisector of BC and is 5 cm away from A. Using construction,
 - find the point E, **(a)**

9

(b) draw the angle bisector of angle BCD.



[3]

dell'

- 10 Raymond and Sammi have each \$4000 to invest for 4 years.
 - (a) Raymond invest it at 5% per year simple interest at Bank A. Calculate the total interest Raymond will earn.

Answer [1]

(b) Sammi invests the amount at an interest rate of 5.2% per year compounded half-yearly. Find the interest he would get at the end of 4 years.

Answer [2]

11 The first 4 terms of a sequence is 5, 9, 13, 17,....Find (a) the next term,

(b) the nth term.

Answer (a)	[1]
(b)	[1]

12 Given that the equation of a line is 3x - 4y = 8,

(a) state the gradient of the line,

Answer [1]

(b) write down the coordinates of the point A, where the line crosses the y-axis.

Answer A = (,) [1]

(c) Given B = (3, 6), find the distance between A and B.

			Answer	[2]
and shows -				
	and the second se		NT. Apple to con-	-

13 Solve 3x - 4 < 10 and state the largest prime number that satisfy the inequality.

Answer _____ [2] 14 Solve the simultaneous equations. 2x + y = 3 2y = 11 + xAnswer $x = \frac{y}{y} = \frac{1}{2}$ [3]

15 A map showing part of an island is drawn to scale of 1:55000.

(a) The distance on the map between two destinations A and B is 5 cm. Find the actual distance, giving your answer in kilometres.

Answer km [2]

Answer	cm ²	[2]

16 The stem-and-leaf diagram shows the marks obtained in a test by a group of students.

		-			N	larks	New York				
	C.far-	G	irls	1 ·					Boy	s	
				na para series Na para series	2	4	6	9			
			6	6	4	5	0	0	2	3	5
8	3	3	3	2	0	6	2	2	3	7	
	8	6	6	4	0	7	8	8	9		
			4	3	1	8	1	1	1		
			4	4	3	9	3	4	8		

Key: Girls2 | 4 means42Boys4 | 6 means46

(a) State the modal score obtained by the boys.

Answer _____ [1]

(b) State the median score obtained by the girls.

Answer _____ [1]

(c) Compare the distribution of the marks obtained by the boys and girls. Which group performed better?

17 (a) Given that $y = (x + 4)^2 - 2$, state the turning point.



(ii) Write the equation of the line of symmetry of the above curve.

Answer [1]

18 Given that $2a - 1 = \frac{3b^2 - 1}{2}$, make b the subject.

19 The graph of the curve $y = x^2 + x - 2$ is drawn below.



(a) By drawing a tangent, find the gradient of the curve $y = x^2 + x - 2$ at the point where x = 1.

Answer _____ [2]

(b) By drawing a suitable line to the graph, find the solutions to the equation $x^2 - 2 = 2 - x$.

[2]

20 The diagram below shows the cross-section of a cylindrical container with centre O and radius 8 cm. A and B are points on the circumference and angle AOB = 1.2 radians.



(a) Find the perimeter of the cross section.

Answer	and balling to	[2]
I LILL IT UL	A STREET STREET IN SHIT I SHOW IN SHIT	1.1

(b) Given that the container can be filled with 1 litre of water, find the depth of the container. $[1 \text{ litre} = 1000 \text{ cm}^3]$

Answer [2]

21 (a) Factorise $6a^2 + ab - b^2$.

A I and that many solution	[0]
Answer	141

(b) Expand and simplify $(2x - 3)^2$.

Answer			[2]
A MILO II OL	1.115	Late file	[4]

- Complete the probability tree below. (a)
 - Answer:



Find the probability of Daisy picking two different sweets. **(b)**

Answer [2]

La the Aventer

[2]

Suppose Daisy picks a third sweet from the box, find the probability that all the three (c) are mango sweets.

> [1] Answer



23

The following table shows the ages, in years, of 40 participants at a fun fair.

(a)

1

Calculate the mean age for the participants.

Answer _____ [1]

Calculate the standard deviation for the participants. **(b)**

Answer [2] Explain why the answers in (a) and (b) are estimates of the mean and standard (c) deviation. Answer acdi [1]

-End of paper-