



Write your class, index number and name in the spaces at the top of this page. 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.

Section A

Answer all questions.

Section B

Answer one question.

The number of marks is given in brackets [] 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 your answers in degrees to one decimal place. For π , use either your calculator value or 3.142.



Set by: Mr Aziz

This question paper consists of <u>18</u> printed pages, including the cover page.

Mathematical Formulae

2

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 = $\frac{4}{3}\pi r^3$

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

Section A (62 marks) Answer all the questions in this section.

(a) Calculate $\sqrt[3]{3147}$.

1

2

Answer

(b) By rounding each number to 1 significant figure, estimate the value of 7.88×551.7

You must show your working.

(a) Write 0.000 987 in standard form.

..... people / km^2 [2]

(b) The population of Singapore in 2022 was 5.642×10^6 . The area of Singapore is 7.18×10^2 km².

Calculate the average number of people per square kilometre in Singapore in 2022. Leave your answer in standard form.

Answer

3



The diagram above is made up of a square, a regular pentagon and parts of an incomplete regular polygon ABCDE of n sides.

Find

(a) $\angle BCD$,

Answer

.....°[2]

(b)

the value of *n*.

6.

	in Kra	inji Secor	ndary Scho	501.							
	4	0	1	5	7	9	9	. *			
	5	0	1	1	1	4	5	9	9		
	6	0	3	6	6						
	7	- 1	2								
						Key: 4	0 means	40			
	Find										
	(a)	the number of students with weight at least 51 kg,									
						Ar	iswer				[1]
	(b)	b) the standard deviation of all the weights.									
			. (*:							,
	-					A	nswer		х 		kg [2]
						n_					,
5	The g	eneral ter	m of a sec	luence	is $T_n = -$	$-\frac{-}{3}+7$.					
5	The g	eneral ter Find the	m of a sec e 3 rd term	juence in the s	is $T_n = -$ equence	$-\frac{-}{3}+7$.					
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5	The g (a) (b)	eneral ter Find the Given t	m of a sec e 3^{rd} term hat $T_n + T_r$	in the s $_{n+1} = 9,$	is $T_n = -$ equence find the	$-\frac{1}{3}+7$. value of	n.			•	[1]

Answer

Ms Wong wants to invest for her retirement. 2 banks offered her the following investment plans.

6

KBS Bank	KCBC Bank
Simple interest rate of 2.2% per	Compound interest rate of 2.5% per
annum	annum for first 5 years only.
	For subsequent years, the compound
	interest rate is 1.5% per annum.

Ms Wong has \$400 000 to invest. She wants to retire in 15 years.

Which bank should she invest her money in? Justify your answer.

6

......[4]

A Besla electric car costs \$94 900. Elijah bought the car at a 10% discount.

7

(a) He intends to sell it for a cash profit of \$30 000. Calculate his selling price.

\$ Answer[2]

Freya buys the car in (a) from Elijah on hire purchase. She pays a deposit of 20% of the selling price and 60 monthly instalments of \$1700 each.

Find

(b)

(i) the amount of deposit paid,

Answer

\$ [1]

(ii) the total amount she has to pay for the car.

Answer

\$ [1]

(a)	Draw the triangle ABC in which $\angle ABC = 63^{\circ}$ and $BC = 7.1$ cm.					
	The line AB is given below.	[2]				
(b)	Construct the perpendicular bisector of <i>AB</i> .	[1]				
		F13				
(c)	Construct the angle bisector of $\angle ABC$.	[1]				
(d)	D is equidistant from points A and B and also equidistant from the lines AB as	nd BC				
(u)	D is equidistant from points A and D and also equidistant from the files AD and	.Iu DC.				
	Draw a circle with centre A and radius AD .	[1]				

6.

- B

8

A

(a)

Factorise

(iii) $m^2 - 4y^2$,

(iv)
$$2x^2 - 11x + 5$$
,

(v) 12ax - 8bx + 9ay - 6by.

Answer

Answer

9

Answer

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

$$5k = \frac{k+2}{h}$$

Answer

A family drove 350 km in a car from Singapore to Kuala Lumpur at an average speed of x km/h.

Write down an expression, in terms of x, for the number of hours taken to drive from **(a)** Singapore to Kuala Lumpur.

Answer

..... hr [1]

The family continued their journey from Kuala Lumpur to Ipoh at an average speed of **(b)** (x + 10) km/h. The distance from Kuala Lumpur to Ipoh is 210 km. Write down an expression, in terms of x, for the number of hours taken to drive from Kuala Lumpur to Ipoh.

> Answer hr [1]

The entire journey from Singapore to Ipoh took 6 hours. Form an equation in x and show that it reduces to $3x^2 - 250x - 1750 = 0$.

Answer

(c)

Solve the equation $3x^2 - 250x - 1750 = 0$ and hence find the average speed of the car (d) from Singapore to Kuala Lumpur.

Answer

..... hr [3]





Answer

(d) Use your graph to find the values of x when y = 0.6.

(e) On the grid, draw the line which has a gradient of -1 and passes through (0, 3). [1]

12 Mr Aziz is planning a housewarming party from 11 am to 5 pm for 30 of his friends and family. He will be using disposable cups as seen in Diagram 1. This is meant to be used for a particular hot drink dispenser.

The cup can be modelled as a frustum with dimensions as shown in Diagram 2.







(a) Calculate the volume of the cup.

The hot drink dispenser is made using a cylinder of radius 7 cm and height 30 cm as shown below.



Diagram 3

(b)

Calculate the number of cups that can be filled with one hot drink dispenser.

..... cups [2]

Mr Aziz plans to serve tea during the party.

Answer:

Hot drink dispensers are usually rented out when batches of tea are sold. Three companies are selling each batch of tea as follow, with prices inclusive of GST.

	The Tea Bros	Tarik King	Miss Teh Tarik
Cost of the tea	\$57 per order	\$46 per order	\$52 per order
Dispenser rental	\$2 per hour	\$3 per hour	\$2 per hour
Islandwide	\$12	\$10	\$12
delivery charges			
Promotion	10% discount on	-	Free delivery with 2
	all purchase	т	or more orders

.....[4]

(c) Suggest a sensible amount of budget for Mr Aziz to host his party. State **one** assumption that you have made. Answer one question from this section. Each question carries 8 marks.

13 The cumulative frequency curve below shows the time taken by students in Kranji Secondary School to complete a 1.6 km run.



(b) A PE teacher analysed the time of 80 students in the school. The teacher considered the passing time to be 8 minutes or less. The following table is then generated.

	Boys	Girls
Pass	30	24
Fail	16	10

Two people are selected at random from the group without replacement.

Find the probability that

(i)

(ii)

the first person chosen is a boy who passed and the second person is a girl who passed,

Answer

both people chosen are girls,

(iii) at least one of the person chosen is a boy who failed.

Answer

.. [2]



(a) A, B, C, D and E are points on the circle, centre O. TAG is a tangent at A and AC intersects BD at F.

Given that $\angle ACD = 55^{\circ}$ and $\angle CAB = 24^{\circ}$, find

(i) $\angle AOD$,

 $\angle AED$,

Answer	 	 	•••••	°[1]

(iii)
$$\angle OAC$$
,

Answer

• [1]

Answer $\dots \circ [1]$ $\angle BAT$.

Answer

°[1]

(1

(ii)

(iv)



(i) Calculate the bearing of Q from P.

Calculate the distance PR.

(ii)

Answer

Answer

..... km [2]

° [2]

~ End of Paper ~

(b)