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Candidate Name	Class	Register Number
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	CHANGKAT CHANGI SECONDARY SCHOOL PRELIMINARY EXAMINATION 2017
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Subject : Mathematics
Paper : 4045/01
Level : Secondary 4 Normal (Academic)
Date : 15 Aug 2017
Duration : 2 hours
Setter : Mdm Tan AC

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

You may use a soft pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

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 in the space below that question.

Omission of essential working will result in loss of marks.

The total number of marks for this paper is 80.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.

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 Examiners' Use	Marks
Mathematics	/ 80
Personal Target	Actual Grade
Parent's / Guardian's signature	

This document consists of **17** printed pages.

[Turn over

Mathematical Formulae*Compound interest*

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

Mensuration

$$\text{Curved Surface area of a cone} = \pi r l$$

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

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

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

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

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

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

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

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

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

Answer **all** the questions.

- 1 (a) Find $\sqrt[3]{568}$.
Write down all the numbers on your calculator display.

Answer [1]

- (b) Give your answer to part (a) correct to 3 significant figures.

Answer [1]

- 2 (a) Evaluate $\frac{56.4 \div 0.02}{2.3 - 0.8}$.

Answer [1]

- (b) Express $6\frac{1}{4}\%$ as a fraction in its simplest form.

Answer [1]

- 3 The following table shows the shoe sizes of a group of customers.

Shoe size	4	5	6	7	8	9
Frequency	3	4	7	5	8	1

- (a) State the modal shoe size of the group.

Answer [1]

- (b) Find the median shoe size.

Answer [1]

- (c) Which of the two measures of central tendency is more useful to the shoe manufacturer - median or mode? Explain your reason clearly.

Answer

.....

..... [2]

- 4 Solve

(a) $5y + 6 = 2y$,

Answer $y =$ [1]

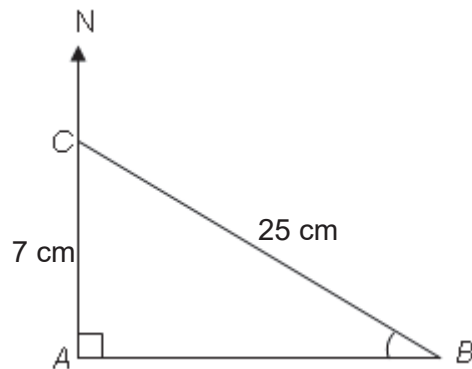
(b) $4y - 3 < 9$.

Answer [1]

5

- 5 In the figure as shown below, $AC = 7$ cm and $BC = 25$ cm.
Calculate

(a) the length of AB ,



Answer [2]

(b) $\cos \angle NCB$, leaving your answer in fraction.

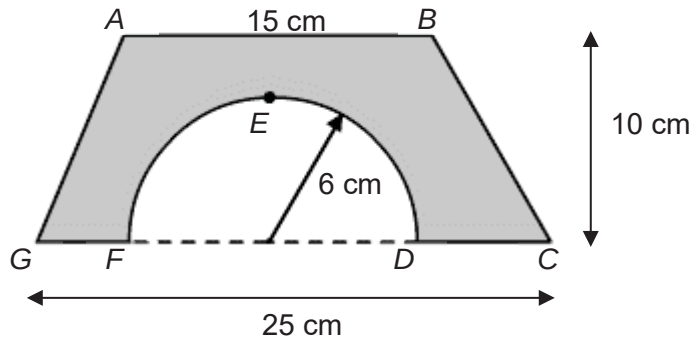
Answer [1]

-
- 6 Ryan runs 850 metres in 5 minutes.
Calculate his average speed in km/h.

Answer km/h [2]

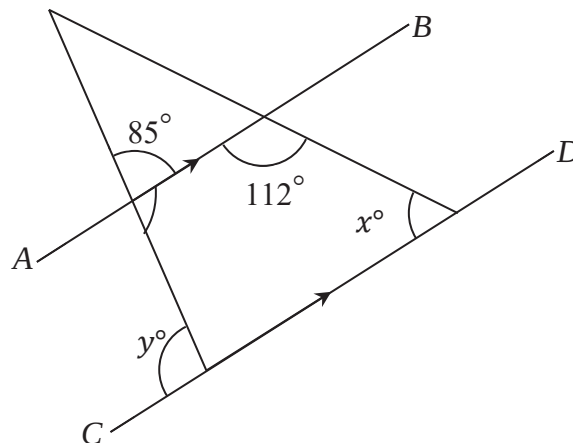
- 7 In the figure above, $ABCG$ is a trapezium with height 10 cm , $AB = 15\text{ cm}$ and $GC = 25\text{ cm}$. A semicircle of radius 6 cm is removed from the trapezium.

Taking $\pi = 3.142$, calculate the area of the shaded region $ABCDEFG$.



Answer [3]

- 8 (a) In the diagram, the lines AB and CD are parallel.



By stating your reasons clearly, find the values of

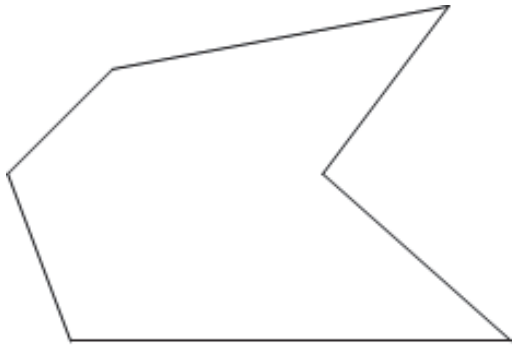
- (i) x ,

Answer⁰ [2]

- (ii) y .

Answer⁰ [2]

- (b) A hexagon is shown in the answer space.
Measure and write down the interior angle that is reflex.



Answer° [1]

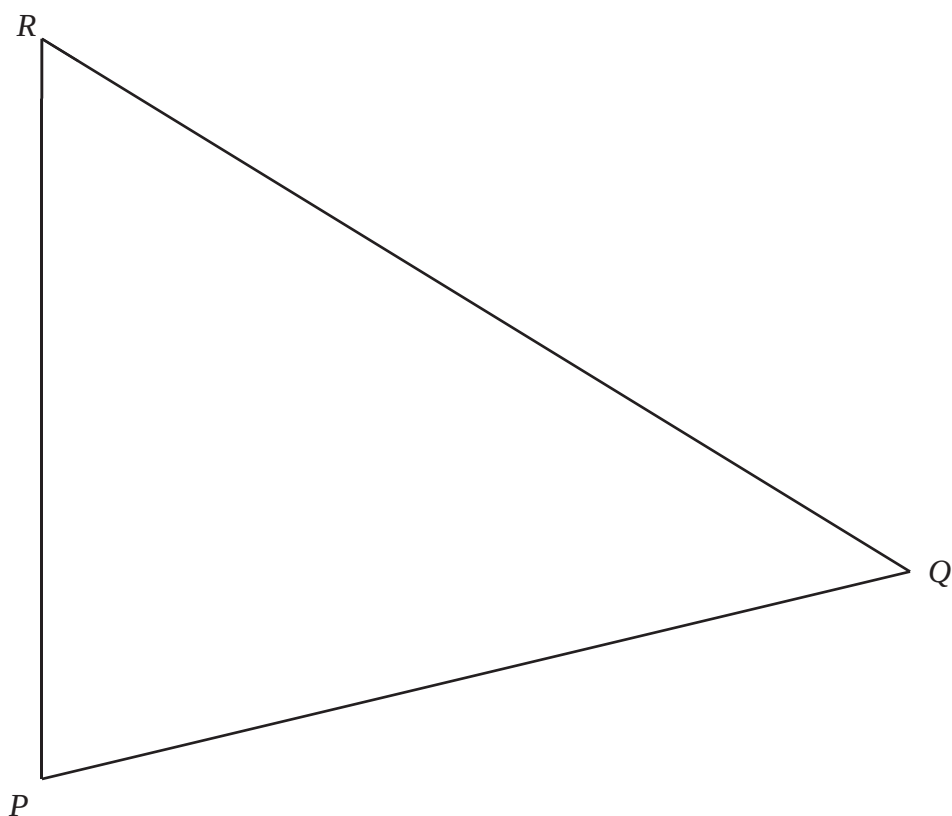
- 9 (a) Factorise completely $24 - 15x^2$.

Answer [1]

- (b) Simplify $\frac{27}{3x^3} \div \frac{3}{6x}$.

Answer [2]

10 PQR is a triangle.



(a) Measure $\angle QRP$.

Answer $\angle QRP = \dots\dots\dots^\circ$ [1]

(b) Construct the perpendicular bisector of RQ . [1]

(c) Construct the angle bisector of $\angle PQR$. [1]

(d) Label the point where the two bisectors intersect as T . Measure the length of RT .

Answer $RT = \dots\dots\dots\text{cm}$ [1]

- 11** Shathia took three tests.
His marks for Mathematics, English and Social Studies were in the ratio 9 : 8 : 6 respectively.
The sum of his Mathematics and Social Studies marks was 105.

(a) Calculate his marks for the English Test.

Answer marks [2]

(b) Calculate the mean mark for the three tests.

Answer marks [1]

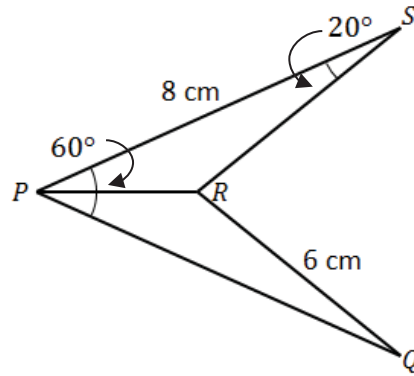
- 12 (a)** Given that $\frac{1}{125} = 5^x$, find x .

Answer [1]

(b) Given that $64^{\frac{1}{3}} \times 4^3 = 2^n$, find n .

Answer [2]

- 13 In the diagram, $\triangle PQR$ and $\triangle PSR$ are congruent.



It is given that $\angle QPS = 60^\circ$, $\angle PSR = 20^\circ$, $PS = 8$ cm and $QR = 6$ cm.

Find

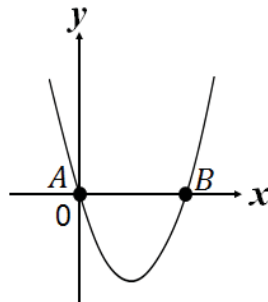
- (i) $\angle PRS$,

Answer⁰ [2]

- (ii) the perimeter of the quadrilateral PQRS.

Answercm [1]

- 14 The diagram below shows the graph of $y = x(x - 3)$.



The graph passes through the points, $A(0, 0)$ and $B(b, 0)$.

Find the value of b .

Answer [2]

- 15** Peter wants to cover a floor measuring 90 cm by 120 cm with squares tiles of the same size. Given that he uses only whole tiles, find

(a) the largest possible length of the side of each tile,

Answer [1]

(b) the number of tiles that are needed to cover the floor.

Answer [1]

- 16** Simplify

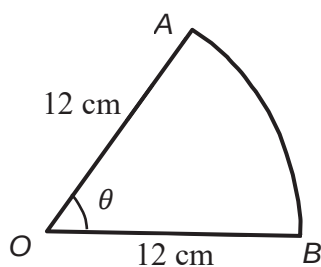
(a) $-3(a + 2b) + 4b$,

Answer [1]

(b) $\frac{9}{3x - 4y} + \frac{3y - 2x}{9x^2 - 16y^2}$.

Answer [3]

- 17 A tile is designed in the shape of a sector AOB , with a radius of 12 cm.



The area of sector AOB is 86.8 cm^2 .

Find

- (a) the angle θ (in degree),

Answer [2]

- (b) the arc length AB ,

Answer [2]

- (c) the perimeter of the tile.

Answer [1]

18 The equation $x^2 + 12x - 9 = 0$ can be expressed in the form $(x + a)^2 - b = 0$.

(a) Find the values of a and b .

Answer $a = \dots\dots\dots$

$b = \dots\dots\dots$ [2]

(b) Hence, solve for x .

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

19 Mr. Poh bought a car for \$120 000. After 1 year, its value decreases by 20%.
For the second year, its value decreases a further 10%.

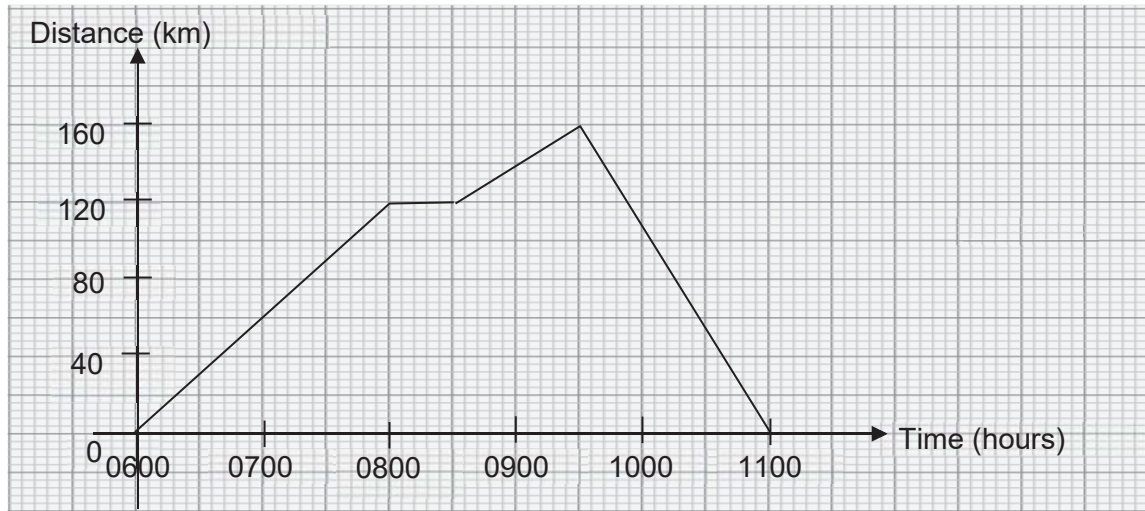
(a) What is the value of the car after 2 years?

Answer \$ $\dots\dots\dots$ [2]

(b) Calculate the percentage loss if Mr. Poh sold his car at the end of 2 years.

Answer $\dots\dots\dots$ [2]

- 20 The diagram below shows the distance-time graph of a taxi's journey from Point A to Point B and back to Point A.



- (a) Calculate the speed of the taxi in km/h for the first two hours.

Answer km/h [2]

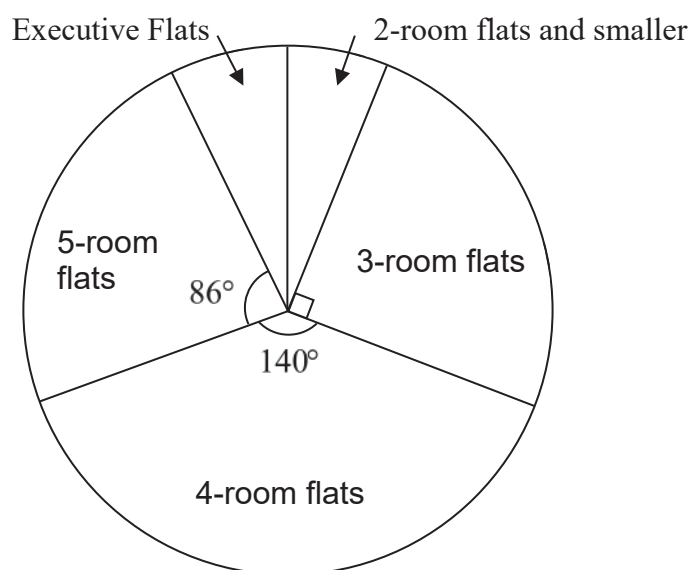
A lorry travels from Point B to Point A one hour after the taxi travels.

The lorry takes 4 hours to reach Point A.

- (b) On the same axes, draw the distance-time graph of the lorry. [1]
- (c) At which time will both the lorry and taxi meet?

Answer [1]

21 The pie chart below illustrates the different types of public housing in Singapore.



- (a) Find the percentage of 4-room flats in Singapore.

Answer % [2]

- (b) The number of 5-room and 3-room flats combined is eight times that of the number of Executive flats. The number of executive flats in Singapore is 65 076.

Calculate

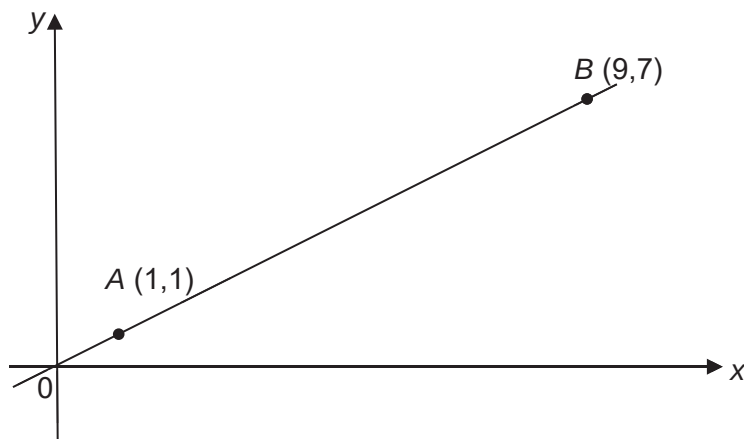
- (i) the number of 5-room and 3-room flats in Singapore,

Answer [1]

- (ii) the number of 3-room flats in Singapore.

Answer years [2]

- 22 In the diagram below, the straight line passes through points $A(1,1)$ and $B(9,7)$.



Find

- (a) the gradient of the line AB ,

Answer units [2]

- (b) the equation of line AB .

Answer [2]

- (c) Given that the distance between the points $P(-3, 2)$ and $Q(1, k)$ is 5 units,
Find the two possible values of k .

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

23 (a) Solve $\frac{3+x}{2} + \frac{1}{3} = x$.

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

(b) Solve the following simultaneous equations.

$$x + 2y = 3x - 4y = 5$$

Show all your working clearly.

Answer $x = \dots\dots\dots$

$y = \dots\dots\dots$ [3]

END OF PAPER

18
Changkat Changi Secondary School
4NA Prelim Paper 1 Marking Scheme 2017
(Total = 80m)

1	(a) 8.281635499 B1 (b) 8.28 B1	2
2	(a) 1880 B1 (b) $\frac{1}{16}$ B1	2
3	(a) modal size = 8 B1 (b) median = 6.5 B1 (c) Mode. Since mode indicates the most popular size, the manufacturer will then know he must make more of that size. B1+B1	4
4	(a) $y = -2$ A1 (b) $y < 3$ A1	2
5	(a) $AB = \sqrt{25^2 - 7^2}$ M1 $= 24 \text{ cm}$ A1 (b) $\cos \angle NCB = -\frac{7}{25}$ A1	3
6	Speed = $\frac{850 \div 1000}{5 \div 60}$ or $\frac{850}{5} = 170 \text{ m/min}$ M1 $= 10.2 \text{ km/h}$ A1	2
6	(a) $m = 88^\circ$ B1 (b) $n = 29^\circ$ B1	2
7	Area of shaded region $= \frac{1}{2}(15+25) \times 10 - \frac{1}{2} \times 3.142 \times 6^2$ M1+M1 $= 143.44 \text{ cm}^2$ A1	3
8	(a) (i) $x = 180^\circ - 112^\circ$ (int. $\angle$ s) M1 $= 68$ A1 (ii) $z^\circ = 180^\circ - 85^\circ$ (Interior angles) M1 $y^\circ = 95^\circ$ (alternate angles) A1 (Deduct 1 mark for no reasons or wrong reasons) (b) The reflex angle is 268° A1	5
9	(a) $3(8 - 5x^2)$ B1 (b) $\frac{27}{3x^3} \div \frac{3}{6x} = \frac{27}{3x^3} \times \frac{6x}{3}$ M1	3

	$= \frac{18}{x^2}$ A1	
10	(a) $\angle QRP = 58^\circ$ A1 (b) & (c) ----- See attached A2 (show all arcs) (d) $RT = 7.3 \text{ cm } (\pm 0.1)$ A1	4
11	(a) 15 units -----> 105 marks $\frac{105}{15} \times 8$ M1 8 units -----> 15 $= 56$ A1 (b) Mean = $\frac{105 + 56}{3}$ $= 53.7$ A1	3
12	(a) $x = -3$ B1 (b) $4 \times 4^3 = 2^n$ $2^{2(4)} = 2^n$ M1 $n = 8$ A1	3
13	(i) $\angle PRS = 180^\circ - 30^\circ - 20^\circ$ M1 $= 130^\circ$ A1 (ii) Perimeter = $2(8) + 2(6)$ $= 28 \text{ cm}$ A1	5
14	$x = x(x - 3)$ $0 = x(x - 3)$ M1 $x = 0$ or $x = 3$ $b = 3$ A1	2
15	(a) 30 cm A1 (b) 12 tiles A1	2
16	(a) $-3a - 2b$ B1 (b)	4

	$\frac{9}{3x-4y} + \frac{3y-2x}{9x^2-16y^2}$ $= \frac{9}{3x-4y} + \frac{3y-2x}{(3x-4y)(3x+4y)}$ $= \frac{9(3x+4y)}{(3x-4y)(3x+4y)} + \frac{3y-2x}{(3x-4y)(3x+4y)}$ $= \frac{9(3x+4y) + 3y-2x}{(3x-4y)(3x+4y)}$ $= \frac{25x+39y}{(3x-4y)(3x+4y)}$ M2 (able to factorise and simplify) A1 (for correct answer)	
17	(a) $\frac{\theta}{360} \times \pi(12)^2 = 86.8$ or $1.2566 \theta = 86.8$ M1 $\theta = 69.1^\circ$ (1 d.p.) A1 (b) Arc length = $\frac{69.07}{360} \times 2\pi(12)$ M1 Arc length = 14.5 cm (3 s.f.) A1 (c) Perimeter = $14.5 + 2(12) = 38.5$ cm (3 s.f.) A1	5
18	(a) $(x+6)^2 - 45 = 0$ M1 $a = 6$ A1 $b = 45$ (b) $x \approx 0.708$ or -12.7 A2	4
19	(a) $0.8 \times 120000 = \\$96000$ M1 $0.9 \times \\$96000 = \\86400 A1 (b) Percentage loss = $\frac{33600}{120000} \times 100\%$ M1 = 28% A1	4
20		4

	0600 (a) $\text{Speed} = \frac{120}{2}$ M1 $= 60 \text{ km/h}$ A1 (b) Draw the correct distance time graph for the lorry A1 (c) 0800 (± 3) A1	
21	(a) $\frac{140}{360} \times 100\%$ M1 $= 38.9\%$ (accept $38\frac{8}{9}\%$) A1 (b)(i) $65076 \times 8 = 520608$ B1 (b) (ii) No. of 3 room flats $= \frac{90}{90 + 86} \times 520608$ M1 $= 266\,220$ A1	5
22	(a) $\text{Gradient} = \frac{7-1}{9-1}$ M1 $= \frac{3}{4}$ A1	6

	(b) $\frac{3}{4} = \frac{y-1}{x-1}$ M1 Equation of line AB is $4y = 3x + 1$ A1 (c) $5^2 = (-3-1)^2 + (2-k)^2$ $25 = 16 = 4 - 4k + k^2$ $k^2 - 4k - 5 = 0 \quad \text{M1}$ $(k-5)(k+1) = 0$ $k = 5$ or $k = -1$ A1 for both correct answers	
23	(a) $\frac{3+x}{2} + \frac{1}{3} = x$ Multiply by 6: $3(3+x) + 2 = 6x$ $9 + 3x - 6x + 2 = 0 \quad \text{M1}$ $x = 3\frac{2}{3} \quad \text{A1}$ (b) $x + 2y = 5 \quad \text{-----eq. (1)}$ $3x - 4y = 5 \quad \text{.....eq. (2)}$ $\text{Eq(1) x 2} \quad 2x + 4y = 10 \quad \text{.....eq. (3)}$ Eq(3)+eq(2): $5x = 15 \quad \text{M1}$ $x = 3 \quad \text{A1}$ Subst. into eq(1): $3 + 2y = 5$ $2y = 2$ $y = 1 \quad \text{A1}$	5

Candidate Name	Class	Register Number
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CHANGKAT CHANGI SECONDARY SCHOOL

PRELIMINARY EXAMINATION 2017

Subject : Mathematics
Paper : 4045/02
Level : Secondary 4 Normal (Academic)
Date : 16 Aug 2017
Duration : 2 hours
Setter : Mdm Tan AC

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen.

You may use a soft pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A

Answer **all** questions.

Section B

Answer **one** question only.

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

The total number of marks for this paper is 60.

The use of an appropriate 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.

At the end of the examination, fasten all your work securely together.

For Examiners' Use	Marks
Mathematics	/ 60
Personal Target	Actual Grade
Parent's / Guardian's signature	

[Turn over

Mathematical Formulae*Compound interest*

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

Mensuration

$$\text{Curved Surface area of a cone} = \pi r l$$

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

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

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

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

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

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

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

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

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

Section A (52 marks)

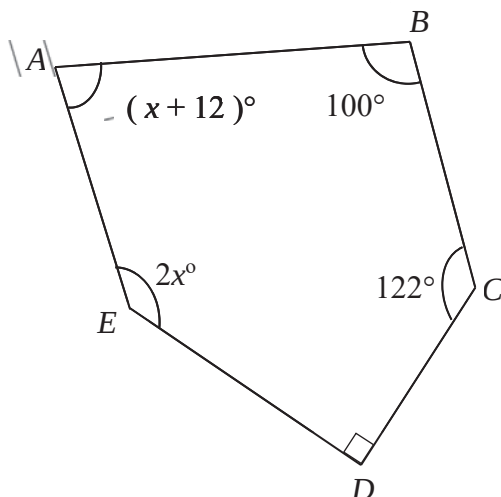
Answer **all** the questions in this section.

1. (a) The number of people who attended the preview of the National Day Parade is 13590. The number of people who attended the actual National Day Parade is 2.13×10^4 .
- (i) Write down the number of people who attended the preview of the National Day Parade in standard form. [1]
- (ii) Find the difference in the number of people who attended the 2 parades. [1]
- (b) A piece of wire is used to form a circle of diameter 25mm. Find the area of the circle. Leave your answer in terms of $\pi \text{ cm}^2$. [2]
-

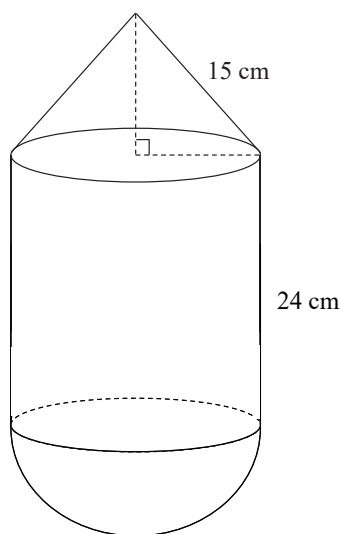
- 2 Factorise completely

- (a) $11x - px - 11y + py$, [2]
- (b) $2x^2 + 11x + 12$. [1]
-

- 3 The diagram shows a pentagon $ABCDE$. Calculate the value of x . [2]



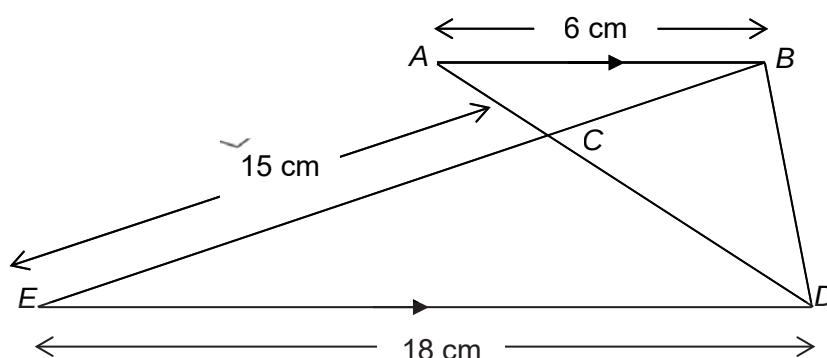
- 4 The solid is made up of a cone, a cylinder and a hemisphere.
 The slant height of the cone is 15 cm.
 The height of the cylinder is 24 cm and its base area is $81\pi \text{ cm}^2$.



- (a) (i) Show that the base radius of the cone is 9 cm. [1]
 (ii) Find the height of the cone. [2]
 (b) Calculate the volume of the solid. [3]
 (c) Given that the metal used to make the solid has a density of 7 g/cm^3 ,
 calculate the mass, in kg, of the solid. [2]

- 5 In the diagram below, ACD and BCE are straight lines. AB is parallel to ED .

It is given that $AB = 6 \text{ cm}$, $EC = 15 \text{ cm}$ and $ED = 18 \text{ cm}$.



- (a) Name the triangle that is similar to triangle ABC . [1]
 (b) Find the scale factor of the enlargement. [1]
 (c) Find the length of BC . [1]

- 6 Part of a pattern of numbers is shown in the table below.

	<i>Column 1</i>	Column 2
Row 1	3	67
Row 2	12	63
Row 3	27	59
Row 4	48	55
Row 5	<i>p</i>	<i>q</i>
⋮	⋮	⋮
⋮	⋮	⋮
Row <i>n</i>	$3(n)^2$	$67 + (n - 1)(-4)$

- (a) State the values of ***p*** and ***q***. [2]
 (b) Find the row if the number in *column 1* is 1200. [1]
 (c) Find the row that contains the first negative term in ***Column 2***. [1]
-

- 7 Amalia wants to put \$8400 in a fixed deposit account as an investment.

AMZ bank offers a simple interest rate of 2.15% per annum.

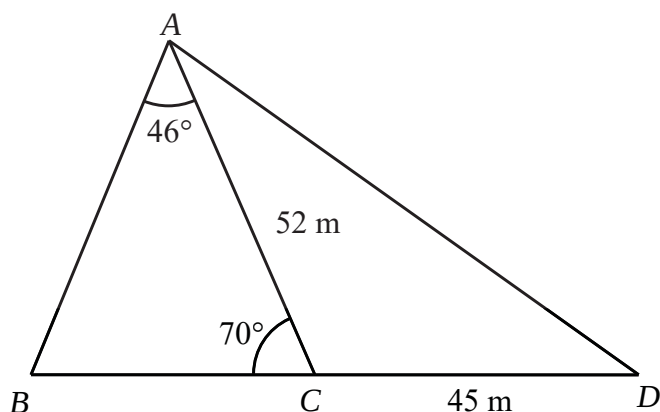
BOT Bank offers a compound interest of 2.15% per annum.

- (a) If Amalia chooses AMZ Bank, calculate the total amount of interest paid to her account in 3 years. [2]
 (b) If Amalia chooses BOT Bank, calculate the total amount of interest paid to her account in 3 years. [2]
-

- 8 Given that $R = \frac{PT}{v + b}$,

- (a) find the value of *R* when $P = 7$, $T = 15$, $b = 1.8$ and $v = 3.2$, [1]
 (b) express *b* in terms of *R*, *P*, *T* and *v*. [2]
-

- 9 A, B, C and D are four points found on a triangle. BCD is a straight line, $AC = 52$ m and $CD = 45$ m. Angle $BAC = 46^\circ$ and angle $ACB = 70^\circ$.



Calculate

- (a) AB , [3]
 (b) the area of triangle ACD . (Give your answer to 2 decimal places.) [2]

10 Answer the whole of this question on a single sheet of graph paper.

The variables x and y are connected by the equation

$$y = 4x + \frac{20}{x} - 25$$

Some corresponding values of x and y are given in the following table.

x	1	2	3	4	5	6	7	8
y	-1	k	-6.3	-4	-1	2.3	5.9	9.5

- (a) Find the value of k . [1]
 (b) Using a scale of 2 cm to represent 1 unit, draw a horizontal axis for $0 \leq x \leq 8$.
 Using a scale of 1 cm to represent 1 unit, draw a vertical axis for $-8 \leq y \leq 10$.
 On your axes, plot the points given in the table and join them with a smooth curve. [3]
 (c) Using your graph, find
 (i) the minimum value of y , [1]
 (ii) the solutions for the equation $4x + \frac{20}{x} - 25 = -5$. [1]
 (d) By drawing a tangent, find the gradient of the curve at $x = 3$. [2]

- 11** International Standard (ISO) paper sizes are used in most countries today. The diagram below shows the different papers sizes found in the A series. Each successive larger ISO paper size is twice the area of the previous smaller size.

(a) Find the ratio of the width of an A5 paper to the **length of an A4** paper. [1]

(b) Papers are measured in GSM. It stands for grams **per square** meter.

A 80 gsm paper means that a sheet of paper that measures 1 m by 1 m has a mass of 80g. The dimensions of an A4 paper is 21.0 cm by 29.7 cm.

Find the mass of a 80 gsm A4 paper, correct to the nearest grams. [2]

(c) Reams of papers with varying gsm are sold at different prices.

John compares the prices of one ream of paper from two paper companies.

<i>Brand</i>	Double B	One Paper
<i>Product Details</i>	500 sheets of A4 papers/ream 80 gsm	500 sheets of A4 papers/ream 70 gsm
<i>Price</i>	\$4.80/ream	\$4.50/ream

John says, “The brand ‘One Paper’ has more value for money.”

Is John correct? Explain your answer. [2]

(d) A student uses a photocopier to enlarge an A4-sized document to A3 size.

The machine prompts him for an enlargement percentage. He proceeds to key in 200% but he does not get the required result.

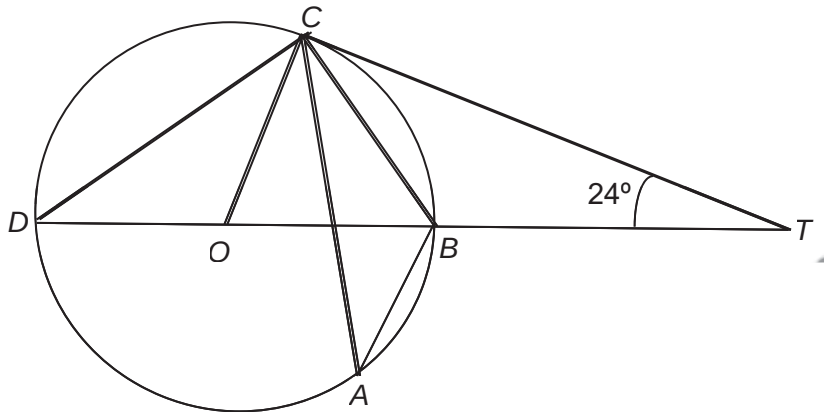
(i) Suggest a possible reason for the student keying in “200%”. [1]

(ii) What is the correct percentage that the student should key in so as to enlarge the A4-sized document to A3 size? (You may draw diagrams to help you explain your answer.) [2]

Section B (8 marks)

Answer only **one** question from this section. Each question carries 8 marks.

12. (a) The diagram shows a circle $ABCD$ with centre at O . $\angle BTC = 24^\circ$, $TBOD$ is a straight line and TC is a tangent to the circle at C .



Find

- | | |
|----------------------|-----|
| (i) $\angle BOC$, | [1] |
| (ii) $\angle BDC$, | [1] |
| (iii) $\angle TCD$, | [1] |
| (iv) $\angle BAC$. | [1] |

- (b) The diagram shows the course $ABCA$ of a yacht race.

The bearing of the yacht, at point C from A is 087° .

- | | |
|--|-----|
| (i) Show that angle $ACB = 65.1^\circ$. | [2] |
| (ii) Find the bearing of B from C . | [2] |

- 13 (a)** The cumulative frequency curve below shows the marks obtained, out of 100, by 400 students in a Science examination.

Number of students

Marks

Use the graph to find the

- | | |
|---|-----|
| (i) median mark, | [1] |
| (ii) interquartile range, | [1] |
| (iii) 85 th percentile mark for the examination, | [1] |
| (iv) passing mark if 220 students passed the examination, | [1] |
| (v) probability that he scores less than 60 marks when a student is randomly selected. | [1] |
- (b)** Each letter of the word “POSSIBILITY” is written on identical cards. One card is chosen at random. Find the probability that the letter on the chosen card is
- | | |
|------------------------------|-----|
| (i) an “I”, | [1] |
| (ii) a “B” or an “S”, | [1] |
| (iii) a vowel. | [1] |

END OF PAPER

10
Changkat Changi Secondary School
4NA Prelim Paper 2 Marking Scheme

Qn		Answers	Marks
1	(a)	(i) 1.359×10^4	B1
		(ii) 7710	B1
	(b)	Area = $\pi \left(\frac{2.5}{2}\right)^2$ ----[M2, 1 mark for converting mm to cm,	M1
		1 mark for finding the radius of the circle]	A1
		Area = $1.5625\pi \text{ cm}^2$ or $1\frac{3}{4}\pi$	
2	(a)	$11x - px - 11y + py$ $= x(11 - p) - y(11 - p)$ $= (11 - p)(x - y)$	M1 A1
	(b)	$(2x + 3)(x + 4)$	A1
3		$(5 - 2) \times 180^0 = (x + 12 + 2x + 122 + 100 \times 90)^0$	M1
		$540^0 - 324^0 = 3x^0$ $540^0 - 324^0 = 3x^0$ $x = 72$	A1
4	(a)	$\pi r^2 = 81\pi$	
	(i)	$r^2 = 81$ $r = 9$ (shown)	A1
	(ii)	Let the h be height of the cone. $15^2 = 9^2 + h^2$ $h = \sqrt{15^2 - 9^2}$ $= 12\text{cm}$	A2
	(b)	Volume $= \frac{1}{3} \times \pi \times 9^2 \times 12 + \pi \times 9^2 \times 24 + \frac{2}{3} \times \pi \times 9^3$ [M2] – 1 for each error $= 8651.946168\text{cm}^3$ $\approx 8650\text{cm}^3$ (3sf) [A1] accept 8652cm^3 or 8651.9cm^3	M2 A1
	(c)	Mass of solid $= 8651.946168 \times 7$ $= 60563.62318 \text{ g}$ $= 60.6 \text{ kg}$ (3sf)	M1 A1
5	(a)	Triangle DEC	B1
	(b)	3	B1
	(c)	$\frac{6}{18} \times 15$ $= 5 \text{ cm}$	A1

6	(a)	$p = 75$ $q = 51$	B1 B1
	(b)	Row 20	B1
	(c)	Row 18	B1
7	(a)	Total interest = $8400 \times \frac{2.15}{100} \times 3$ $= \$541.80$	B1 B1
	(b)	Total amount = $8400(1.0215)^3$ $= \$8,953.53$ Total interest = $\$8953.53 - \$8400 = \$553.53$	B1 A1
8	(a)	$R = \frac{PT}{v+b} = 21$	A1
	(b)	$R = \frac{PT}{v+b}$ $R(v+b) = PT$ $Rb = PT - Rv$ $b = \frac{PT - Rv}{R}$ or $\frac{RT}{R} - v$	M1 A1
9	(a)	$\angle ABC = 180^\circ - 46^\circ - 70^\circ$ $= 64^\circ$ (sum of $\angle$ s in Δ) Using Sine Rule, $\frac{AB}{\sin 70^\circ} = \frac{AC}{\sin 64^\circ}$ $= \frac{52}{\sin 64^\circ}$ $AB = \frac{52}{\sin 64^\circ} \times \sin 70^\circ$ $= 54.366$ $\approx 54.4 \text{ m}$ (3 sig. fig.)	M1 M1 A1

		(iii) $\angle TCD = 180^\circ - 33^\circ - 24^\circ = 123^\circ$ (angle sum of triangle)	A1
		(iv) $\angle BAC = \angle BDC = 33^\circ$ (angle at circumference are equal)	A1
		(Deduct one mark for no reasons or incorrect reasons)	A1
	(b)	(i) $\angle BAC = 87^\circ - 50^\circ = 37^\circ$ By sine law, $\frac{\sin \angle ACB}{98} = \frac{\sin \angle BAC}{65}$ $\therefore \sin \angle ACB = \frac{98 \sin \angle BAC}{65}$ $\angle ACB = 65.1^\circ$ (ii) Draw $N'C//NA$. $\angle BCN' = \angle N'CA - \angle ACB$ $= 180^\circ - 87^\circ - 65.1^\circ$ $= 27.9^\circ$ Bearing of C from B is $360^\circ - 27.9^\circ \approx 332.1^\circ$	M1 A1 M1 A1

13	(a)(i)	Median = 45 marks	B1
	(ii)	$Q_3 = 60, Q_1 = 30$ Interquartile range = $60 - 30 = 30$	B1
	(iii)	66 marks	B1
	(iv)	42 marks	B1
	(v)	$\frac{3}{4}$	B1
	(b)(i)	$\frac{3}{11}$	B1
	(ii)	$\frac{3}{11}$	B1
	(iii)	$\frac{4}{11}$	B1