MINISTRY OF EDUCATION, SINGAPORE
in collaboration with
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER S

INDEX NUMBER

MATHEMATICS

4048/01

Paper 1

October/November 2018

2 hours

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number and name 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.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
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 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, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 80.

This document consists of **16** printed pages.

DC (SC/SG) 146117/3

Oct/Nov 2018 Paper 1 (1)

Answer **all** the questions.

1 Write the following numbers in order of size, starting with the **smallest**.

$$0.65, \quad \frac{3}{4}, \quad \left(\frac{3}{4}\right)^2, \quad \frac{3}{5}$$

Answer ....., ..., ..., ... [1]

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2 Simplify $\left(\frac{x^8}{y^6}\right)^{-\frac{3}{2}}$.

Answer ..... [2]

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3 One solution of the equation $kx^2+(k+1)x-4=0$ is $x=-2$.

Find

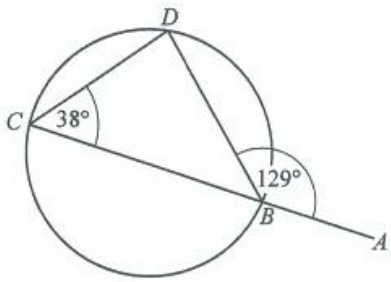
(a) the value of k,

Answer $k=$ ..... [1]

(b) the second possible value of x.

Answer $x=$ ..... [1]

4



In the diagram, B, C and D are points on a circle.
ABC is a straight line.
Angle $BCD = 38°$ and angle $ABD = 129°$.

Explain why BC is **not** a diameter of the circle.

.....

.....

.....

..... [2]

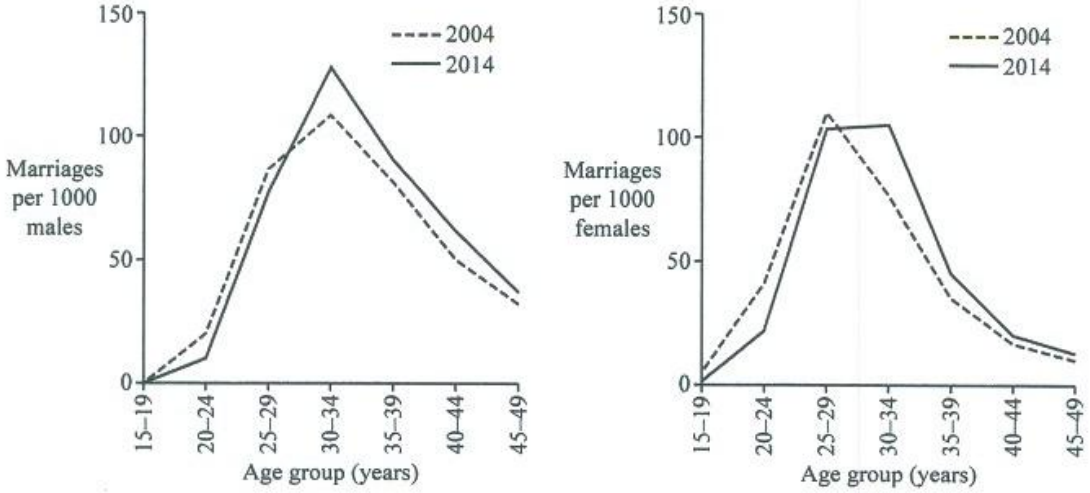
5 Show that $(3n-1)^2+2$ is a multiple of 3 for all integer values of n.

Answer

[2]

6

Marriage rates by age group



These charts show the marriage rates for males and females in Singapore for 2004 and 2014.

(a) Make one comment about the ages at which males married in 2014 compared with 2004.

.....[1]

(b) Huma claims that, in 2014, in general males married at a higher age than females.

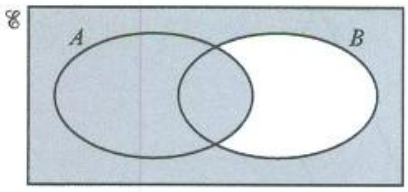
Do the charts support her claim?
Justify your answer with reference to the charts.

..... because .....

.....[1]

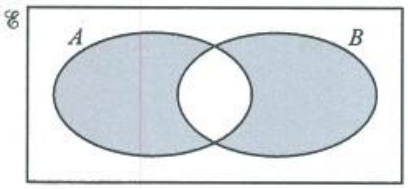
7 Write down the sets represented by the following shaded regions.

(a)



Answer ..... [1]

(b)



Answer ..... [1]

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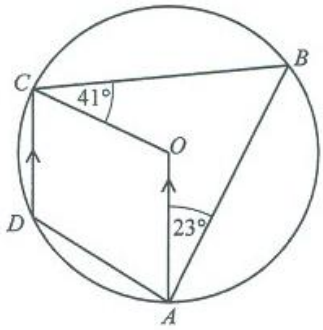
8 The cash price of a television is $1475.
The hire-purchase price of the television is $1651.
The hire-purchase price is a deposit plus 12 equal monthly payments of $113.

Calculate the deposit as a percentage of the cash price.

Answer ..... % [3]

9



In the diagram, A, B, C and D are four points on a circle, centre O.
OA and CD are parallel.
Angle $OAB = 23°$ and angle $OCB = 41°$.

Find

(a) angle ABC,

Answer ..... [1]

(b) angle AOC,

Answer ..... [1]

(c) angle OAD.

Answer ..... [1]

---

10 An aeroplane leaves Adelaide, in Australia, at 0925 local time.
The distance from Adelaide to Singapore is 5408 km.
The average speed of the aeroplane is 721 km/h.
The aeroplane arrives in Singapore at 1525 local time.

Find the time difference between Adelaide and Singapore, stating whether the time in Singapore is ahead of or behind the time in Adelaide.
Show your working.

Answer Singapore is ..... by .....hours [3]

---

11 The cargo volume of an aircraft is $184\,m^3$.
A model of this aircraft is built to a scale of 1 : 20.

Find the cargo volume, in m^3, of the model.
Give your answer in standard form.

Answer ..... m^3 [3]

12 (a) The time taken to erect a fence is inversely proportional to the number of workers.
Four workers take 17.5 hours.

Find the time it would have taken 5 workers to erect the fence.

Answer ..... hours [1]

(b) The force, F, between two objects is inversely proportional to the square of the distance, d, between them.

The distance between two objects is increased by 20%.

Calculate the percentage reduction in the force between the objects.

Answer ..... % [2]

13 Factorise completely

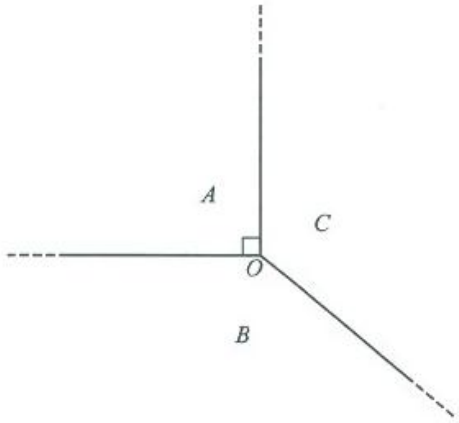
(a) $8p^2q-6pq^3$,

Answer ..... [2]

(b) $6x^2y-2xy+3x-1$.

Answer ..... [2]

14



The diagram shows one interior angle of each of three regular polygons, A, B and C.
The polygons fit together at O.
A is a square and C is a regular hexagon.

Find the number of sides in polygon B.

Answer ..... [4]

15 The mean height of a group of students is 171 cm.
In the group there are 4 more females than males.

The mean height of the females is 162 cm.
The mean height of the males is 183 cm.

Calculate the total number of students in the group.

Answer ..... [4]

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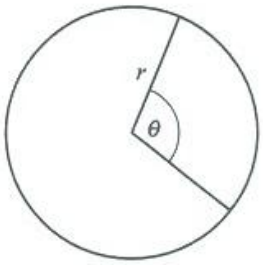
16 The diagram shows a circle with radius r cm.
The circle is divided into two sectors.
The angle of the minor sector is θ radians.



The perimeter of the major sector is
twice the perimeter of the minor sector.

Find the value of θ.
Give your answer correct to three decimal places.

Answer ..... radians [4]

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17 Rearrange the formula $y = \frac{x^2+3}{x^2-a}$ to make x the subject.

Answer $x =$ ..... [4]

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18 (a) $\overrightarrow{PQ} = \begin{pmatrix} a \\ 3a \end{pmatrix}$.

$|\overrightarrow{PQ}| = \frac{5\sqrt{10}}{2}$.

Find the two possible values of a.

Answer $a =$ ..... or ..... [2]

(b) A line joins the two points A (–5, 1) and B (43, 38).

(i) Find $\overrightarrow{AB}$.

Answer ( ) [1]

(ii) Use vectors to show whether or not the point C (11, 13) lies on this line.

Answer

[2]

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19 The masses, in grams, of 30 apples and 25 bananas were recorded.
The results are shown in the stem-and-leaf diagram.

Apples						Bananas					
			5	2	9						
	8	2	1	0	10	3	3	5	5		
9	6	5	0	0	11	0	2	4	4	7	8
9	7	4	3	2	12	1	1	5	5	6	8
8 6	5	2	2	0	13	2	3	4	4	9	
9	8	8	6	4	14	0	6	6	x		
		9	9	3	15						

Key (Apples)
2 | 9 means 92 grams

Key (Bananas)
10 | 3 means 103 grams

(a) Write down the median mass of the apples.

Answer ..... grams [1]

(b) The range of the masses for the bananas is 44 grams.

Find x.

Answer $x =$ ..... [1]

(c) Make two comments comparing the masses of the apples and the bananas.

1. .....

.....

2. .....

..... [2]

20 **(a)** Express 126 as the product of its prime factors.

Answer ..... [1]

(b) The number $126k$ is a perfect square.

Find the smallest positive integer value of k.

Answer $k =$ ..... [1]

(c) x is a number between 200 and 300.
The highest common factor of x and 126 is 21.

Find the smallest possible value of x.

Answer $x =$ ..... [2]

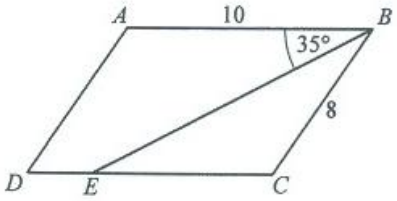
21 The points (–2, 11) and (4, –1) lie on the curve given by the equation $y = ax^2 + bx + 3$.

Use an algebraic method to find the values of a and b.

Answer $a =$ .....

$b =$ ..... [4]

22



$ABCD$ is a parallelogram.
BE bisects angle ABC.
$AB = 10$ cm, $BC = 8$ cm and angle $ABE = 35°$.

Calculate the area of trapezium $ABED$.

Answer ..... cm^2 [5]

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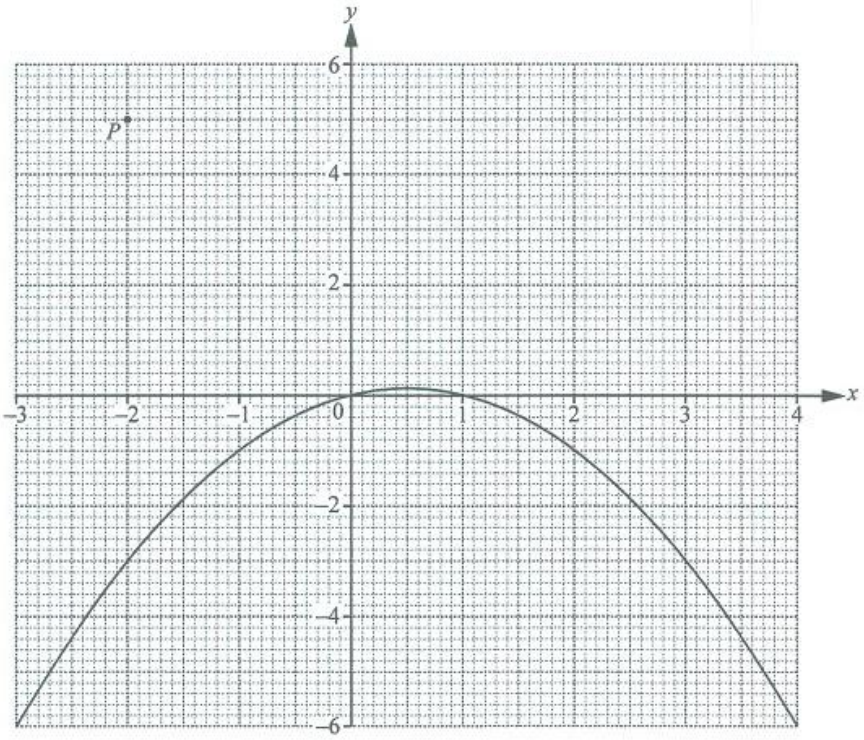
23 The graph of $y = \frac{1}{2}(x - x^2)$ is drawn on the grid.



(a) Write down the equation of the line of symmetry of the curve.

Answer ..... [1]

(b) Use the graph to solve the equation $x - x^2 = -4$.

Answer $x =$ ..... or ..... [2]

(c) The point P has coordinates $(-2, 5)$.
A tangent to the curve can be drawn so that the tangent passes through P.

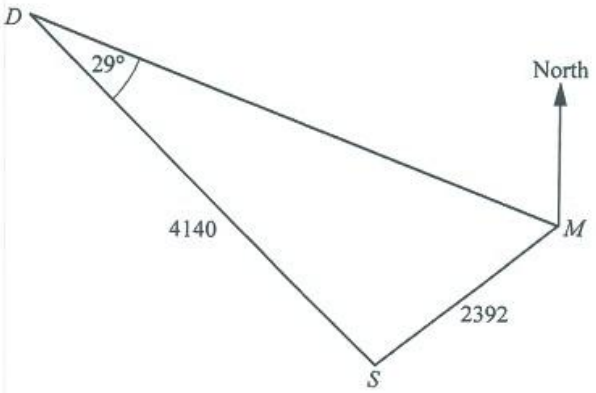
(i) Draw this tangent on the grid above. [1]

(ii) Find the equation of this tangent.

Answer ..... [2]

[Question 24 is printed on the next page]

24



The diagram shows the positions of three cities, Singapore (S), New Delhi (D) and Manila (M). $SM = 2392$ km, $SD = 4140$ km and angle $SDM = 29°$.

(a) Calculate acute angle DMS.

Answer ..... [2]

(b) The bearing of New Delhi from Manila is 290°.

Find the bearing of New Delhi from Singapore.

Answer ..... [2]