## St. Stephen's Girls' College Final Examination 2018-2019

Form 1 178 students VC, LHK, LL, JSCL, CYN

## MATHEMATICS Paper I Time Allowed: 1 hour 30 minutes

Class:	Class No.:	Division:	Name:
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## Please read the following instructions very carefully.

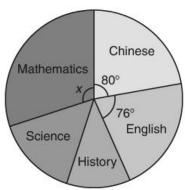
- 1. Write your class, class number, name and division in the spaces provided on this cover.
- 2. This paper carries 100 marks. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question/Answer Paper.
- 3. *ALL* working must be clearly shown.
- 4. The diagrams in this paper are not necessarily drawn to scale.

For	For Markers' Use Only			
Question No.	Marks			
1	(6)			
2	(8)			
3	(6)			
4	(8)			
5	(5)			
6	(7)			
7	(7)			

For Markers' Use Only			
Question No.	Marks		
8	(9)		
9	(6)		
10	(9)		
11	(5)		
12	(7)		
13	(8)		
14	(9)		
Total	(100)		

1. The pie chart below shows the favourite subjects of 180 S1 students. There are 54 students who like Mathematics.

Favourite subjects of 180 S1 students



Thistory	
<ul><li>(b) (i) Find the total number of students who like Science or History. (2</li><li>(ii) If the number of students who like Science is 6 more than that of History, find the nu</li></ul>	2 marks) 2 marks) mber of 2 marks)

2. The back-to-back stem-and-leaf diagram below shows the lifetimes (in hours) of dry cells brand *A* and brand *B*.

## Lifetimes of dry cells of 2 different brands

Brand $A$	Brand B		
Leaf (1 hour)	Stem (10 hours)	Leaf (1 hour)	
8	0	7 7 9	
8 7 4	1	3 3 5 7 8 0 4 5 5 6 8 9	
7 5 3 2	a	0 4 5 5 6 8 9	
6 4 2 1 0 <i>b</i>	3	1 8 9	
4 2	4	2 2	

	<ul> <li>Find the values of a and b.</li> <li>Dry cells with lifetimes less than 20 hours fail a quality control test.</li> <li>(i) Find the percentage of dry cells of brand A that fail the test.</li> <li>(ii) Find the percentage of dry cells of brand B that fail the test.</li> <li>(iii) Someone claims that the percentage of all the dry cells that fail the test is 65%. Do you agree? Explain your answer.</li> </ul>	(2 marks) (2 marks) (2 marks) (2 marks)

<ul><li>(a) Express t</li><li>(b) If the number</li></ul>	the total number of sweets in mber of children is reduced How many sweets are there i	n terms of <i>x</i> .  by 2, each of the rem	(1 mark) e 13 more (5 marks)

4. Daisy has 3 books on her shelf, a Chinese book, an English book and a Mathematics book. The Chinese book has 30 pages more than twice the number of pages in the English book. The total number of pages in 6 copies of the Chinese book and 2 copies of the English book is equal to that in a copy of the Mathematics book. (a) If the number of pages in the English book is x, express in terms of x, the number of pages in each of the Chinese and Mathematics books. (b) If the number of pages in 44 copies of the Chinese book is equal to that in 7 copies of the Mathematics book, find the number of pages in each of the three books. (5 marks)

- 5. The figure shows a polar coordinate plane. Denote the pole by O. The coordinates of points P and Q are  $(4, 210^\circ)$  and  $(3, 120^\circ)$  respectively.
  - (a) Is *OP* perpendicular to *OQ*? Explain your answer.

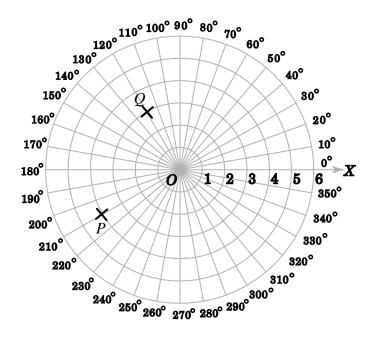
(2 marks)

(b) (i) Plot  $R(5, 30^{\circ})$  in the polar coordinate plane.

(1 mark)

(ii) Find the area of  $\triangle PQR$ .

(2 marks)



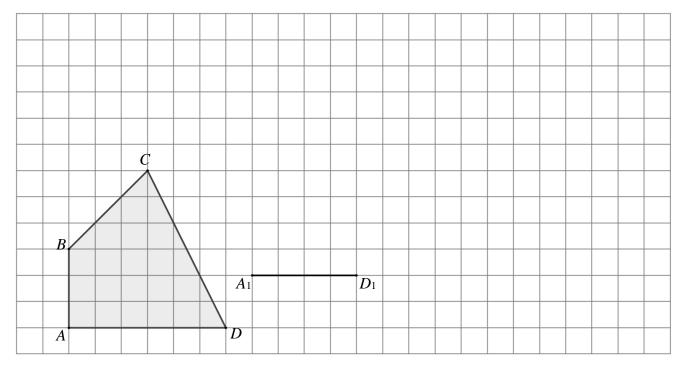
- 6. In the figure,  $A_1D_1$  is the image of AD after reduction.
  - (a) Draw the image  $A_1B_1C_1D_1$  after reducing ABCD.

(3 marks)

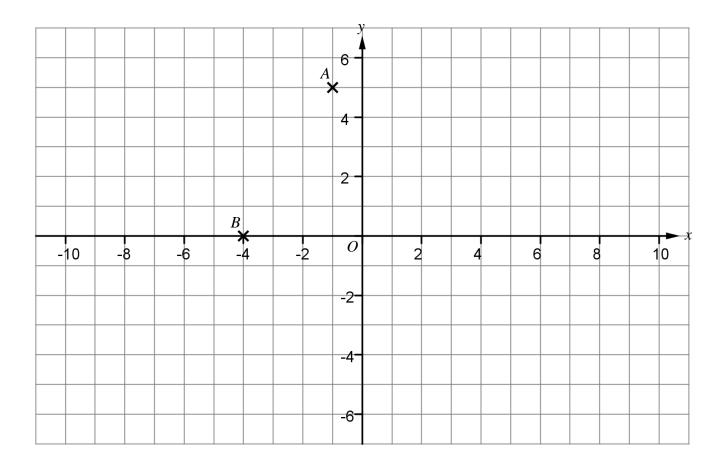
(b) Write down the reduction factor.

(1 mark)

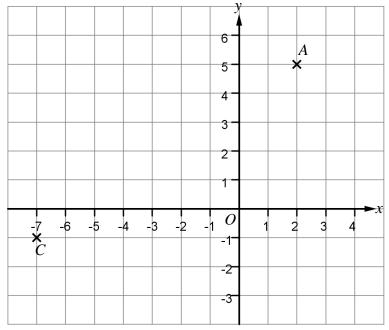
(c) Draw the image  $A_2B_2C_2D_2$  after translating  $A_1B_1C_1D_1$  6 units to the right, and then 2 units upwards. (3 marks)




- 7. The figure shows the points A and B in a rectangular coordinate plane. A and B are rotated clockwise about O through  $90^{\circ}$  to points R and S respectively.
  - (a) Mark R and S in the rectangular coordinate plane. (2 marks)
  - (b) (i) Plot T(-1, -5) in the rectangular coordinate plane. (1 mark)
    - (ii) If A undergoes a transformation to T, describe the transformation. (2 marks)
    - (iii) Draw the quadrilateral *BSRT*. Draw all the axes of symmetry of *BSRT*. (2 marks)



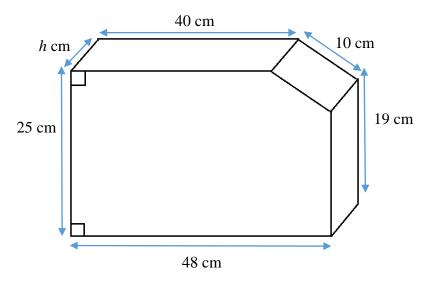
8. The figure shows a rectangular coordinate plane. The coordinates of points A and C are (2, 5) and (-7, -1) respectively. A is reflected along the y-axis to a point B. C is translated 9 units to the right and then 2 units downwards to a point D.



- (a) Write down the coordinates of B and D. (2 marks)
- (b) Draw the quadrilateral *ABCD* in the rectangular coordinate plane. (2 marks)
- (c) Let *P* be the point of intersection of the diagonals of *ABCD*. Mark *P* in the rectangular coordinate plane. Which quadrant does *P* lie in?
- (d) Find the area of ABCD. (3 marks)


(2 marks)

9. Peter buys a toy from a shop. The packing of the toy is a prism as shown.

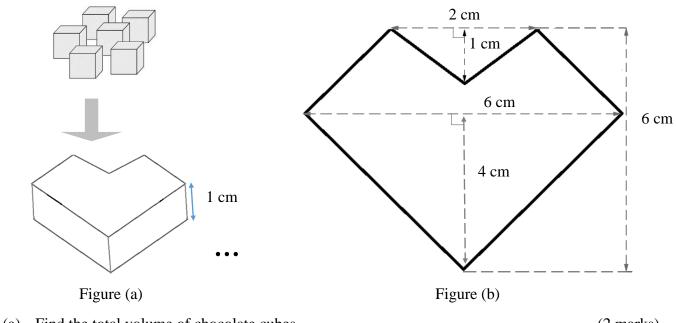


It is given that the volume of the toy is 14112 cm<sup>3</sup>.

(a) Find the value of h. (4 marks)

(b) Find the total surface area of the prism.	(2 marks)

10. Carol had six chocolate cubes each of side 2 cm. To celebrate Valentine's Day, she melted all the chocolate cubes to form a number of 'heart-shaped' prisms as shown in Figure (a). Figure (b) shows the dimensions of the base of the prism.



(a) Find the total volume of chocolate cubes.

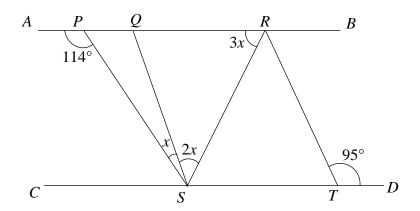
(2 marks)

(b) Find the volume of a 'heart-shaped' prism.

- (3 marks)
- (c) Find the maximum number of 'heart-shaped' prisms she can make and the volume of the chocolate remained. (4 marks)

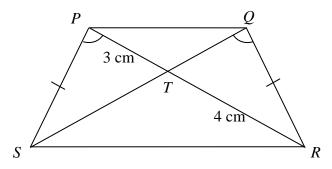

11. Find the unknowns in the figure.	(5 marks)	$B \xrightarrow{A \atop 70^{\circ}} C$ $D \xrightarrow{B \atop 70^{\circ}} C$	F $G$ $H$ $H$

13. In the figure, APQRB and CSTD are straight lines where  $AB /\!\!/ CD$ .



<ul><li>(a) Find x.</li><li>(b) Determine if QS // RT. Explain your answer.</li></ul>	(4 marks)

14. In the figure, PR and QS intersect at T. It is given that  $\angle SPR = \angle RQS$  and PS = QR.



	(a) Prove that $\triangle PST \cong \triangle QRT$ . (b) If $TR = 4$ cm and $PT = 3$ cm, find $ST$ and $QT$ .		(3 marks)	(3 marks)	
			(2 marks)		
	(c)	Using the results of (b), prove that $\triangle RST \sim \triangle QPT$ .	(4 marks)		