

St. Stephen's Girls' College  
Final Examination 2016-2017

Form 1  
174 students

VC, LHK, KAL, CYN

MATHEMATICS  
Paper I  
Time Allowed: 1 hour 30 minutes

Name: \_\_\_\_\_ (    )

Class: \_\_\_\_\_ Division: \_\_\_\_\_

**Instructions:**

- Attempt **ALL** questions.
- Write your answers in the spaces provided in this **Question-Answer Paper**.
- **ALL** working must be clearly shown.
- The diagrams in this paper are not necessarily drawn to scale.
- This paper carries 100 marks.

Question No.	Marks
1	
2	
3	
4	
5	
6	
7	
8	

Question No.	Marks
9	
10	
11	
12	
13	
14	
15	
Total	

1. It is given that  $S = \frac{17a-1}{a+1}$ . If  $S = \frac{59}{4}$ , find the value of  $a$ . (3 marks)

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2. Solve the equation  $\frac{x-4}{5} - x = 1$ . (4 marks)

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3. There are 20 questions in a game. 5 marks will be given for a correct answer. Otherwise, 3 marks will be deducted.  
(a) Peter got  $x$  answers correct. Express the marks of Peter in terms of  $x$ . (3 marks)  
(b) Is it possible for a student to get 0 mark in the game? Explain your answer. (4 marks)

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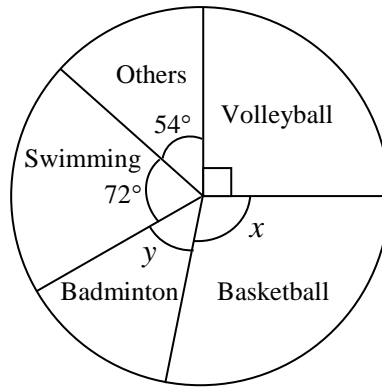
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4. The pie chart below shows the favourite sports of the students in S1A.



It is known that 8 students in S1A choose 'Swimming' as their favourite sport.

(a) Find the total number of students in S1A. (2 marks)

(b) If 30% of students in S1A choose 'Basketball' as their favourite sport, find

(i)  $x$ , (2 marks)

(ii) the number of students in S1A who choose 'Badminton' as their favourite sport. (3 marks)

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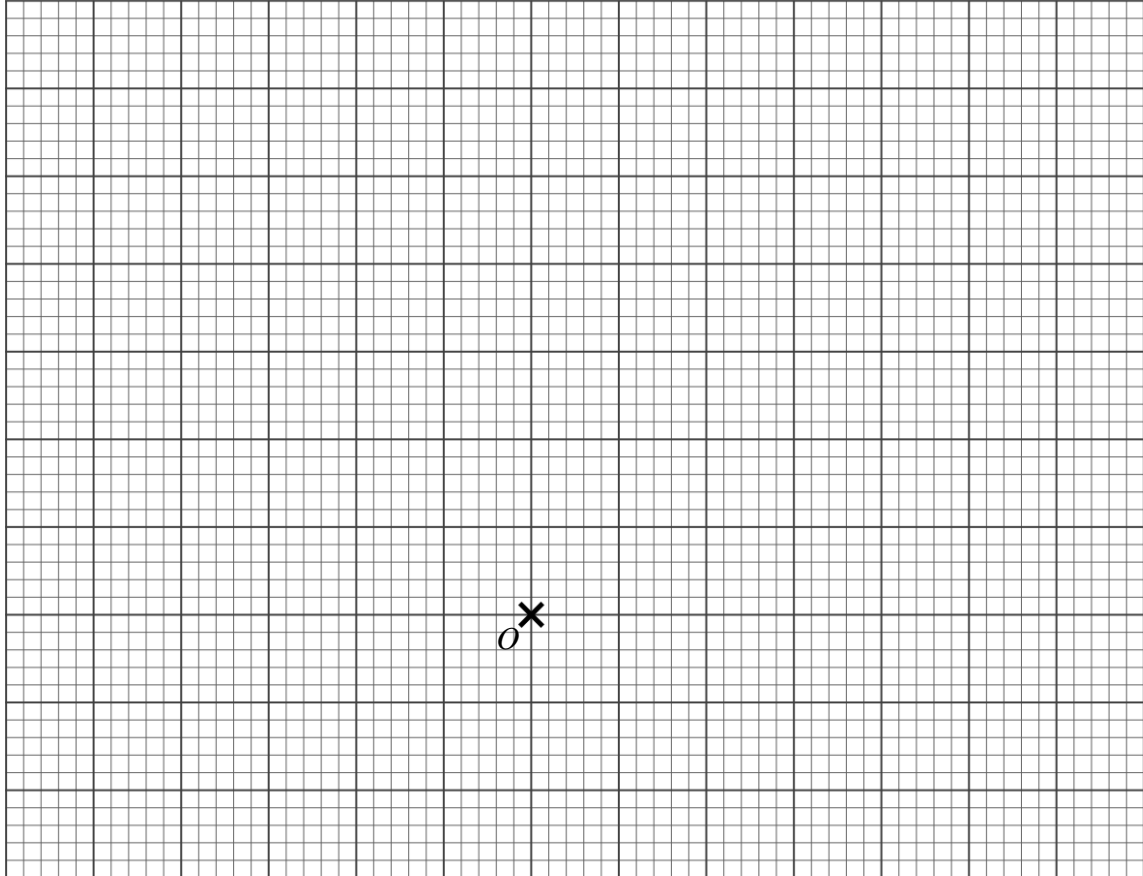
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5.  $A(-5, -2)$ ,  $B(3, -1)$ ,  $C(6, 4)$  and  $D(0, 6)$  represent the vertices of a quadrilateral  $ABCD$ . Let  $O$  be the origin.

- (a) Draw the quadrilateral  $ABCD$  in a rectangular coordinate plane. (3 marks)
- (b) Find the area of  $ABCD$ . (3 marks)
- (c) The coordinates of a point  $P$  are  $(5, 0)$ .
  - (i) Mark  $P$  in the coordinate plane in (a). (1 mark)
  - (ii) Hence, determine whether  $O$  and  $P$  lie inside or outside  $ABCD$ . (1 mark)



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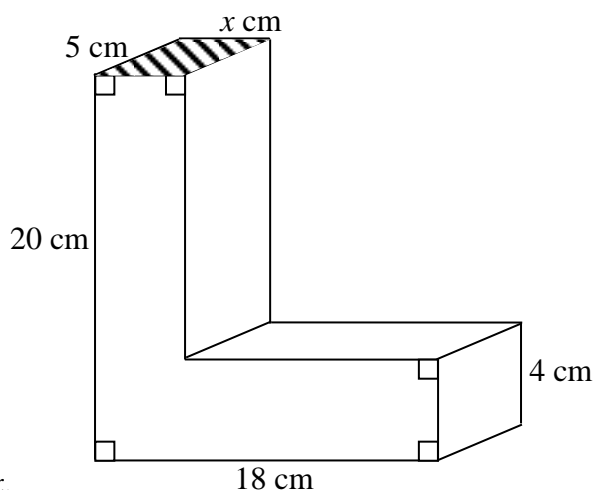
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6. Consider two points  $A(3, 5)$  and  $B(3, -2)$ .  $AB$  cuts the  $x$ -axis at  $C$ .
- (a) Write down the coordinates of  $C$ . (2 marks)
- (b)  $K$  is a point on the  $x$ -axis such that the area of  $\triangle KAB$  is 14 sq. units. Find the two possible coordinates of  $K$ . (4 marks)

7. The figure shows a container in the shape of a prism. The shaded area is the lid of the container. It is given that the total surface area (including the lid) of the container is  $588 \text{ cm}^2$ .



- (a) Find the value of  $x$ . (4 marks)  
 (b) Find the capacity of the container. (3 marks)  
 (c) If the container contains 54% of its capacity of water, find the depth of water if the container is placed upright as shown. (3 marks)

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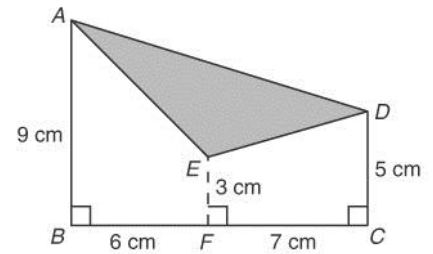
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8. In the figure, the shaded region is the base of a metal prism.
- Find the area of the shaded region. (3 marks)
  - It is given that the height of the prism is 12 cm. If the prism is melted and recast into another prism with height 10 cm, find base area of the new prism. (2 marks)




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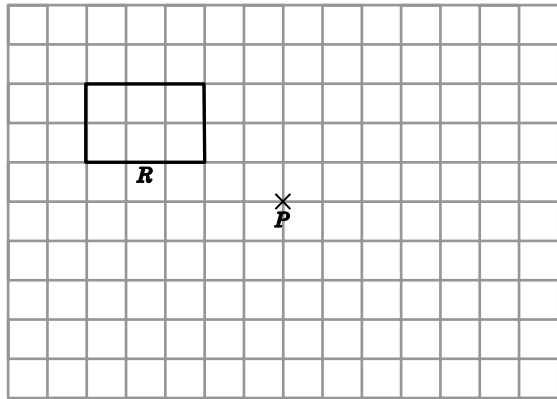
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9. The figure shows a rectangle  $R$ .
- Draw the image  $K$  after  $R$  is translated 4 units to the right. (2 marks)
  - Draw the image  $K'$  after  $K$  is rotated clockwise about point  $P$  through  $270^\circ$ . (2 marks)
  - Draw the image  $R'$  after  $R$  is rotated clockwise about point  $P$  through  $270^\circ$ . (2 marks)
  - If  $R'$  undergoes a transformation to  $K'$ , describe the transformation. (2 marks)




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10. In the figure, point  $Q$  is the image of point  $P$  after  $P$  is rotated anticlockwise about the origin  $O$  through  $270^\circ$ .

(a) Write down the coordinates of  $P$ .

(1 mark)

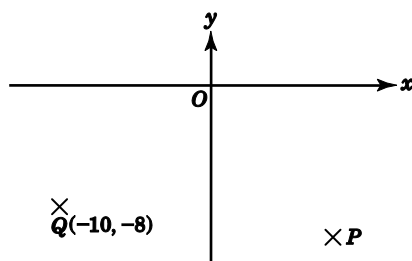
(b)  $Q$  is translated 18 units upwards and then 2 units to the right to a point  $R$ .

(i) Find the coordinates of  $R$ .

(ii) If  $P$  undergoes a transformation to  $R$ , describe the transformation.

(iii) Do  $P$ ,  $O$  and  $R$  lie on the same straight line?

(5 marks)




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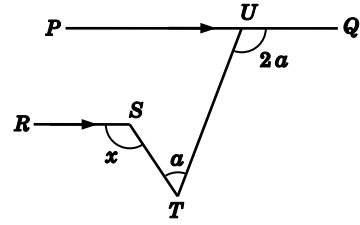
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12. In the figure,  $U$  is a point on  $PQ$  and  $PQ \parallel RS$ .
- (a) Express  $x$  in terms of  $a$ . (5 marks)
- (b) If  $a = 65^\circ$ , find  $x$ . (2 marks)



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15. The stem-and-leaf diagram below shows the ages of the employees of a company.

<u>Stem(tens)</u>	<u>Leaf(units)</u>						
2	<i>a</i>	8	8	9			
3	0	1	1	3	4	6	6
4	1	6	8	8	9		
5	1	4					
6	0	1					

- (a) If the difference between the age of the oldest employee and the age of the youngest employee is less than 35, write down all the possible values of *a*. (2 marks)
- (b) Find the percentage of employees with ages 40 or above. (2 marks)
- (c) After 5 years, the two oldest employees will leave the company and the company will not recruit new employees. Will the percentage of employees with ages 40 or above be greater than the answer in (b)? Explain your answer. (3 marks)

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