

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

Form 2  
164 students

LC, KAL, LL, WYL, MLY

MATHEMATICS  
Paper II  
Time Allowed: 1 hour

Name: \_\_\_\_\_ No.: \_\_\_\_\_ Class: \_\_\_\_\_ Division: \_\_\_\_\_

**Instructions:**

- Answer **ALL** questions in the spaces provided in this **Question-Answer Paper**.
- All rough work should be done on the rough work paper provided, but will not be marked.
- The diagrams in this paper are not necessarily drawn to scale.
- Unless otherwise specified, numerical answer should be either exact or correct to 3 significant figures.
- This paper carries 100 marks.

Marks:

/ 100

	<u>Answers</u>	<u>Marks</u>
1. How many significant figures are there in each of the following numbers?	1.	
(a) 162 000, correct to the nearest hundred	(a) _____	1
(b) 0.070, correct to 3 decimal places	(b) _____	1
2. The measured temperature of a thermometer is 36 °C with a percentage error of $1\frac{7}{18}\%$ . Find the upper limit of the actual temperature.	2. _____	3
3. Simplify $\frac{(4a^2b)^2}{a^5b^2}$ .	3. _____	2
4. Expand $(2a-3)(a^2+a-5)$ .	4. _____	2
5. Factorize $3(5a-b)^2 - (b-5a)$ .	5. _____	3
6. If $(x+3)(4x-6) \equiv 2x(2x+A) - 18$ , where A is a constant, find the value of A.	6. _____	2
7. Determine whether each of the following is an identity. Circle the correct answers.	7.	
(a) $(6-y)^2 = 36 - 12y - y^2$	(a) Yes / No	1
(b) $(-4b+7c)(7c+4b) = 49c^2 - 16b^2$	(b) Yes / No	1
(c) $(-5x-2)^2 = (2+5x)^2$	(c) Yes / No	1
8. Change the subject of each of the following formulae to the letter in the square brackets.	8.	
(a) $a = 1 + 2bc$ [b]	(a) _____	2
(b) $4ac = b(x+c)$ [c]	(b) _____	3
9. Solve the simultaneous equations $\begin{cases} 5x+3y=8 \\ 3x+5y=4 \end{cases}$ .	9. $x =$ _____ $y =$ _____	1 1
10. If the graph of the equation $3x + y = 12$ passes through $P(m+8, m)$ , find the value of $m$ .	10. _____	2

**Subtotal:** / 26

11. The weights of Philip and Daniel are  $x$  kg and  $y$  kg respectively. The sum of their weights is 72 kg and Daniel is 8 kg lighter than Philip. Form two simultaneous equations to show the above relations between  $x$  and  $y$ .

11. \_\_\_\_\_ 1  
 \_\_\_\_\_ 1  
 \_\_\_\_\_

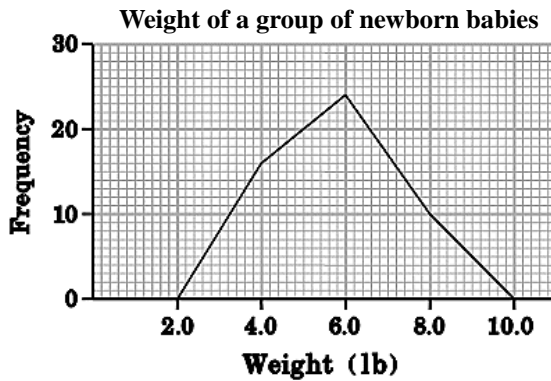
12. The frequency distribution table below shows the working time of a group of teenagers on a certain day.

Time (h)	8.0–8.4	8.5–8.9	9.0–9.4	9.5–9.9	10.0–10.4	10.5–10.9
Frequency	4	32	8	6	2	1

- (a) Find the class mark of the first class interval.  
 (b) Find the class boundaries of the second class interval.  
 (c) Find the class width of each class interval.  
 (d) A teenager in the group spent 9.45 h at work on that day. To which class interval does this datum belong?

12. \_\_\_\_\_ 1  
 (a) \_\_\_\_\_ 1  
 (b) \_\_\_\_\_ 2  
 (c) \_\_\_\_\_ 2  
 (d) \_\_\_\_\_ 2

13. The frequency polygon below shows the weights of a group of newborn babies.



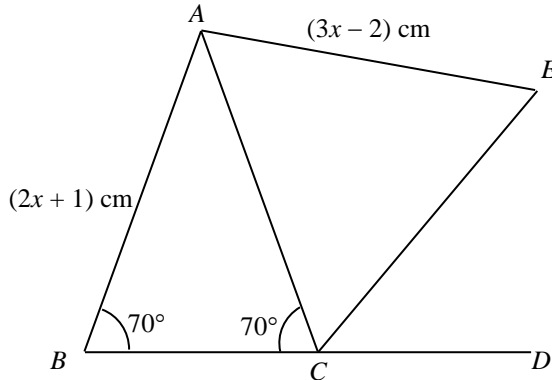
Find the number of newborn babies with weights between 5.0 lb and 7.0 lb (excluding 7.0 lb).

13. \_\_\_\_\_ 2

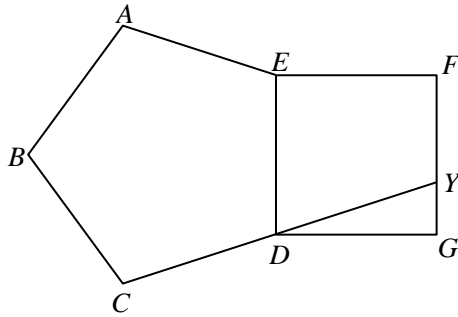
14. Kate can make coffee at a rate of 2 cups/min. How long does it take her to make 96 cups of coffee?  
 15. Simplify 5 cm : 1 m.  
 16. It is given that  $(x - 2y) : (x + y) = 2 : 3$ . Find  $x : y$ .  
 17. The ratio of the width to the length of a rectangle is 3 : 5 and its perimeter is 48 cm. Find its width.  
 18. A box contains 80 balls of three colours: red, yellow and green. The ratio of the number of red balls to that of yellow balls is 1 : 3. If there are 24 yellow balls, find the number of green balls.

14. \_\_\_\_\_ 2  
 15. \_\_\_\_\_ 1  
 16. \_\_\_\_\_ 2  
 17. \_\_\_\_\_ 2  
 18. \_\_\_\_\_ 3

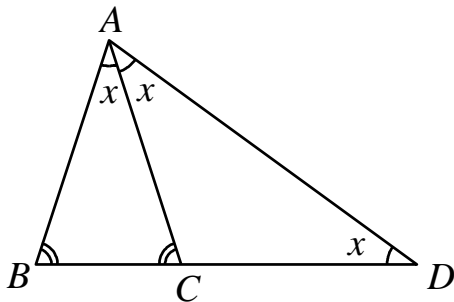
19. The scale of a map is 1 : 80000. If the distance between building *A* and building *B* on the map is 2.5 cm, find the actual distance between *A* and *B* in km.
20. The length of a screw in a scale drawing is 8 cm and its actual length is 2 mm. Find the scale of the drawing in the form 1 : *n*.
21. In the figure,  $\triangle ACE$  is an equilateral triangle.  $\angle ABC = \angle ACB = 70^\circ$  and  $BCD$  is a straight line. Find  $x$ .



22. Find the difference in size of an interior angle and an exterior angle of a regular hexagon.
23. In the figure,  $ABCDE$  is a regular pentagon and  $DEFG$  is a square.  $CDY$  is a straight line. Find  $\angle DYG$ .



24. In the figure, *C* is a point on *BD* and  $\angle ABC = \angle ACB$ . Find  $x$ .



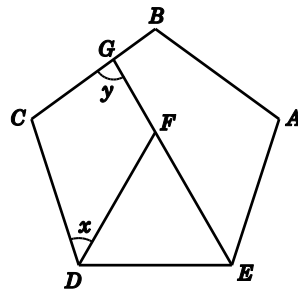
19. \_\_\_\_\_ 2
20. \_\_\_\_\_ 2
21. \_\_\_\_\_ 2

22. \_\_\_\_\_ 3
23. \_\_\_\_\_ 2

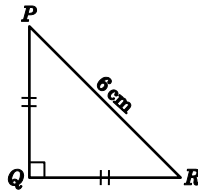
24. \_\_\_\_\_ 3

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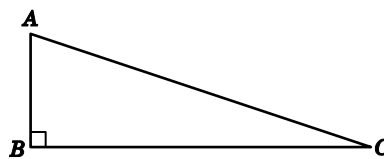
25. In the figure,  $ABCDE$  is a regular pentagon,  $DEF$  is an equilateral triangle and  $GFE$  is a straight line. Find  $x$  and  $y$ .



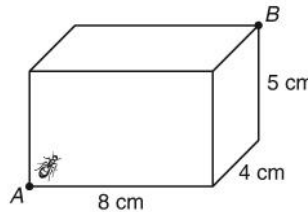
26. Find the area of  $\triangle PQR$  in the figure.



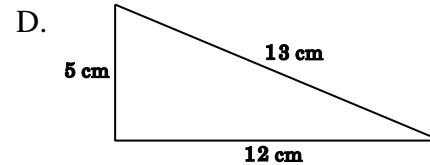
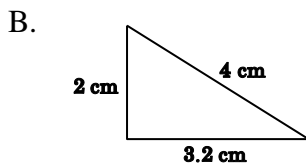
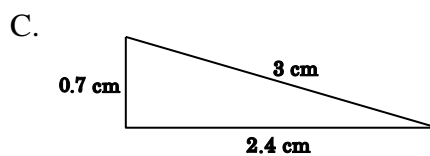
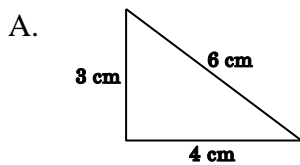
27. In the figure,  $AB : AC = 2 : 5$ . If  $BC = 10$  cm, find  $AB$ , correct to 3 significant figures.



28. An ant crawls on the surface of a rectangular block as shown in the figure. If it moves from point  $A$  to point  $B$  through the shortest path, what is the distance travelled by the ant? (Give your answer correct to 3 significant figures.)



29. Which of the following triangles must be a right-angled triangle?



30. Simplify the following expressions:

(a)  $\sqrt{25a} - \sqrt{4a}$

(b)  $\sqrt{10} \times \sqrt{35}$

25.  $x =$  \_\_\_\_\_ 2

$y =$  \_\_\_\_\_ 2

26. \_\_\_\_\_ 2

27. \_\_\_\_\_ 3

28. \_\_\_\_\_ 2

29. \_\_\_\_\_ 2

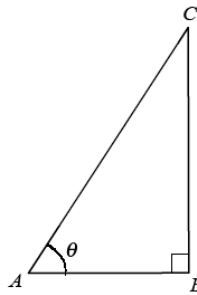
30. \_\_\_\_\_ 2

(a) \_\_\_\_\_ 2

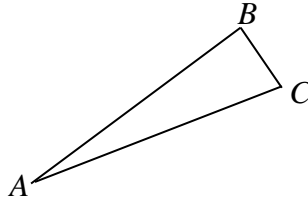
(b) \_\_\_\_\_ 2

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31. In the figure,  $AB = 5$  cm,  $BC = 8$  cm.  
Find  $\theta$  and correct your answer to 3 significant figures.

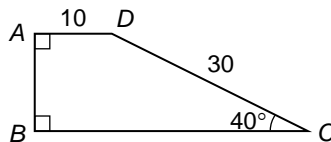


32. In the figure,  $BC = 2$  cm,  
 $\angle ACB = 72^\circ$  and  
 $\angle ABC = 90^\circ$ . Find the length  
of  $AB$  and correct your answer  
to 3 significant figures.

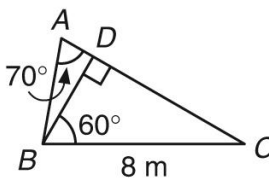


33. If  $\tan \theta = \frac{4}{3}$  and  $\theta$  is an acute angle, find  $\sin \theta$ .

34. In the figure,  $\angle BAD = \angle ABC = 90^\circ$ ,  $\angle DCB = 40^\circ$ ,  $AD = 10$   
and  $CD = 30$ . Find  $BC$ .  
Correct your answer to 3 significant figures.



35. In the figure,  $BD$  is a height of  $\triangle ABC$ ,  $BC = 8$  m,  $\angle BAC = 70^\circ$   
and  $\angle CBD = 60^\circ$ . Find  $AC$ .  
(Give your answer correct to 2 decimal places.)



36. Simplify  $\tan (90^\circ - \theta) \sin \theta$ .

37. If  $\cos(90^\circ - 2\theta) = \sin 25^\circ$  and  $\theta$  is an acute angle,  
find  $\theta$ .

38. Evaluate  $\cos 30^\circ \tan 30^\circ + \sin 45^\circ \tan 45^\circ$  and express  
your answer in surd form.

39. Is each of the following expressions identical to  
 $2 \sin^2 \theta - 1$ ? Circle the correct answers.

- (a)  $1 - 2 \cos^2 \theta$   
(b)  $\sin^2 \theta - \cos^2 \theta$   
(c)  $\cos^2 \theta + \sin^2 \theta$

31. _____	2
32. _____	2
33. _____	2
34. _____	3
35. _____	3
36. _____	2
37. _____	2
38. _____	3
39.	
(a) Yes / No	1
(b) Yes / No	1
(c) Yes / No	1

Subtotal:  / 22

---End of Paper ---