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

Form 2 **LC, WMC, LHK, LL, CYN, MLW**
168 students

MATHEMATICS
Paper II
Time Allowed: 1 hour

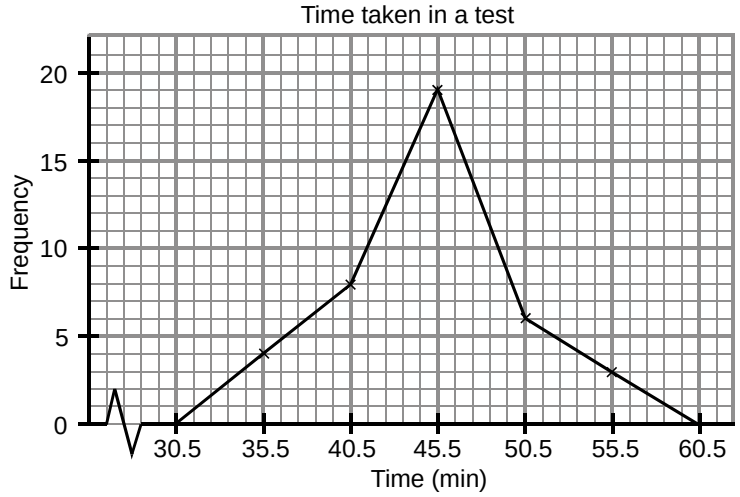
Name: _____ No.: _____ Class: _____ Division: _____

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.*
- *This paper carries 100 marks.*

		Answers	**Marks**
1.	Simplify $2^{2n} \times 8^{3n}$.	1._____	3
2.	Expand $(x + 6)(x + 2)$.	2._____	2
3.	Determine whether the following statements are true or false and circle the correct answers.	3.	
	(a) $x^2 - 4^2 = (x-4)^2$	(a) True / False	1
	(b) $(3x + y)(3x - y) = 3x^2 - y^2$	(b) True / False	1
	(c) $(1-b)^2 = (b-1)^2$	(c) True / False	1
4.	Make q the subject of the formula $p = \frac{1}{3}qr^2$.	4._____	2
5.	A bottle is termed *standard* if its capacity is measured as 200 mL, correct to the nearest 10 mL. Find the least capacity of a *standard* bottle.	5._____	2
6.	Stephen spent 12.06 s to complete a 100 m race, correct to 4 significant figures. Find the maximum error of the measured time.	6._____	2
7.	The length of a piece of metal wire is measured as 2.0 m, correct to the nearest 0.1 m. Peter cuts this metal wire into n pieces of shorter wires, with each length measured as 5 cm correct to the nearest cm. Find the greatest possible value of n.	7._____	3
		Subtotal:	/17

8. The following frequency polygon shows the time taken in a test by a group of students.



8.

(a) Find the class width of each class interval. (a) _____ 2

(b) For the class interval with the highest frequency, find (b)

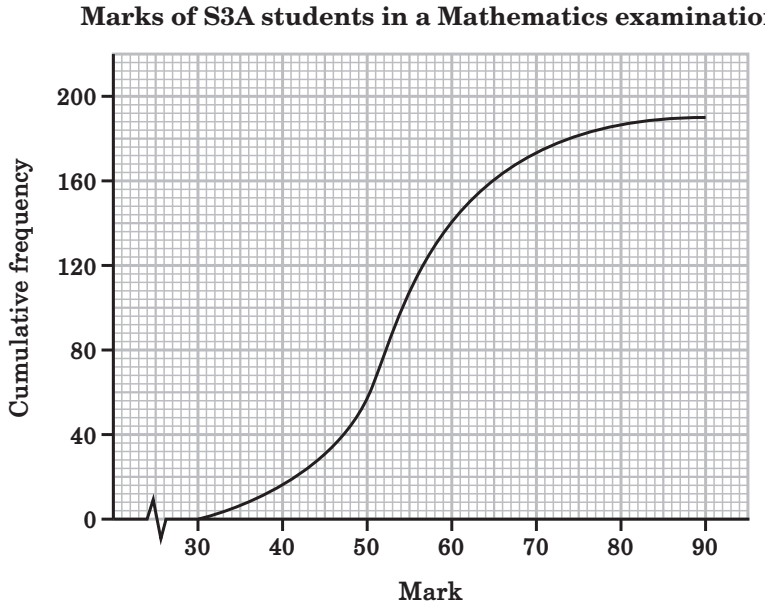
(i) its frequency, (i)_____ 1

(ii) its class mark, (ii)_____ 1

(iii) its class boundaries. (iii)_____ 2

(c) What is the shortest possible time taken by the group of students? (c) _____ 2

9. The following cumulative frequency curve shows the marks of 190 S3A students of a school in a Mathematics examination.



9.

(a) How many students got 60 marks or more? (a) _____ 1

(b) If the passing mark is 40, find the passing percentage of the examination. (Correct the answer to 3 significant figures.) (b) _____ 2

Subtotal: /11

10. Which of the following points lies on the graph of the equation $y = 3x - 5$?
$A(-2, 1)$, $B(-1, -2)$, $C(-5, 0)$, $D(3, 4)$

10. _____ 2

11. If the graph of the equation $3x + y = 12$ passes through $P(m + 8, m)$, find the value of m.

11. _____ 3

12. Solve the simultaneous equations $\begin{cases} 9u = 3v + 6 \\ 9u = 4 - v \end{cases}$.

12.
u = _____ 2

v = _____ 2

13. David has some \$10 and \$2 coins that worth \$90 in total. If there are a total of 13 coins, how many \$10 coins does David have?

13. _____ 3

14. Mary has 10 English books, 8 Chinese books and 2 Japanese books. Find the ratio of the number of English books to that of Chinese books to that of Japanese books.

14. _____ 2

15. If $4x = 9y$, find $x : y$.

15. _____ 2

16. If $a : c = 3 : 10$ and $b : c = 5 : 4$, find $a : b : c$.

16. _____ 3

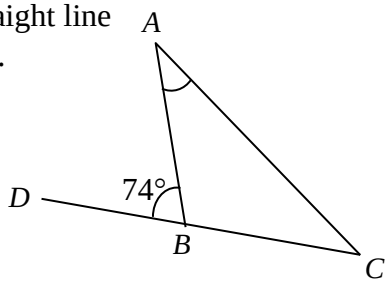
17. Twelve packs of green tea are sold for \$38.4. Find the price rate in \$/pack.

17. _____ 2

18. Susan buys the first 24 cans of cola at \$$x$/can and the next 8 cans of cola at \$$(x + 0.4)$/can. If the average cost of the cola is \$3.4/can, find the value of x.

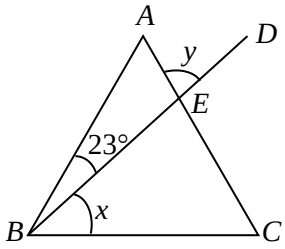
18. _____ 3

19. In the figure, DBC is a straight line and $AB = BC$. Find $\angle BAC$.



19. _____ 2

20. In the figure, ΔABC is an equilateral triangle. BD and AC intersect at E. Find x and y.

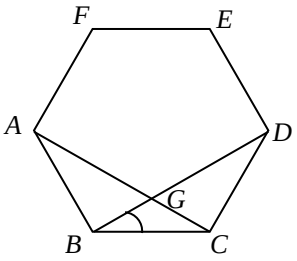


20.
x = _____ 1

y = _____ 2

Subtotal: /29

21. In the figure, *ABCDEF* is a regular hexagon. *AC* and *BD* intersect at *G*. Find $\angle DBC$.



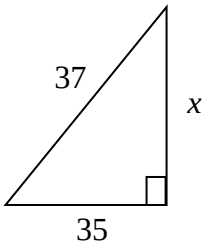
21. _____ 3

22. The size of each exterior angle of a regular *n*-sided polygon is 18°. Find the value of *n*.

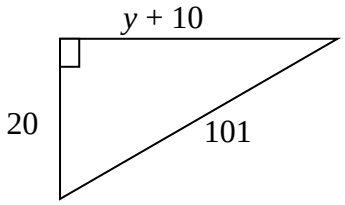
22. _____ 2

23. Find the unknowns in the following figures.

(a)



(b)

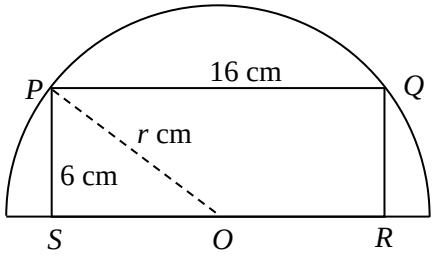


23.

(a) x = _____ 2

(b) y = _____ 3

24. In the figure, *PQRS* is a rectangle with *R* and *S* lie on the diameter of a semicircle. *PQ* = 16 cm, *PS* = 6 cm and *OP* = *r* cm. If *OP* is the radius of the semicircle, find *r*.



24. _____ 2

25. In ΔABC, $AB = 7$, $BC = \sqrt{18}$ and $CA = \sqrt{31}$. Determine whether ΔABC is a right-angled triangle. (Circle the correct answer.)

25. Yes / No 2

26. Which of the following is NOT a rational number?

$3.\dot{9}$, $\frac{2}{7}$, $\sqrt{25}+1$, $\sqrt{3}$

26. _____ 1

27. Simplify the following expressions.

(a) $7\sqrt{3}+2\sqrt{3}-3\sqrt{3}$

27.

(a) _____ 2

(b) $\sqrt{72}-\sqrt{50}$

(b) _____ 2

28. Simplify $\left(\sqrt{x+1}+\sqrt{x}\right)\left(\sqrt{x+1}-\sqrt{x}\right)$.

28. _____ 2

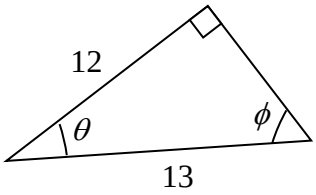
Subtotal: /21

29. In the following figure, find the value of each of the following and give the answers in fractions.

(a) $\cos\theta$

(b) $\sin\theta$

(c) $\tan\phi$

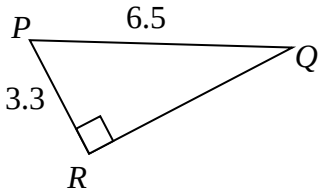


29. (a) _____ 1

(b) _____ 2

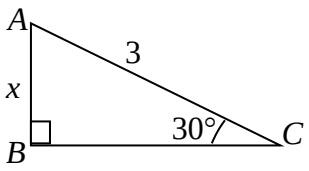
(c) _____ 2

30. In the figure, find $\angle P$. Correct your answer to 3 significant figures.



30. _____ 2

31. In the figure, $\angle ABC = 90°$, $\angle ACB = 30°$ and $AC = 3$. Find x.



31. _____ 2

32. If x is an acute angle such that $\sin x = \frac{7}{10}$, find the value of $\cos x$ in surd form. Simplify and rationalize the denominator of your answer if necessary.

32. _____ 3

33. Simplify $9 - \sin^2 x - \cos^2 x$.

33. _____ 2

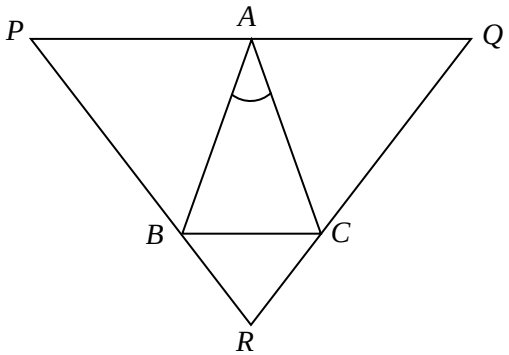
34. Find the acute angle x such that $\sin x = \cos 55°$.

34. _____ 2

35. Find the acute angle x such that $\tan x = \frac{1}{\tan 2x}$.

35. _____ 3

36. In the figure, PAQ, PBR and QCR are straight lines. It is given that $AP = AB = AC = AQ$, $PR = QR$ and $\angle BRC = 2\angle BAC$. Find $\angle BAC$.



36. _____ 3

Subtotal: /22

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