Exam Number			

LA SALLE COLLEGE
FINAL EXAMINATION 2013-2014

Form 3 Mathematics Paper 1

Section A & B

Time allowed: 105 minutes

Question – Answer Book

Instructions

1. Write your examination number in the spaces provided on this cover.
2. In this paper, Section A carries 20 marks and Section B carries 40 marks.
3. Attempt ALL questions in the two sections. Do not write in the margins. Answers written in the margins will not be marked.
4. Supplementary answer sheets will be supplied on request. Write your Examination Number on each sheet and put them INSIDE this book.
5. Unless otherwise specified, all working steps must be clearly shown.
6. Unless otherwise specified, numerical answers should either be exact or correct to 3 significant figures.
7. The diagrams in this paper are not necessarily drawn to scale.

Page No.	Marks
1	(8)
2	(6)
3	(6)
Section A	
4	(8)
5	(8)
6	(8)
7	(8)
8	(8)
Section B	
Supp. Sheet	
Total	**(60)**

Section A [20 marks]

1. Simplify $\frac{(2mn)^{-2}}{(3m)^2}$ and express the answer with positive indices. (2 marks)

2. Expand $(5+2y)^2(y-1)$ and arrange the answer in ascending powers of y. (3 marks)

3. Factorize $-2n + 2m - 3mn + 3m^2 - m^2n + mn^2$. (3 marks)

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4. Make R the subject of the formula $4S = \frac{a}{1-2R}$. (3 marks)

5. A camera is marked at a certain price. If it is sold at a discount of 5%, the selling price will be \$3 800. Find the marked price of the camera. (3 marks)

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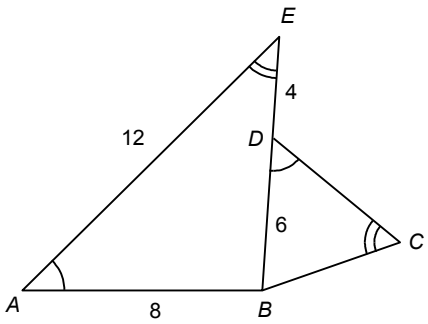
6. A, B and C share a box of cookies in the ratio $7 : 9 : 4$, and A gets 16 cookies less than B. How many cookies are there in the box? (3 marks)

7. In the figure, $\angle EAB = \angle CDB$, $\angle AEB = \angle DCB$.

(a) Write down a pair of similar triangles and give reasons. (1 mark)

(b) Find BC. (2 marks)



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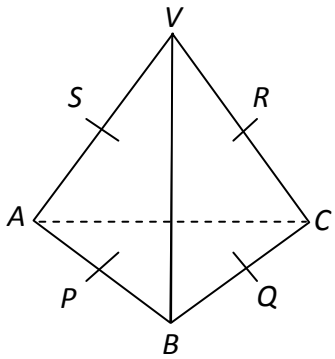
Section B [40 marks]

8. The figure shows a regular tetrahedron. P, Q, R and S are the mid-points of AB, BC, VC and VA respectively.



(a) Name the projection line of SQ which projected on VBC. (1 mark)

(b) Name the angle between VBC and VAC. (1 mark)

(c) $\angle VPC$ is the angle between two planes of the tetrahedron. Name these two planes. (2 marks)

9. In a watch shop, the product description of watch A says that the error of the time measured is only 0.216 second per day. The product description of watch B says that the error of the time measured is only 1.47 second per week. Which of the two watches is more accurate? Explain your answer by showing the percentage error of two watches. (4 marks)

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10. Solve $\begin{cases} 2(2-x) > 2x+1 \\ 1-\frac{x}{3} \geq x-2 \end{cases}$, and represent the solutions graphically. (4 marks)

11. In a class of 40 students, 25 of them are boys. The mean weight of the whole class and that of the boys are 51 kg and 54 kg respectively. Find the mean weight of the girls. (4 marks)

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12. (a) Solve the equation $5y^2 + 14y - 3 = 0$. (2 marks)

(b) Hence, solve the equation $\frac{5}{x^2} + \frac{14}{x} - 3 = 0$, where $x \neq 0$. (2 marks)

13. Find angle θ in the equation of $\cos^2 30° + \cos^2 60° = 2\tan(\theta + 30°) \cdot \sin(60° - \theta)$ for $0° \leq \theta \leq 90°$. (4 marks)

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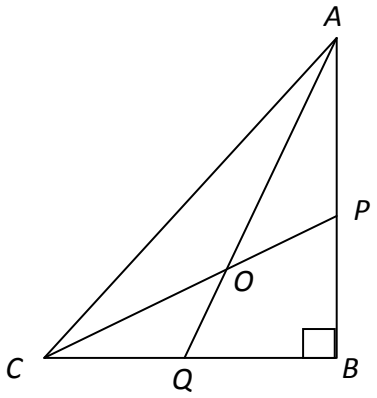
14. Mr Wong deposits \$50 000 in a bank and the interest is compounded half yearly. After 2 years, he receives an amount of \$60 775.3125. Find the annual interest rate. (4 marks)

15. In the figure, O is the centroid of $\triangle ABC$. POC and AOQ are straight lines. If $AP = 10.5$ cm, $QB = 10$ cm and $\angle ABC = 90°$, find the length of AC and OQ. (4 marks)



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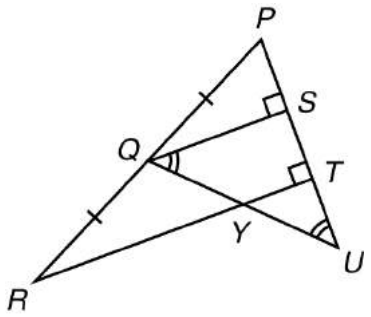
16. If $\tan\theta = \frac{48}{55}$, find the value of $\frac{3\sin\theta - 2\cos\theta}{4\sin\theta}$ by using trigonometric identities.

(4 marks)

17. In the figure, *PQS*, *PRT*, *QUS* and *YUT* are four right-angled triangles. *PQ* = *QR*, $\angle SQU = \angle SUQ$ and *QS* = 2*PS*. Prove that *QY* = *YU*. (4 marks)



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Supplementary Answer Sheet

- End of Section A and B -

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