# 2018-2019 F.5 1st TERM EXAM-MATH-CP 1

18-19 F.5 1st TERM EXAM MATH CP PAPER 1

> 2018 – 2019 Form 5 First Term Examination

## **MATHEMATICS Compulsory Part**

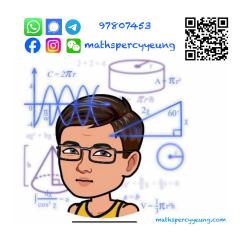
## PAPER 1

### **Question–Answer Book**

2<sup>nd</sup> January, 2019 8:15 am – 10:00 am (1 hour 45 minutes) **This paper must be answered in English** 

#### INSTRUCTIONS

- 1. Write your name, class and class number in the spaces provided on this cover.
- This paper consists of THREE sections, A(1), A(2) and B.
- Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question – Answer Book. Do not write in the margins. Answers written in the margins will not be marked.
- 4. Unless otherwise specified, all working must be clearly shown.
- 5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
- 6. The diagrams in this paper are not necessarily drawn to scale.



Sections	Marks
A (1-4)	
A (5 – 11)	
A Total	/56
B Total	/28
TOTAL	/84

Simpl	ify $\frac{x^5y^{-2}}{(x^2y^{-3})^{-2}}$ and express your answer with positive indices.	(3 marks)
Factor	ize	
	4p-10q,	
	$2p^2 + pq - 15q^2,$	
(c) 4	$4p-10q-2p^2-pq+15q^2$ .	
		(4 mark
Consi	der the formula $x+8=3(5x+2y)$ .	
(a) N	Aake y the subject of the above formula.	
(b) I	f the value of $x$ is decreased by 6, find the change in the value of $y$ .	
		(4 mark

Answers written in the margins will not be marked

- 4. The marked price of a toy is \$144. It is given that the marked price of the toy is 20% higher than its cost.
  - (a) Find the cost of the toy.
  - (b) If the toy is sold at a discount of 20% on its marked price, determine whether there will be a gain or a loss on selling the toy. Explain your answer.

(4 marks)

Consider the compound inequality

5. Consider the compound inequality

$$-6x \ge 12$$
 and  $\frac{2x+5}{3} > 2(x+1)$  .....(\*)

- (a) Solve (\*).
- (b) Write down the greatest negative integer satisfying (\*).

(4 marks)

Answers written in the margins will not be marked

cloc (a)	Find the coordinates of P'.
(a) (b)	If $P'$ , $O$ and $Q$ are collinear, find $a$ .
(0)	(4  m)
	(+ 1)
rema	$g(x) = x^3 - x^2 - 11x + c$ , where c is a constant. When $g(x)$ is divided by $x + a$ and c is 12.
rema (a)	ainder is 12. Is $x + 3$ a factor of $g(x)$ ? Explain your answer. David claims that all the roots of the equation $g(x) = 0$ are rational. Do you a Explain your answer.
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#### Section A(2) (28 marks)

The stem-and-leaf diagram below shows the ages of the players of a football team: 8.

Stem (tens)	Le	af (	unit	<u>s)</u>											
1	8	9	9												
2	0	1	1	1	3	3	5	6	6	7	7	8	8	8	8
		0													

Find the mean, the median and the range of the ages of the players of the football team. (a)

(3 marks)

- As the two oldest players leave the team, three new players join the football team. After (b) the three players join the football team, the manager of the team finds the mean age of the players of the football team is the same as the mean found in (a).
  - (i) Find the mean age of the three new players.
  - (ii) Furthermore, the manager finds that the median and the range of the ages of the players of the football team are the same as the median and the range found in (a) respectively. Write down two sets of possible ages of the three new players.

(4 marks)

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).		Figure 1, <i>BL</i> C are straigh	D is a diameter of the circle, $DE = 5\sqrt{3}$ cm, $CD = 10\sqrt{3}$ cm, $AB = BE$ , $ADC$ and the lines.
	(a)	Prove that	$\Delta ABD \cong \Delta EBD.$ (3 marks)
	(b)	Prove that	$\Delta ABC \sim \Delta EDC$ . (2 marks) $0$ $5\sqrt{3}$ cm $10\sqrt{3}$ cm
	(c)	Find <i>AB</i> .	(3 marks) B B E C
			Figure 1

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- 10. Jack wants to rent a new apartment. The rent (R) per month of an apartment consists of two parts. One part is a constant and the other part varies directly as the size (S sq.ft.) of the apartment and varies inversely as the time (T months) that he rents an apartment. If he rents an apartment of 800 sq. ft. for 6 months, the rent is \$25 000 per month. The rent of an apartment of 1 000 sq. ft. for 24 months is \$20 875 per month.
  - (a) Find the rent per month of an apartment of 600 sq. ft. for 36 months. (4 marks)
  - (b) John claims that the rent of two 500 sq. ft. apartments for 24 months is cheaper than the rent of a 1 000 sq. ft. apartment for the same period of time. Do you agree? Explain your answer.
     (2 marks)

11.	<ul> <li>The circle C passes through the point A(4,-3) and the centre of C is the point G</li> <li>(a) Find the equation of C.</li> <li>(b) P is a moving point in the rectangular coordinate plane such that AP = GP. locus of P by Γ.</li> <li>(i) Find the equation of Γ.</li> <li>(ii) Describe the geometric relationship between Γ and the line segment AG.</li> <li>(iii) If Γ cuts C at Q and R, find the perimeter of the quadrilateral AQGR.</li> </ul>							
	(iii) If $\Gamma$ cuts C at Q and R, find the perimeter of the quadrilateral AQGR.	(5 marks)						

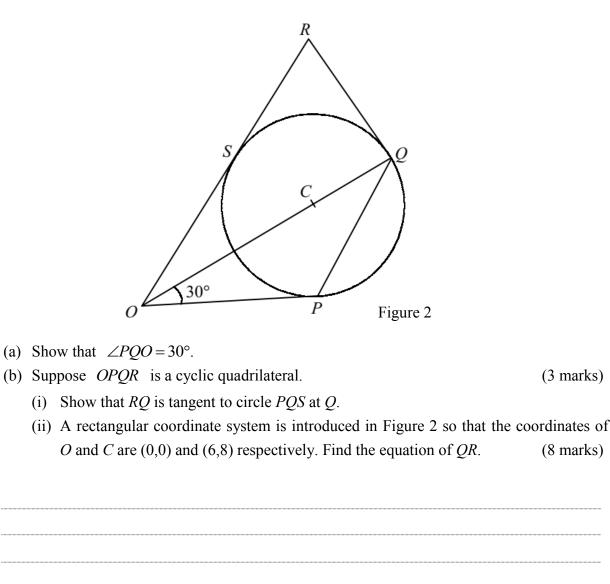
#### Section B (28 marks)

- 12. The standard deviation of the scores of a class of students in an examination is 4 marks. The score of Joey and Andy in the examination are 58 marks and 86 marks respectively. The standard score of Joey in the examination is -2.
  - Find the standard score of Andy in the examination. (2 marks) (a)
  - (b) A student, Bobby, is in the class and his teacher forgot to insert his examination score. It is given that his examination score is 66. Will there be any change in the standard score of Andy due to the insertion of the examination score of Bobby? Explain your answer.

(2 marks)

Answers written in the margins will not be marked

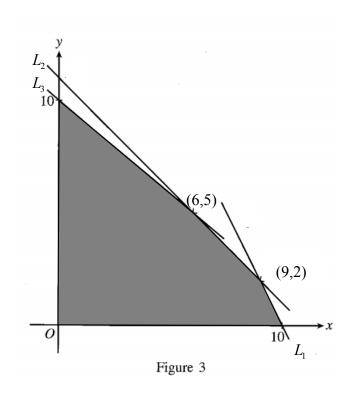

In Figure 2, C is the centre of the circle PQS. OR and OP are tangent to the circle at S and P 13. respectively. *OCQ* is a straight line and  $\angle QOP = 30^\circ$ .



(3 marks)

(8 marks)


14. (a) In Figure 3,  $L_1$  and  $L_2$  intersect at the point (9, 2) while  $L_2$  and  $L_3$  intersect at the point (6, 5). The equation of  $L_3$  is 5x+6y-60=0.



- (i) Find the equations of  $L_1$  and  $L_2$ .
- (ii) In Figure 3, the shaded region (including the boundary) represents the solution of a system of inequalities. Write down the system of inequalities.

(4 marks)

- (b) The owner of a boat-building yard decided to build two types of boats, type *A* and type *B*, under the following conditions.
  - (1) A boat of type A needs  $30 \text{ m}^2$  of working space and a boat of type B needs  $36 \text{ m}^2$  of working space. He has  $360 \text{ m}^2$  of working space.
  - (2) The expenses on materials for building a boat of type A and a boat of type B are \$8 000 and \$4 000 respectively. He can spend at most \$80 000 on buying the materials.
  - (3) He has enough manpower to build at most 11 boats.

Let x and y be the numbers of boats of type A and type B to be built respectively. Suppose the profit on a boat of type A is 20% more than that on a boat of type B, Find the number of boats of each type that should be built to maximize the total profit on selling the two types of boats.

(5 marks)

Answers written in the margins will not be marked


15.	(a)	Express $\frac{1}{4+3i}$ in the form of $a+bi$ , where a and b are real numbers. (1 mark)
	(b)	The roots of the quadratic equation $x^2 + px + q = 0$ are $\frac{25}{4+3i}$ and $\frac{25}{4-3i}$ . Find p
		and <i>q</i> . (3 marks)
		(5 marks)
		End of Paper