17-18 F.4
1st TERM EXAM
MATH CP
PAPER 1

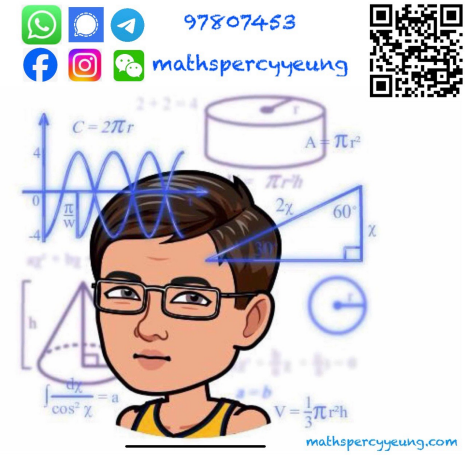
2017 – 2018
Form 4 First Term Examination

MATHEMATICS Compulsory Part

PAPER 1

Question–Answer Book

3rd January, 2018
8:15 am – 9:15 am (1 hour)
This paper must be answered in English



Sections	Marks
A (1 – 3)	
A (4 – 8)	
A Total	**/36**
B Total	**/12**
TOTAL	**/48**

INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.

2. This paper consists of THREE sections, A(1), A(2) and B.

3. 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.

Section A(1) (17 marks)

1. Simplify $\dfrac{\left(x^{-2}y^{3}\right)^{2}}{y^{-2}}$ and express your answer with positive indices. (3 marks)

2. Make a the subject of the formula $\dfrac{2b+3a-7}{4a}=2$. (3 marks)

3. Factorize

   (a) $9m^{2}-4n^{2}$,

   (b) $9m^{2}-4n^{2}+6m-4n$.

   (3 marks)

Answers written in the margins will not be marked

4. Given that the quadratic equation $3x^2 - 2kx + 12 = 0$ has double roots.

   (a) Find the value(s) of k.

   (b) Solve the equation $3x^2 - 2kx + 12 = 0$ for each value of k.

(5 marks)

5. The monthly sales (\$$E$) of a digital camera are given by $E = 1200x - 30x^2 + 48000$, where x $(0 < x \leq 60)$ is the number of months since the launch of the camera. Find the maximum monthly sales of the digital camera and the corresponding value of x. (3 marks)

Answers written in the margins will not be marked

Section A(2) (19 marks)

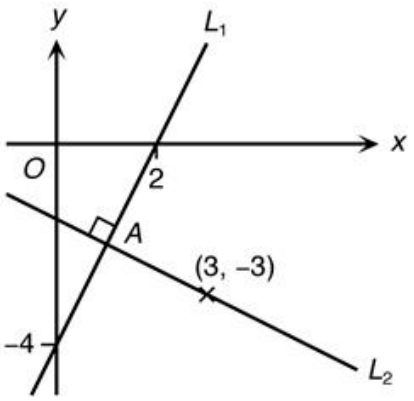
6. In the figure, L_1 and L_2 are two straight lines perpendicular to each other. A is the point of intersection of L_1 and L_2. L_2 passes through the point $(3,-3)$.

(a) Find the slope of L_1.

Hence find the equations of L_1 and L_2.

(4 marks)

(b) Find the coordinates of A. (2 marks)



Answers written in the margins will not be marked

7. Given that $f(2x+1) = 8x^2 - 4x - 3$.

(a) Find $f(x)$. (3 marks)

(b) Danny claims that $f(x) > 0$ for any real number x. Do you agree? Explain your answers.

(3 marks)

Answers written in the margins will not be marked

8. Let $f(x) = 3x^3 - 7x^2 + kx - 8$, where k is a constant. $f(x)$ is divisible by $x - 2$.

(a) Find the value of k. (2 marks)

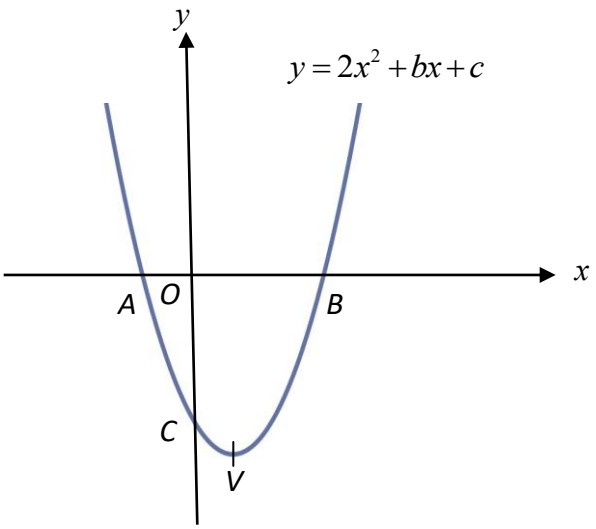
(b) Factorize $f(x)$. (2 marks)

(c) Someone claims that all the roots of the equation $f(x) = 0$ are real numbers. Do you agree? Explain your answer. (3 marks)

Answers written in the margins will not be marked

Section B (12 marks)

9. The figure shows the graph of the function $y=2x^2+bx+c$, where b is a negative constant and c is a constant. The graph cuts the x-axis at $A(\alpha,0)$ and $B(\beta,0)$. Also it cuts the y-axis at $C(0,-6)$. V is the vertex of the graph. Given that $\alpha^2+\beta^2=10$.



(a) Find the values of b and c. (5 marks)

(b) Find the coordinates of the vertex V. (3 marks)

(c) Given that P is a point on the graph of $y=2x^2+bx+c$ such that the area of ΔPAB is the same as the area of ΔVAB. P and V are not the same point. Find the coordinates of P, correct to 2 significant figures. (4 marks)

Answers written in the margins will not be marked

Answers written in the margins will not be marked

Answers written in the margins will not be marked

End of Paper