

2017 – 2018
Form 4 First Term Uniform Test

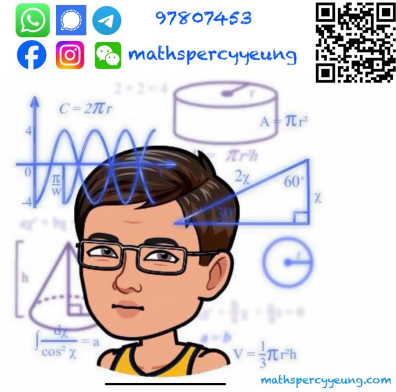
MATHEMATICS Compulsory Part
Question–Answer Book

6th November, 2017
8:15 am – 9:15 am (1 hour)

This paper must be answered in English

INSTRUCTIONS

- Write your name, class and class number in the spaces provided on this cover.
- Answer ALL questions in Section A. You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured. You should mark only ONE answer for each question. If you mark more than one answer, you will receive NO MARKS for that question.
- Attempt ALL questions in Sections B and C. Write your answers in the spaces provided in this Question – Answer Book.
- Unless otherwise specified, all working must be clearly shown and numerical answers should be either exact or correct to 3 significant figures.
- The diagrams in this paper are not necessarily drawn to scale.



Section	Marks
A Total	/24
B1 (13 – 14)	
B2 (15 – 20)	
B Total	/31
C Total	/11
TOTAL	/66

Section A (24 marks)

Choose the best answer for each question.

- If $f(x) = x^2 + 3x - 1$, then $2f(0) =$
 - 6.
 - 1.
 - 0.
 - 2.
- Which of the following numbers is a rational number?
 - $\frac{\pi}{2\pi}$
 - $\sqrt{0.9}$
 - $2 + \sqrt{2}$
 - $\sqrt{4} \times \sqrt{8}$
- Factorize $a^2 - 2ab + b^2 - a + b$.
 - $(a-b)(a-b-1)$
 - $(a-b)(a-b+1)$
 - $(a-b)(a+b-1)$
 - $(a+b)(a-b-1)$
- Solve the equation $(x+1)x = 3(x+1)$.
 - $x = -1$
 - $x = 3$
 - $x = 1$ or 3
 - $x = -1$ or 3
- Simplify $\sqrt{a^6 b^5 c^3}$.
 - $a^5 b^4 c^2 \sqrt{abc}$
 - $a^3 b^3 c^2 \sqrt{abc}$
 - $a^2 b^2 c^2 \sqrt{bc}$
 - $a^3 b^2 c \sqrt{bc}$
- What is the largest domain of the function $\frac{\sqrt{2+5x}}{x-1}$?
 - $x \geq -\frac{2}{5}$.
 - $x > -\frac{2}{5}$.
 - $x \geq -\frac{2}{5}$, except $x = 1$.
 - x can be all real numbers, except 1.
- $(2^{2a})(3^{2a}) =$
 - 6^a .
 - 6^{4a} .
 - 36^a .
 - 36^{2a} .
- If $\frac{1}{x} = a+b$ and $\frac{1}{y} = a-b$, then $x+y =$
 - $\frac{2}{a}$.
 - $\frac{2a}{a^2 - b^2}$.
 - $\frac{a^2 - b^2}{a}$.
 - $\frac{2a}{b^2 - a^2}$.
- If $f(x) = 5x - 1$, then $f(x+1) - f(x) =$
 - $4(x+1)$.
 - 7.
 - 5.
 - 4.

10. If $k < 0$, then the quadratic equation $x^2 - x + 6k = 0$ has
- A. a double real root.
 - B. no real roots.
 - C. two negative roots.
 - D. a positive root and a negative root.

11. If α and β are the roots of $x^2 - 2x - 4 = 0$, then $\alpha^2 + 2\beta =$
- A. 2.
 - B. 4.
 - C. 8.
 - D. cannot be found.

12. x, y and z are three consecutive positive integers. Which of the following is true?
- A. xyz must be even.
 - B. $x + y + z$ must be even.
 - C. $x + y + z$ must be odd.
 - D. $x^2 + y^2 + z^2$ must be even.

Section B(1) (6 marks)

13. Factorize

(a) $a^2 - 2a - 3$,

(b) $ab^2 + b^2 + a^2 - 2a - 3$.

(3 marks)

14. Make b the subject of the formula $\frac{4a + 5b - 7}{b} = 8$.

(3 marks)

Section B(2) (25 marks)

15. Simplify $\sqrt{27} + \sqrt{50} + \sqrt{192} - \sqrt{200}$.

(3 marks)

16. Solve the following quadratic equations.

(a) $98 - 2x^2 = 0$

(b) $2x^2 + x + 7 = 0$

(5 marks)

17. (a) Simplify $(\sqrt{7} + 2\sqrt{2})(\sqrt{7} - 2\sqrt{2})$.

(b) Evaluate $(\sqrt{7} + 2\sqrt{2})^{2n} (\sqrt{7} - 2\sqrt{2})^{2n+1}$.

(4 marks)

18. It is given that $f(x) = (m-1)x + 2m$ and $f(4) = 20$, where m is a constant.

(a) Find the value of m .

(b) Hence, find the value of x such that $f(x) = 2$. (4 marks)

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19. Prove that the equation $x^2 + (3k - 1)x + 2k^2 = 2k$ has real roots for any real values of k .

(3 marks)

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END OF PAPER