

18-19 F.4  
1st TERM UT  
MATH CP

2018 – 2019  
Form 4 First Term Uniform Test

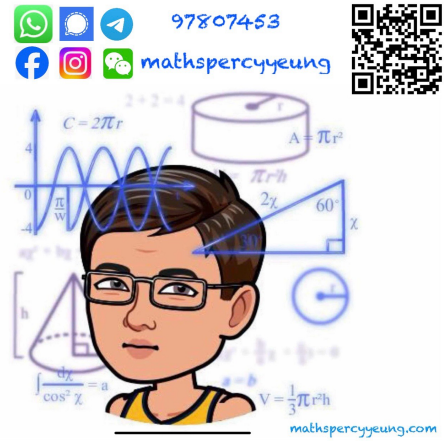
**MATHEMATICS Compulsory Part**  
**Question–Answer Book**

6<sup>th</sup> November, 2018  
8:15 am – 9:15 am (1 hour)

**This paper must be answered in English**

**INSTRUCTIONS**

1. Write your name, class and class number in the spaces provided on this cover.
2. 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.
3. Attempt ALL questions in Sections B and C. Write your answers in the spaces provided in this Question – Answer Book.
4. Unless otherwise specified, all working must be clearly shown and numerical answers should be either exact or correct to 3 significant figures.
5. The diagrams in this paper are not necessarily drawn to scale.



Section	Marks
<b>A Total</b>	<b>/24</b>
B (13 – 16)	
B (17 – 22)	
<b>B Total</b>	<b>/36</b>
<b>C Total</b>	<b>/8</b>
<b>TOTAL</b>	<b>/68</b>

**Section A (24 marks)**

**Choose the best answer for each question.**

1. Which of the following numbers is a rational number?

- A.  $\sqrt{3} + 1$
- B.  $-\frac{\sqrt{64}}{3}$
- C.  $\sqrt{-\frac{9}{4}}$
- D.  $3\pi$

2. Simplify  $\sqrt{3}(4 - 2\sqrt{12})$ .

- A. 0
- B.  $4\sqrt{3}$
- C.  $2\sqrt{3} - 18$
- D.  $4\sqrt{3} - 12$

3. Which of the following is not a function of  $x$  for all positive values of  $x$ ?

- A.  $y = 2 - x^2$
- B.  $y = \sqrt{x + 3}$
- C.  $y = \frac{x + 3}{2}$
- D.  $y^2 = x + 5$

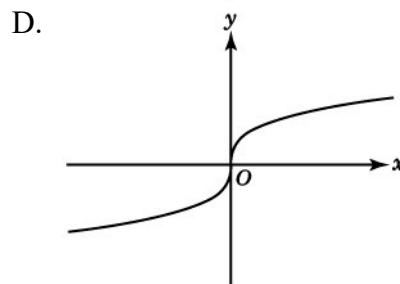
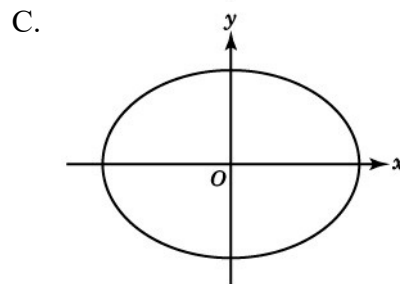
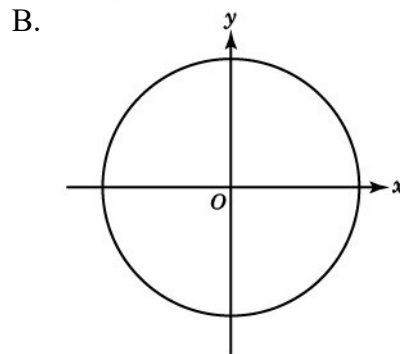
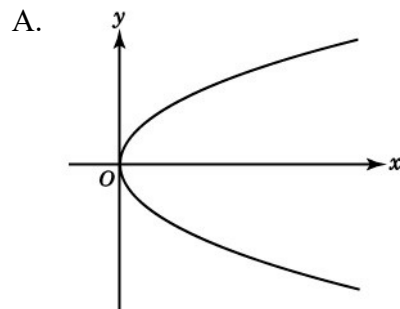
4. Which of the following is the domain of the function  $f(x) = \frac{1}{x-1}$ ?

- A. All real numbers
- B. All real numbers greater than 1
- C. All real numbers except 1
- D. All real numbers smaller than 1

5.  $4hu + 4ku - 7hv - 7kv =$

- A.  $(h + k)(4u - 7v)$ .
- B.  $(u - v)(4h + 7k)$ .
- C.  $3(u - v)(h + k)$ .
- D.  $28(u + v)(h - k)$ .

6. Which of the following graphs represents that  $y$  is a function of  $x$ ?



7.  $\frac{1}{3 + \sqrt{2}} =$

- A.  $\frac{3 - \sqrt{2}}{7}$ .
- B.  $\frac{3 + \sqrt{2}}{7}$ .
- C.  $\frac{3 + \sqrt{2}}{11}$ .
- D.  $\frac{3}{13}$ .

8. If  $f(x) = \frac{x}{x+2}$ , then  $f\left(\frac{1}{3}\right) =$

- A. 1.
- B.  $\frac{1}{7}$ .
- C.  $-\frac{1}{7}$ .
- D.  $-\frac{1}{5}$ .

9. Solve the equation  $(x-3)(x-4) = (a-3)(a-4)$  where  $a$  is a constant.

- A.  $x = 0$  or  $x = 7$
- B.  $x = 3$  or  $x = 4$
- C.  $x = a$  or  $x = 7 - a$
- D.  $x = a$  or  $x = 7$

10. Solve the equation  $-x^2 + 8x - 15 = 1$ .

- A. -4 only
- B. 4 only
- C. 3 or 5
- D. 2 or 4

11. Form a quadratic equation in  $x$  with roots 3 and  $-\frac{1}{2}$ .

- A.  $2x^2 + 5x + 3 = 0$
- B.  $2x^2 - 5x + 3 = 0$
- C.  $2x^2 - 5x - 3 = 0$
- D.  $2x^2 + 5x - 3 = 0$

12. Suppose that the difference of two numbers is 4 and the sum of their squares is 5 times their sum. If the smaller number is denoted by  $x$ , which of the following is true?

- A.  $x^2 - x - 2 = 0$
- B.  $x^2 - 9x + 18 = 0$
- C.  $2x^2 + x + 12 = 0$
- D.  $2x^2 + 3x - 4 = 0$

**Section B(1) (19 marks)**

13. If  $(x+2)(x-9) \equiv x^2 + Ax + B$ , find the constants  $A$  and  $B$ .

(2 marks)

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14. Simplify  $\frac{(2a^{-1}b^0)^3}{a^{-4}b^7}$  and express your answer with positive indices.

(3 marks)

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15. Factorize

(a)  $y^2 - 4y + 3,$

(b)  $(2y - 3)^2 - 4(2y - 3) + 3.$

(3 marks)

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16. Make  $x$  the subject of the formula  $y = \frac{x - m}{x - 2m}.$

(3 marks)

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17. Simplify  $\sqrt{45} - \sqrt{20} + 4\sqrt{5} + \frac{25\sqrt{3}}{\sqrt{15}}$ .

(3 marks)

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18. Convert  $0.7\dot{4}\dot{5}$  into a fraction.

(2 marks)

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19. Solve the equation  $(2a+3)(a+1)=3(a+3)$ . (Leave your answers in surd form if necessary.)

(3 marks)

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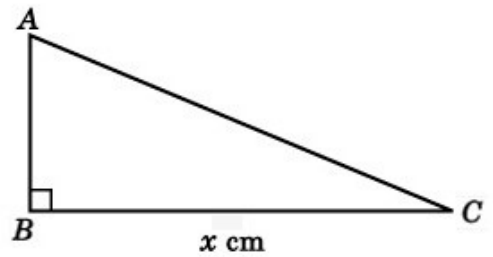
21. A piece of wire is bent to form a right-angled triangle  $ABC$  as shown.  $BC = x$  cm,  $AB$  is 7 cm less than  $BC$  and  $AC$  is 1 cm longer than  $BC$ .

(a) Express  $AB$  and  $AC$  in terms of  $x$ .

(1 mark)

(b) Hence find the value of  $x$  and the perimeter of  $\triangle ABC$ .

(4 marks)



22. If the quadratic equation  $2x^2 + 4x + k - 5 = 0$  has two distinct real roots where  $k$  is a constant,

(a) find the range of values of  $k$ ,

(3 marks)

(b) solve the equation by taking the largest integral value of  $k$ .

(give your answers correct to 2 decimal places)

(2 marks)

**Section C (8 marks)**

23. It is given that  $\alpha$  and  $\beta$  are the roots of the quadratic equation  $x^2 - 8x - k = 0$ , where  $k$  is a constant.

(a) Find, in terms of  $k$ ,

(i)  $(\alpha + \beta)$ ,

(ii)  $\alpha\beta$ ,

(iii)  $\frac{1}{\alpha^2\beta^2}$ ,

(iv)  $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ . (5 marks)

(b) If  $k = -16$ , form a quadratic equation in  $x$  with the roots  $\frac{1}{\alpha^2}$  and  $\frac{1}{\beta^2}$ . (3 marks)

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