

MATH CP  
PAPER 1

2025 – 2026

## Final Examination

## S.4 MATHEMATICS Compulsory Part

## PAPER 1

## Question-Answer Book

Time allowed: 2 hours 15 minutes

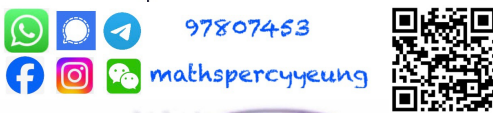
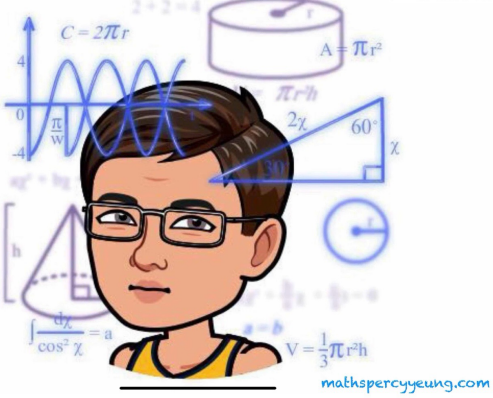
Full Marks: 95

This paper must be answered in English

## INSTRUCTIONS

- (1) Write your name, class and class number in the spaces provided.
- (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) Graph paper and supplementary answer sheets will be supplied on request. Write your name, class and class number in the spaces provided on each sheet and fasten them with string INSIDE this book.
- (5) Unless otherwise specified, all working must be clearly shown.
- (6) Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
- (7) The diagrams in this paper are not necessarily drawn to scale.
- (8) Only calculators with the “H.K.E.A. APPROVED” or “H.K.E.A.A. APPROVED” label are allowed in the examination.

|       |     |
|-------|-----|
| Name  |     |
| Class | ( ) |

| Marker's Use Only                                                                   |       |
|-------------------------------------------------------------------------------------|-------|
| Question No.                                                                        | Marks |
|   |       |
|  |       |
| 9                                                                                   |       |
| 10                                                                                  |       |
| 11                                                                                  |       |
| 12                                                                                  |       |
| 13                                                                                  |       |
| 14                                                                                  |       |
| 15                                                                                  |       |
| 16                                                                                  |       |
| 17                                                                                  |       |
| 18                                                                                  |       |
| 19                                                                                  |       |
| 20                                                                                  |       |
| 21                                                                                  |       |
| <b>Total</b>                                                                        |       |

**SECTION A(1) (40 marks)**

1. Simplify  $\frac{y}{(x^7 y^9)^{-6}}$  and express your answer with positive indices. (3 marks)

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2. Make  $x$  the subject of the formula  $\frac{Ax+C}{B} = 3x$ . (3 marks)

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3. Factorize
- (a)  $x^2 - 4xy + 3y^2$ ,
- (b)  $x^2 - 4xy + 3y^2 + 11x - 33y$ . (3 marks)

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4. Simplify  $\frac{3}{y^2 - 4y + 3} + \frac{3}{(y-3)(y-5)}$ . (3 marks)

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5. The marked price of a vase is 30% above its cost. A loss of \$88 is made by selling the vase at a discount of 40% on its marked price. Find the marked price of the vase. (5 marks)

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6. Let  $a$ ,  $b$  and  $c$  be non-zero numbers such that  $5a = 6c$  and  $\frac{2b+7c}{b+c} = 4$ .

Find  $\frac{5a+8b}{2b+3c}$ .

(4 marks)

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7. The number of apples owned by Ada is 4 times that owned by Billy. If Ada gives 12 of her apples to Billy, they will have the same number of apples. Find the total number of apples owned by Ada and Billy. (4 marks)

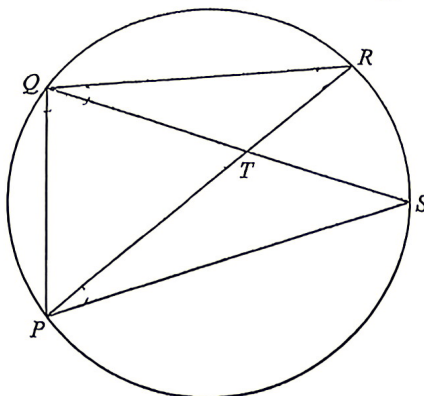
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8. In the figure,  $PR$  is a diameter of the circle  $PQRS$ . Denote the point of intersection of  $PR$  and  $QS$  by  $T$ . If  $\angle PSQ = 41^\circ$  and  $\angle PTQ = 68^\circ$ , find  $\angle RQS$  and  $\angle PQS$ .



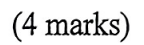
(4 marks)

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S.4 \_\_\_\_\_ ( )

- Find reflex  $\angle POQ$ .





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10. If the quadratic equation  $x^2 - 4x + 2k = 0$  has no real roots, where  $k$  is a constant, find the range of values of  $k$ . (3 marks)

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11. Solve  $5 \sin \theta \cos \theta = \sin \theta$ , where  $0^\circ \leq \theta < 360^\circ$ . (4 marks)  
(Give the answers correct to 1 decimal place if necessary.)

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**SECTION A(2)      (25 marks)**

12. Solve the following equations.

(a)  $3^{x-2} + 3^x = 270.$  (3 marks)

(b)  $\log_2[\log_4(x+1) - \log_4 x] = 1.$  (3 marks)

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13. Let  $f(x) = (x - 4)g(x) + 3$ , where  $g(x) = x + a$ . It is given that  $f(3) = -1$ .

(a) Find the value of  $a$ .

(2 marks)

(b) Find the value(s) of  $k$  such that  $f(k) + g(k) = 0$ .

(2 marks)

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14. Simplify  $\frac{\cos 360^\circ}{2 \sin (180^\circ - \theta) + 2} - \frac{\cos 240^\circ}{1 - \tan (180^\circ + \theta) \cdot \sin (90^\circ + \theta)}$ . (4 marks)

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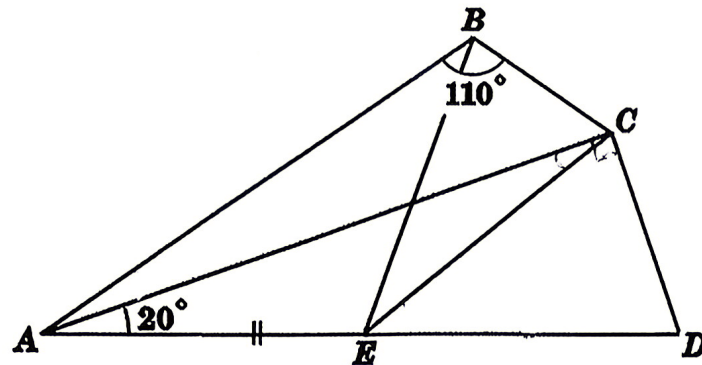
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15. In the figure,  $AED$  is a straight line.  $AE = ED$ ,  $\angle ACD = 90^\circ$ ,  $\angle CAD = 20^\circ$  and  $\angle ABC = 110^\circ$ .

(a) Determine whether  $ABCD$  is a cyclic quadrilateral. (3 marks)

(b) Find  $\angle CED$ . (2 marks)



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**SECTION B (30 marks)**

17. (a) Express  $\frac{5+3i}{1+i}$  in the form  $a + bi$ , where  $a$  and  $b$  are real numbers. (2 marks)
- (b) If  $x - 26i = \frac{5+3i}{1+i}(x + yi)$ , find the values of real numbers  $x$  and  $y$ . (4 marks)

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19. Let  $p(x) = 12x^3 + kx^2 + 7x + 2$ , where  $k$  is a constant. When  $p(x)$  is divided by  $4x^2 + 7x + d$ , the quotient and the remainder are  $3x - 1$  and  $8x + e$  respectively, where  $d$  and  $e$  are constants.
- (a) Find the value of  $d$ . (3 marks)
- (b) Let  $q(x)$  be a quadratic polynomial such that when  $q(x)$  is divided by  $4x^2 + 7x + d$ , the remainder is  $8x + e$ .
- (i) Prove that  $p(x) - q(x)$  is divisible by  $4x^2 + 7x + d$ .
- (ii) Someone claims that all the roots of the equation  $p(x) = q(x)$  are rational numbers. Do you agree? Explain your answer.

(5 marks)

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S.4 \_\_\_\_\_ (       )

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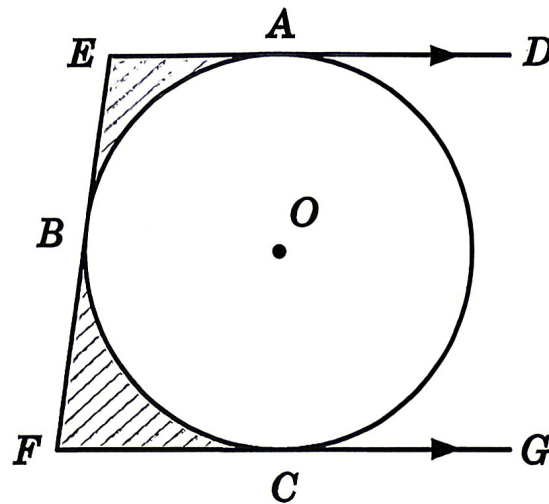
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S.4 \_\_\_\_\_ ( )

21. In the figure,  $O$  is the centre,  $DE$ ,  $EF$  and  $FG$  are tangents to the circle at points  $A$ ,  $B$  and  $C$  respectively. If  $DE \parallel FG$ ,  $AE = 9$  cm,  $CF = 12$  cm, find

- (a) the radius of the circle, (5 marks)
- (b) the area of the shaded region. (3 marks)



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S.4 \_\_\_\_\_ (      )

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**End of Paper**

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