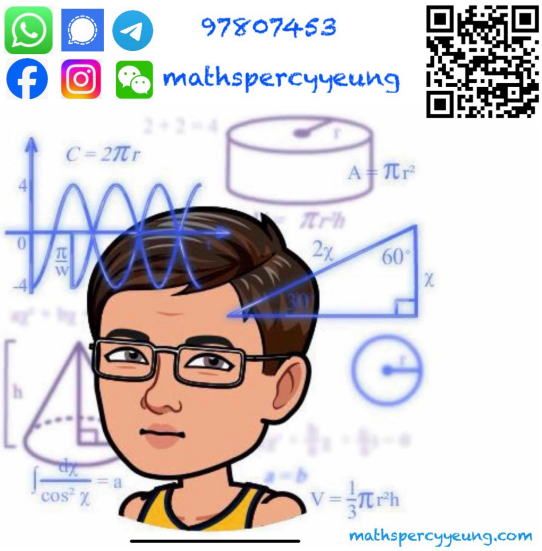


MID YEAR EXAMINATION

2024 – 2025

QUESTION-ANSWER BOOK

Subject: **SECONDARY 2 MATHEMATICS**

Paper: **I**

Time Allowed: **1 HOUR**

Total Marks: **100**

No. of pages: 9

Page	Marks
2	
3	
4	
5	
6	
7	
8	
9	
Total	

INSTRUCTIONS:

(1) Write your name, class and examination number in the spaces provided.

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

(3) Attempt ALL questions in Sections A(1), A(2) and B.
Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins.

(4) The use of HKEAA approved calculators is allowed.

(5) Unless otherwise specified, all working must be clearly shown.

(6) The diagrams in this paper are not necessarily drawn to scale.

Section A(1) (40 marks)

1. Prove that $4(3x-1)+8=(7x+4)+5x$ is an identity. (3 marks)

2. If $2x^2-4x+3 \equiv Bx^2+3+Cx$, where B and C are constants, find the values of B and C. (3 marks)

3. Expand the following expressions by **using suitable identities**. (9 marks)
   (a) $(6x+1)(6x-1)$ (b) $(x+7)^2$

   (c) $(9-y)^2$ (d) $\frac{1}{2}(4x+6y)^2$

Answers written in the margins will not be marked.

4. Factorize the following expressions. (4 marks)
   (a) $xy + x$ (b) $5qx + 5qy + 10qz$

5. Factorize the following expressions by **using suitable identities**. (6 marks)
   (a) $y^2 - 81$ (b) $16x^2 + 8x + 1$

   (c) $9k^2 - 24k + 16$

6. Given that $y = mx + c$. (4 marks)
   (a) Find the value of y when $m = 1$, $x = 4$ and $c = -2$.

   (b) Find the value of x when $y = 5$, $m = -2$ and $c = 1$.

Answers written in the margins will not be marked.

7. Simplify the following expressions. (8 marks)

(a) $\dfrac{16x^8y}{24x^3y^2}$

(b) $\dfrac{3(a-2b)}{21(2b-a)}$

(c) $\dfrac{5a^6}{b^8} \div \dfrac{20}{a^2b}$

(d) $\dfrac{7}{15v} - \dfrac{2}{5v}$

8. Make S the subject of the formula $P + S = 3(S - 2)$. (3 marks)

Answers written in the margins will not be marked.

Section A2 (30 marks)

9. Factorize the following expressions. (6 marks)

(a) $x(2a-1)+4(1-2a)$ (b) $-8r-2pq+16p+qr$

10. Factorize the following expressions by **using suitable identities**. (9 marks)

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

(c) $-r^5-18r^3-81r$

Answers written in the margins will not be marked.

11. Simplify the following expressions. (8 marks)

(a) $\dfrac{3y-5}{6xy^2+3xy} \times \dfrac{3x^3y}{12y-20} \div \dfrac{2}{y+1}$

(b) $\dfrac{8}{n(n-3)} - \dfrac{1}{n}$

12. Consider the formula $y+4=\dfrac{2x+1}{3-x}$.

(a) Make x the subject of the formula. (5 marks)

(b) If $y = 4$, using the result of (a), find the value of x. (2 marks)

Answers written in the margins will not be marked.

Section B (30 marks)

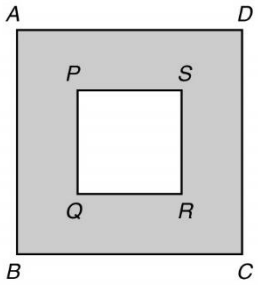
13. Expand $4(-2a-3b)(-3b+2a)$ by **using suitable identities**. (4 marks)

14. (a) Expand $(x+8y)^2$. (2 marks)

(b) Hence, expand $[(a-2b)+8y]^2$. (4 marks)

Answers written in the margins will not be marked.

15. In the figure, $ABCD$ and $PQRS$ are two squares with $AB = x$ and $PQ = y$.



(a) Express the area of the shaded region in terms of x and y. (2 marks)

(b) **Without using calculator**, find the area of the shaded region when $AB = 6.85$ cm and $PQ = 3.15$ cm. (3 marks)

16. (a) Expand $(x^2 + 2y^2)^2$. (2 marks)

(b) Using the result of (a) or otherwise, factorize $x^4 + 4y^4$. (4 marks)

Answers written in the margins will not be marked.

17. For Company *A*, the rental fee $\$R$ for a bicycle is the sum of basic charge and hourly fee. The details are as follow.

Basic charge (per bicycle)	\$ 20
Hourly fee (per hour)	\$ 5

Suppose Ricky rented a bicycle for t hours.

(a) (i) Write down the formula for R in terms of t. (1 mark)

(ii) If the rental fee for the bicycle is \$35, find the number of hours that Ricky rented. (3 marks)

(b) For Company *B*, the rental fee for a bicycle also the sum of basic charge and hourly fee. The details are as follow.

Basic charge (per bicycle)	\$ 30
Hourly fee (per hour)	\$ 3

Ricky want to compare the difference of the rental fee $\$D$ between two companies by using formula, $D =$ rental fee (Company *A*) $-$ rental fee (Company *B*).

(i) Express and simplify Ricky's formula for D in terms of t. (3 marks)

(ii) Suppose Ricky wants to rent a bicycle for 6 hours. Using the result of (b)(i), which company should Ricky select so as to pay a lower fee? Explain your answer. (2 marks)

END OF PAPER

Page total

Answers written in the margins will not be marked.