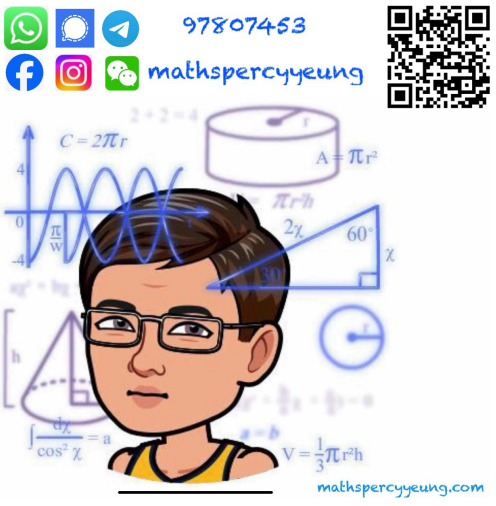
Conventional Questions
Section A (46 marks)

1. Make h the subject of the formula $A = \dfrac{-15(3h-2)}{h}$. (3 marks)

2. Simplify the following expressions and express the answers with positive indices.

(a) $\dfrac{a^{-5}}{(a^3a^0)^4}$ (b) $(4h^3k^{-4})^2 \cdot 3k$ (c) $\left(-\dfrac{a^3b^{-4}}{4a^7b^5}\right)^3$

(9 marks)



3. Factorize
   (a) $16x^2 - 25y^2$,
   (b) $16x^2 - 25y^2 - 8x^2 - 10xy$.

(4 marks)

4. A test consisted of 20 true-false questions. 2 marks were awarded for each correct answer and 1 mark was deducted for each wrong answer. Jane answered all the questions. If she got 25 marks at most, find the maximum number of questions that she answered correctly. (4 marks)

5. (a) Without using a calculator, convert 221_{10} into a binary number.
   (b) Without using a calculator, convert $7+3\times2^4+2^9$ into a binary number.

(5 marks)

6. Solve the following inequalities and represent the solutions graphically.
   (a) $-2(5x-4) \geq 3x+7$
   (b) $\frac{2x+5}{3}-\frac{x}{4} < \frac{9-5x}{2}$

(6 marks)

7. The average temperature of a town increases steadily at a rate of 10% every 2 months. If the average temperature of the town in June was 33°C, find the average temperature of the town 6 months ago.
(*Give the answer correct to the nearest 0.1°C.*) (3 marks)

8. Dennis deposits $80 000 in a bank at an interest rate of 2.5% p.a. for 3 years.
(a) Find the simple interest received,
(b) If it is compounded quarterly, find the interest received.
(4 marks)

9. Rita's net chargeable income is $162 000 and she is entitled to a total allowance of $384 000.

Net chargeable income	Rate
On the first $50 000	2%
On the next $50 000	6%
On the next $50 000	10%
On the next $50 000	14%
Remainder	17%

(a) Find her salaries tax payable.

(b) Find the percentage of her salaries tax payable to her annual income correct to 3 significant figures.

(4 marks)

10. In a factory, the production cost ($\$C$) of a refrigerator in a day is given by

$$C = 450 + \frac{14\,400}{n}$$

where n is the number of refrigerators produced that day.

The factory produced 80 refrigerators yesterday. If the number of refrigerators produced increases by 12.5% today, find the percentage change in the production cost of a refrigerator correct to 3 significant figures.

(4 marks)

Section B (14 marks)

11. Simplify the following expressions and express the answers with positive indices.

(All the letters in the expressions represent non-zero numbers.)

(a) $(k^{-5} \times k^2 - 2k^{-3})^{-3}$

(b) $\dfrac{(-5b^2)^3}{b^{-2} + (2b)^{-2}}$

(6 marks)

12. A telecom company provides two international telephone service plans as follows:

Plan	Basic monthly fee	Free airtime*	Charge for each extra minute of airtime*
A	\$95	1 600 min	\$0.4
B	\$175	3 000 min	\$0.2

**Note: Time less than 1 min is counted as 1 min.*

Mr Lee chooses plan *B* and he uses more than 3 000 min of airtime in a month. Based on the table above, he finds that if he chooses plan *A*, his monthly charge will at least be tripled.

(a) Find the maximum possible airtime used by Mr Lee.

(b) Can Mr Lee's monthly charge exceed \$320? Explain your answer.

(8 marks)

Bonus Question (4 marks)

13 It is given that abc_2 is a 3-digit binary number, i.e.

Digit	a	b	c
Place value	2^2	2^1	2^0

and abc_{10} is a 3-digit denary number, i.e.

Digit	a	b	c
Place value	10^2	10^1	10^0

If $a + b + c = ab + ac + bc$, is abc_{10} divisible by abc_2 when abc_2 is expressed as a denary number?

END OF PAPER