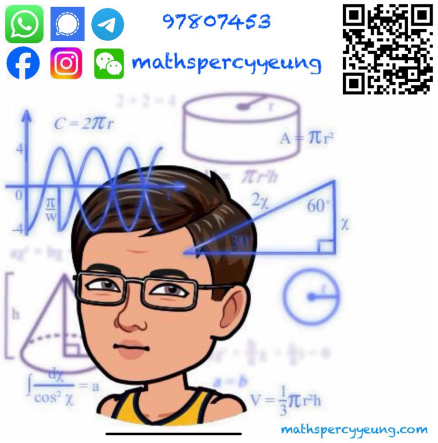
HY F2 Mid-Year Examination 2025 - 2026

Section A: Multiple Choice Questions (20 marks)

Please darken the circles on the answer sheets provided to indicate your answers.

1. Tom is 20% taller than Billy. Billy is 20% shorter than Carson. If Tom's height is 168 cm, then Carson's height is
   A. 153.8 cm.
   B. 160 cm.
   C. 161.28 cm.
   D. 175 cm.



2. $0.\dot{1}35\dot{0}\dot{9}\dot{9} =$
   A. 0.13510 (correct to 5 significant figures).
   B. 0.1351 (correct to 5 decimal places).
   C. 0.14 (correct to 3 significant figures).
   D. 0.136 (correct to 3 decimal places).

3. $x^2 \times \left(\frac{y^4}{x^3}\right)^3 =$
   A. $x^{11}y^{12}$.
   B. x^7y^{12}.
   C. $\frac{y^7}{x^4}$.
   D. $\frac{y^{12}}{x^7}$.

4. If $(xy)^n = 2500$ and $x^{n+2} = 4x^2$, then $y^n =$
   A. 25.
   B. 45.
   C. 625.
   D. 1250.

5. $(1-x^2+3x)-(4x-3+5x^2) =$
   A. x^2-x+1.
   B. x^2-9x+1.
   C. $-6x^2-x+4$.
   D. x^2-9x+5.

6. $-3(x^2+2x-5)(x-1) =$
   A. $-3x^3-3x^2+9x-15$.
   B. $-3x^3+21x-15$.
   C. $-3x^3-3x^2+21x-15$.
   D. $-3x^3-3x^2+21x+15$.

7. Let k be a positive integer. Suppose the degree of the polynomial $2x^k y + y^5 - 4x$ is 5. Which of the following must be true about the polynomial?

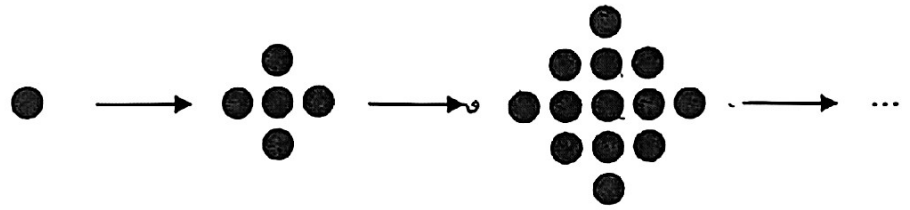
A. $k = 4$

B. The coefficient of x^k is 2.

C. The coefficient of x is -4.

D. The coefficient of y is $2x^k$

8. In the figure, the 1st pattern consists of 1 dot. For any positive integer n, the $(n+1)$ th pattern is formed by adding $4n$ dots to the n th pattern. Find the number of dots in the 4th pattern.



A. 25

B. 26

C. 27

D. 28

9. The length of each side of a square is x cm. If the length is increased by 5 cm and the width is increased by 2 cm to form a rectangle, then the area is increased by 115 cm^2. Find x.

A. 14

B. 15

C. 16

D. 17

10. Let A and B be constants. If $2(x+A)^2 - 2B(x+3) \equiv Bx^2 + 8x + 2A$, find the value of A.

A. -3

B. -1

C. 2

D. 3

11. Which of the following must be true?

I. $(a^{333})^2 = a^{666}$

II. $2^{444} + 2^{444} = 2^{888}$

III. $(a^{111} + b^{333})^2 = a^{222} + b^{666}$

A. I only

B. II only

C. I and III only

D. II and III only

12. $3a^3 - 9b^3 + a^2b - 27ab^2 =$

A. $(a+3b)(a-3b)(3a+b)$.

B. $(a+3b)(a-3b)(3a-b)$.

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

D. $(a+3b)^2(3a+b)$.

13. Which of the following is/are factor(s) of $p^2 + q^2 - 2pq - pr + qr$?

I. $p+q$

II. $p-q$

III. $p-q-r$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

14. The pie chart shows Kit's expenditure this month. He spent \$4800 on food this month. Which of the following must be true?

I. Kit spent \$18960 on rent this month.

II. Kit spent 50% more on transportation than on food.

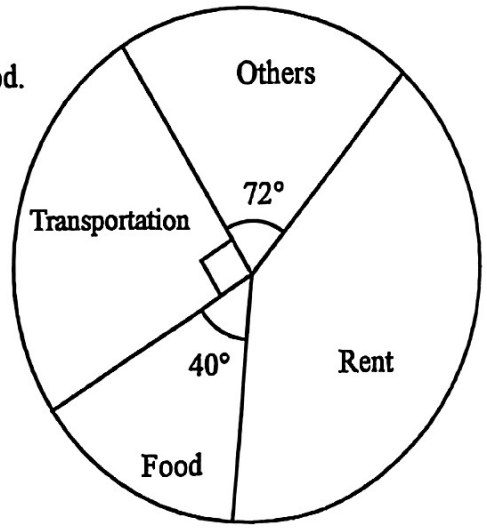
III. Kit spent 20% of expenditure of this month on other expenses.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III



15. Simplify $\frac{1}{a-2b}-\frac{1}{14b-7a}$.

A. $\frac{8}{7(2b-a)}$

B. $\frac{8}{7(a-2b)}$

C. $\frac{6}{7(2b-a)}$

D. $\frac{6}{7(a-2b)}$

16. $\frac{1}{x+3}-\frac{1}{x-3}=$

A. 0.

B. $\frac{2x}{(x+3)(x-3)}$.

C. $-\frac{6}{(x+3)(x-3)}$.

D. $\frac{6}{(x+3)(x-3)}$.

17. Consider the formula $A=2\pi rh+2\pi r^2$. If $A=130\pi$ and $r=5$, find the value of h.

A. 8

B. 10

C. 12

D. 14

18. Change the subject of the formula $k=5+\frac{3n}{p}$ to p.

A. $p=\frac{k-5}{3n}$

B. $p=\frac{3n}{k-5}$

C. $p=\frac{3n}{k}-5$

D. $p=\frac{3n+5}{k}$

19. If $\begin{cases} y=3x-28 \\ 2x-5y=23 \end{cases}$, then $x=$

A. 8.

B. 9.

C. 10.

D. 11.

20. If the solution of the simultaneous equations $\begin{cases} ax+by=11 \\ x-by=2a \end{cases}$ is $(5,1)$,

find the value of a.

A. -2

B. -1

C. 1

D. 2 .

End of Section A

Section B: Short Questions (20 marks)

1. Write down the number of terms, the coefficient of x^3, the constant term and the degree in the following polynomial: (2 marks, 0.5 marks each)

Polynomial	Number of terms	Coefficient of x^3	Constant term	Degree of the polynomial
$-5x^3+3x+4$				

2. (a) Factorize $x^2-10x+25$.
   (b) Hence, factorize $x^2-10x+25+2ax-10a$. (3 marks)

3. (a) Factorize $2pq+2pr-4qs-4rs$.
   (b) Factorize $5x^2-8xy+3y^2$ by using the cross method. (5 marks)

4. The total cost ($\$C$) of a party can be calculated by the formula $C=\frac{500+4n}{3}$, where n is the number of guests who join the party.

   (a) Change the subject of the formula to n.

   (b) Is it possible that the total cost is \$526? Explain your answer. (5 marks)

5. Solve the simultaneous equations $\begin{cases} 3x+5y=21 \\ 2x-7y=-17 \end{cases}$ by the method of elimination.

   (5 marks)

End of Section B

Mid-Year Examination 2025 – 2026

Form 2 Mathematics

Question-Answer Booklet for Sections C and D

Name: _____ Class: _____ Class Number: _____

Section C: Long Questions (30 marks)

1. (a) Solve the simultaneous equations $\begin{cases} 2a+3b=204 \\ 4a-b=-12 \end{cases}$ for a and b by the method of substitution.

(b) Use the result of (a) to solve the simultaneous equations $\begin{cases} 4^x 8^y = 2^{204} \\ 81^x 27^4 = 3^y \end{cases}$ for x and y.

(7 marks)

2. (a) Factorise the following expressions using cross method.

(i) $x^2+10x+24$

(ii) $x^2+10x-24$

(b) Expand $(x^2+10x+24)(x^2+10x-24)$ using an appropriate identity.

(c) Hence, or otherwise, simplify the fraction $F=\dfrac{x^4+20x^3+100x^2-576}{(x+2)(x+4)(x+6)(x+8)(x+10)(x+12)}$.

(7 marks)

3. The cost $\$C$ of producing one designer dress can be calculated by the formula

$$C = \frac{20(m-120)}{n},$$

where $\$m$ is the cost of materials and n is the number of dresses produced in one batch.

(a) Make m the subject of the above formula.

(b) Carmen plans to make 30 dresses in one batch and keep the cost of one dress at \$320.

(i) Find the cost of materials.

(ii) Carmen wants to reduce the cost of materials by at least 17%. Can she do that by reducing the cost of one dress by 20%? Explain your answer.

(8 marks)

4. (a) (i) Consider the points $A(-3,0)$, $B(5,-1)$ and $C(11,-2)$. Among them, only one does **not** lie on the graph of the equation $x+7y=-3$. Which point is that? Explain your answer.

(ii) The figure below shows the graph of the equation $6x-y=25$. Use the above results to draw the graph of the equation $x+7y=-3$ in the same figure.

(iii) Hence, write down the solution to the simultaneous equations $\begin{cases} x+7y=-3 \\ 6x-y=25 \end{cases}$.

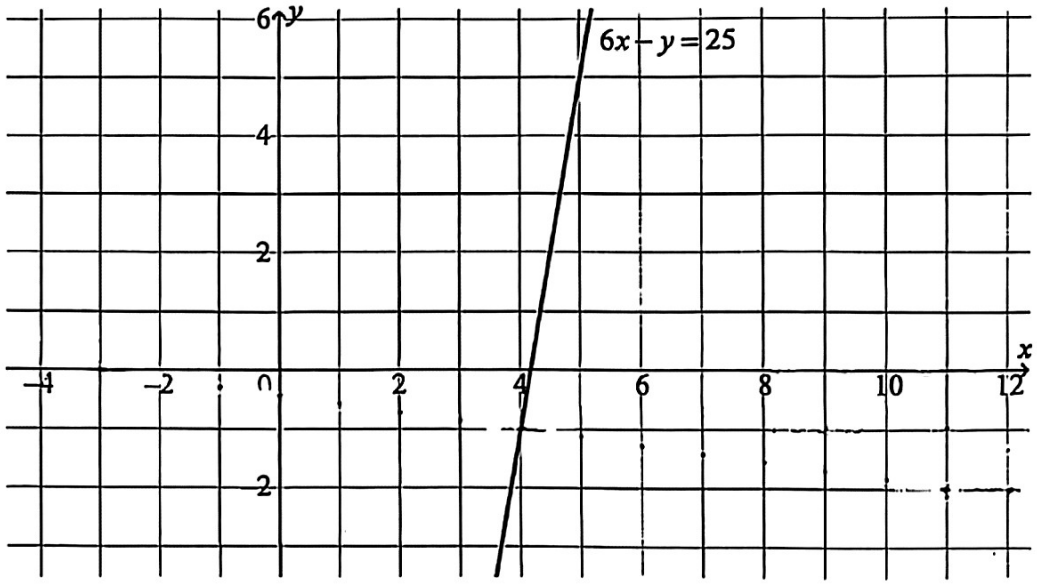
(b) P and Q are two constants such that the equation in x:

$$(5x+3)(5x-3)+3=P(6x^2-x+2)+Q(14-4x-x^2)$$

is an identity. Use the result of (a) to find the values of P and Q.

(8 marks)

Figure for 4. (a) (ii) *(A pencil is recommended when you work on the figure.)*



Section D: Challenging Question (OPTIONAL, 5 marks)

In the figure, the equations of the graphs L_1 and L_2 are $px+y=24$ and $y=\frac{1}{5}x+q$ respectively, where p and q are constants. The two graphs intersect at $R(5,9)$. It is known that L_1 and L_2 pass through points S and T respectively such that their x-coordinates are the same and that the y-coordinate of T is larger than the y-coordinate of S by 6464 units. Find the x-coordinate of S.