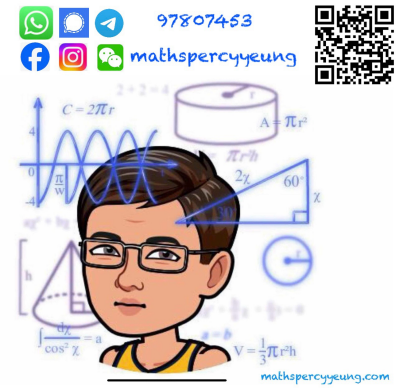
2024-2025 S4
1st TERM EXAM
MATH CP
PAPER 2
MC



2024 – 2025
S4 First Term Examination

MATHEMATICS Compulsory Part

PAPER 2

7th January, 2025
9:45 am – 10:30 am (45 minutes)
Total Marks: 27

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there. Look for the words '**END OF PAPER**' after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS**. You should use an HB pencil to mark all your 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.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

There are 18 questions in Section A and 9 questions in Section B.
The diagrams in this paper are not necessarily drawn to scale.
Choose the best answer for each question.

Section A

1. Make a the subject of the formula $x = \frac{2a}{b} + c$.

A. $\frac{b(x-c)}{2}$
B. $\frac{bx-c}{2}$
C. $b\left(\frac{x}{2}-c\right)$
D. $\frac{x}{2}-bc$

2. $\frac{(a^2b^{-3})^2}{a^{-2}b} =$

A. $\frac{a^2}{b^7}$.
B. $\frac{a^2}{b^5}$.
C. $\frac{a^6}{b^2}$.
D. $\frac{a^6}{b^7}$.

3. $a^2-2a+1+2b-2ab=$

A. $(a-1)(a-2b-1)$.
B. $(a-1)(a-2b+1)$.
C. $(a-1)(a+2b-1)$.
D. $(a-1)(a+2b+1)$.

4. Which of the following is a rational number?

A. $(\sqrt{3}+\sqrt{4})^2$
B. $\sqrt{3}\times\sqrt{243}$
C. $\sqrt{-25}$
D. $\frac{7\pi}{22}$

5. If p and q are constants such that $x^2+p \equiv (x+2)(x+q)+10$, then $p=$

A. –4.
B. –2.
C. 6.
D. 10.

6. Solve the equation $x+a=(x-3)(x+a)$, where a is a constant.

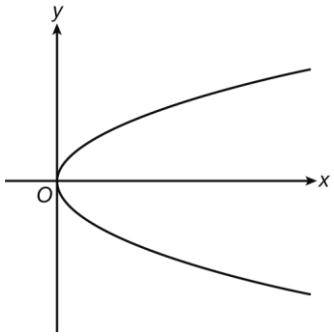
A. $x=3$
B. $x=-a$
C. $x=a$ or $x=3$
D. $x=-a$ or $x=4$

7. Let k be a constant. If the quadratic equation $-3x^2+6x+k=5$ has no real roots, find the range of values of k.

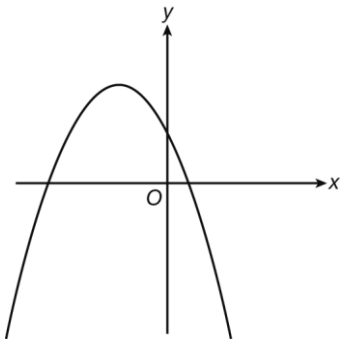
A. $k<2$
B. $k>2$
C. $k<-3$
D. $k>-3$

8. Which of the following CANNOT represent a graph of a function $y = f(x)$?

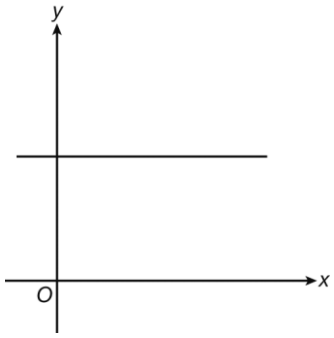
A.



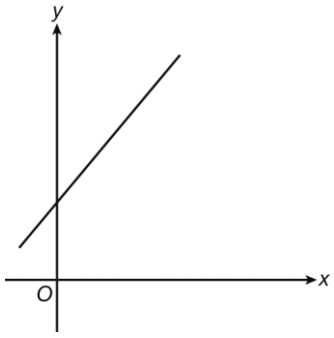
B.



C.



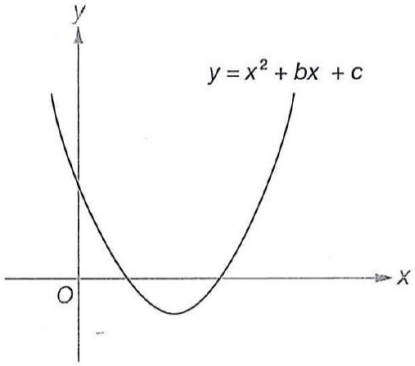
D.



9. If $f(x) = (x+1)^2$ and $g(x) = 4x + 3$, then $\dfrac{[f(-2)]^2}{g(-1)} =$

A. 25.
B. −1.
C. −2.
D. −9.

10. The figure shows the graph of $y = x^2 + bx + c$. Which of the following is true?



A. $b > 0$ and $c < 0$
B. $b > 0$ and $c > 0$
C. $b < 0$ and $c < 0$
D. $b < 0$ and $c > 0$

11. Let k be a constant. When $2x^3 + 2x^2 + kx + 6$ is divided by $x + 3$, the remainder is 3. Find the value of k.

A. −26
B. −25
C. −11
D. −10

12. The straight line L is perpendicular to the straight line $8x-3y+15=0$. If L passes through (4, –3), then the equation of L is

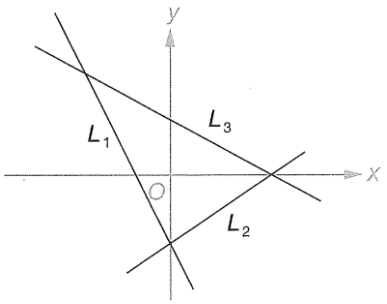
A. $3x-8y-12=0$.

B. $3x-8y+12=0$.

C. $3x+8y-12=0$.

D. $3x+8y+12=0$.

13. The figure shows 3 lines L_1, L_2 and L_3 whose slopes are m_1, m_2 and m_3 respectively. Which of the following must be true?



A. $m_1 < m_2 < m_3$

B. $m_1 < m_3 < m_2$

C. $m_3 < m_2 < m_1$

D. $m_3 < m_1 < m_2$

14. If the sum of the squares of two positive consecutive integers is 365, find the larger number.

A. 13

B. 14

C. 15

D. 16

15. When a polynomial $g(x)$ is divided by $x-2$, the quotient is x^2+2x-4. If $g(2)=0$, then $g(-1)=$

A. –9.

B. –3.

C. 11.

D. 15.

16. It is given that the equation of the straight line L is $y=a(x+b)$, where a and b are non-zero constants. Which of the following is / are NOT true?

I. The y-intercept of L is b.

II. L is parallel to the straight line $L_1: y=-(2+ax)$.

III. L is perpendicular to the straight line $L_2: y=-\frac{1}{a}x+3$.

A. III only

B. I and II only

C. II and III only

D. I, II and III

17. $A(-10, -8)$ is rotated anticlockwise about the origin through 90° to B. Find the equation of AB.

A. $4x-5y=0$

B. $x-9y-62=0$

C. $x+9y+82=0$

D. $9x-y+98=0$

18. Let a and b be constants. When x^3+2x^2+ax+b is divided by $x-1$ and $x+1$, the remainders are 3 and 5 respectively. Find the values of a and b.

A. $a=-2,\ b=2$
B. $a=-2,\ b=-2$
C. $a=2,\ b=-2$
D. $a=2,\ b=2$

Section B

19. The H.C.F. of $30x^4y^3$, $12x^2y^2$ and $8xy^2$ is

A. $2xy^2$.
B. $6xy$.
C. $120x^4y^3$.
D. $2\,880x^7y^6$.

20. The H.C.F. and the L.C.M. of three polynomials are $x^2(x+1)^4$ and $6x^3(x+1)^5(x-2)^7$ respectively. If the first polynomial and the second polynomial are $3x^2(x+1)^5$ and $6x^2(x+1)^4(x-2)^3$ respectively, then the third polynomial can be

A. $2x^3(x+1)^3$.
B. $2x^3(x+1)^4(x-2)^7$.
C. $4x^3(x+1)^3$.
D. $4x^3(x+1)^4(x-2)^7$.

21. Let k be a non-zero constant. If the roots of the quadratic equation $x^2+kx+2k=0$ are α and β, then $\frac{1}{\alpha}+\frac{1}{\beta}=$

A. $-\frac{k}{2}$.
B. $-2k$.
C. $-\frac{1}{2}$.
D. -2.

22. It is given that $f(x) = 4x^2 - 4x + 13$. Which of the following must be true?

I. The minimum value of $f(x)$ is 12.
II. The axis of symmetry of the graph of $y=f(x)$ is $x=-\frac{1}{2}$.
III. The coordinates of the vertex of the graph of $y = f(-x)$ are $\left(-\frac{1}{2}, 12\right)$.

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

23. The imaginary part of $\frac{1}{4+3i}=$

A. $\frac{1}{3}$.
B. $\frac{3}{25}$.
C. $-\frac{3}{25}$.
D. $-\frac{1}{3}$.

24. It is given that $z = i(3 - xi) - 4$, where x is a real number. If z is a purely imaginary number, then $x =$

A. –3.
B. 3.
C. – 4.
D. 4.

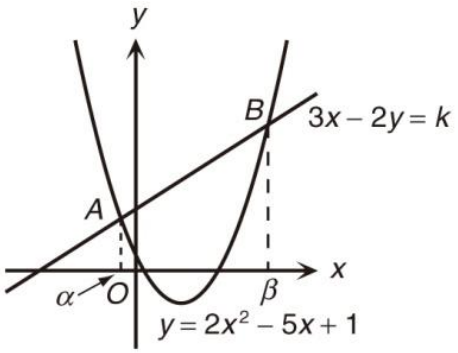
25. Let P and Q be constants. If $\frac{-x+21}{(x-3)(x+6)} \equiv \frac{P}{x-3} + \frac{Q}{x+6}$, find the values of P and Q.

A. $P = 21,\ Q = -1$
B. $P = -1,\ Q = 21$
C. $P = -3,\ Q = 2$
D. $P = 2,\ Q = -3$

26. If α and β are the roots of the equation $x^2 + px + q = 0$, where p and q are constants, find a quadratic equation in x with the roots $\frac{2}{\alpha}$ and $\frac{2}{\beta}$.

A. $qx^2 + 2px + 4 = 0$
B. $qx^2 - 2px + 4 = 0$
C. $qx^2 - 4x - 2p = 0$
D. $px^2 + 2qx + 4 = 0$

27. In the figure, the graphs of $y = 2x^2 - 5x + 1$ and $3x - 2y = k$ intersect at two points A and B. The x-coordinates of A and B are α and β respectively. Given that $\alpha\beta = -\frac{3}{2}$, find the value of k.



A. –6
B. –7
C. –8
D. –9

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