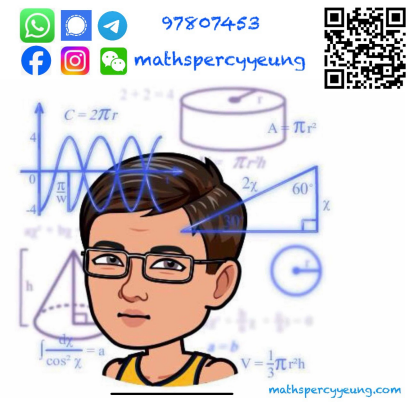
2024-2025 S4
2nd TERM EXAM
MATH CP
PAPER 2
MC



2024 – 2025
S4 Second Term Examination

MATHEMATICS Compulsory Part

PAPER 2

16th June, 2025
10:15 am – 11:15 am (1 hour)
Total Marks: 36

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 24 questions in Section A and 12 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. $ax-ay-2x+2y+bx-by=$

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

2. $\dfrac{4^{3n+5}}{8^{2n+3}}=$

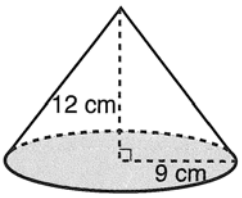
   A. 2^n .
   B. 2^{n+2} .
   C. 2 .
   D. 4 .

3. If $y=\dfrac{x+1}{x-1}$, then $x=$

   A. $\dfrac{y+1}{y-1}$.
   B. $\dfrac{y+1}{1-y}$.
   C. $\dfrac{y-1}{y+1}$.
   D. $\dfrac{1-y}{y+1}$.

4. The figure shows a solid right circular cone with height 12 cm and base radius 9 cm. Find the total surface area of the cone.

   A. 135π cm^2 .
   B. 162π cm^2 .
   C. 189π cm^2 .
   D. 216π cm^2 .



5. If α is a root of equation $2x^2-3x+a=0$, then $9+9\alpha-6\alpha^2=$

   A. $3-a$.
   B. $3+a$.
   C. $9-3a$.
   D. $9+3a$.

6. Let k be a non-zero constant. When $x^3+kx^2+3kx-4k$ is divided by $x+k$, the remainder is $2k$. Find k.

   A. -2 .
   B. -1 .
   C. 1 .
   D. 2 .

7. Let $f(x)$ be a polynomial. When $f(x)$ is divided by $x+5$, the remainder is -10. If $f(x)$ is divisible by $x-5$, find the remainder when $f(x)$ is divided by x^2-25.

   A. $x+5$
   B. $x-5$
   C. $5x+1$
   D. $5x-1$

8. $\sin(-\theta)\cos(90°-\theta)+\dfrac{\tan(360°-\theta)}{\tan(180°-\theta)}=$

   A. $\cos^2\theta$.
   B. $-\sin^2\theta$.
   C. 1 .
   D. 0 .

9. Suppose that z varies directly as $\sqrt{x}$ and inversely as y^2, where $x > 0$. Which of the following must be a constant?

A. $\sqrt{x}y^2z$

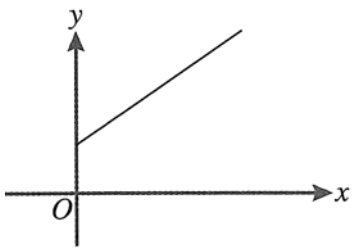
B. $\dfrac{\sqrt{x}z}{y^2}$

C. $\dfrac{y^2z}{\sqrt{x}}$

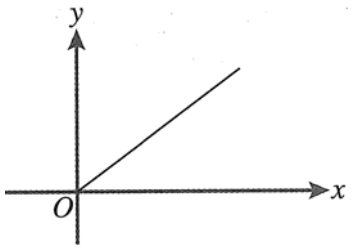
D. $\dfrac{z}{\sqrt{x}y^2}$

10. Which of the following graphs may represent that y is partly constant and partly varies directly as x?

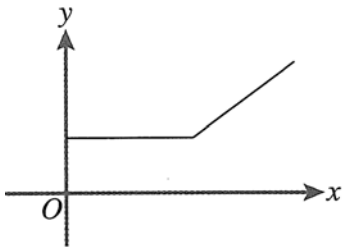
A.



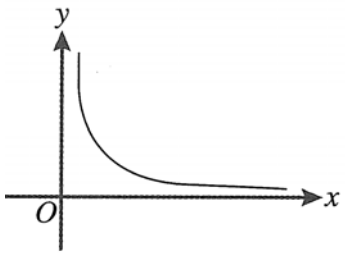
B.



C.



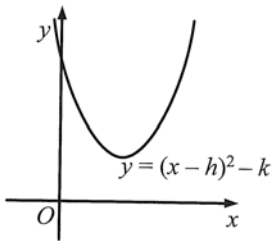
D.



11. Suppose x varies directly as y^3 and inversely as z^2. If y is decreased by 10% and z is increased by 50%, then x is decreased by

A. 20 %.
B. 32.4 %.
C. 67.6 %.
D. 70%.

12. The figure shows the graph of $y = (x-h)^2 - k$, where h and k are constants. Which of the following must be true?



A. $h < 0$ and $k > 0$
B. $h < 0$ and $k < 0$
C. $h > 0$ and $k > 0$
D. $h > 0$ and $k < 0$

13. If the graph of $y = 9x^2 + 24x + k$ touches the x-axis, solve the equation $9x^2 + 24x + k = 0$.

A. $x = -16$

B. $x = -\dfrac{4}{3}$

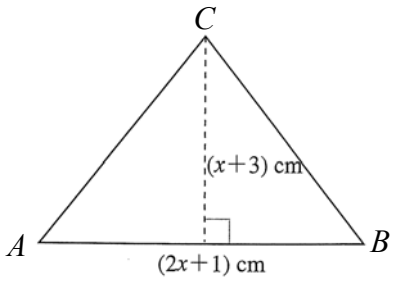
C. $x = \dfrac{4}{3}$

D. $x = 16$

14. If the quadratic equation $x^2 + 2x + k = 1$ has no real roots, find the range of values of k.

A. $k > 2$
B. $k \geq 2$
C. $k > 1$
D. $k \geq 0$

15. In the figure, the area of the triangle is $21\,\text{cm}^2$. Find the length of its base AB.

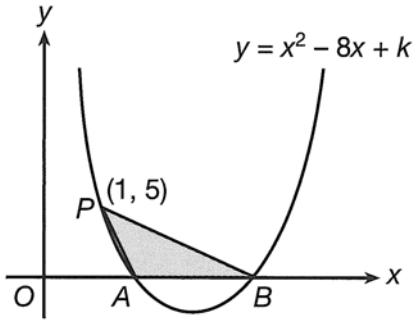


A. 3 cm
B. 6.5 cm
C. 7 cm
D. 14 cm

16. Solve $(x-1)(3x+2)-(x-1)(x+3)=0$.

A. $x=-1$ or $x=\dfrac{5}{2}$
B. $x=-1$ or $x=\dfrac{1}{2}$
C. $x=1$ or $x=-\dfrac{1}{2}$
D. $x=1$ or $x=\dfrac{1}{2}$

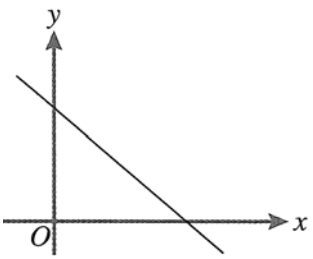
17. Let k be a constant. The quadratic graph of $y=x^2-8x+k$ cuts the x-axis at points A and B. The graph also passes through $P(1, 5)$. Find the area of ΔPAB.



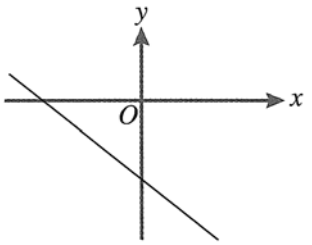
A. 10
B. 15
C. 16
D. 24

18. If $a>0$, $b<0$ and $c>0$, which of the following may represent the graph of the straight line $ax+by+c=0$?

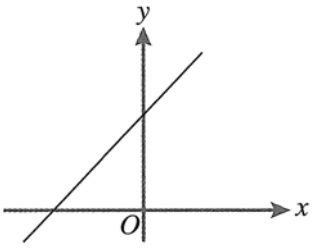
A.



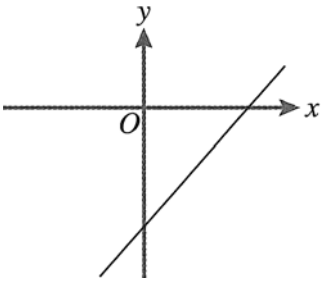
B.



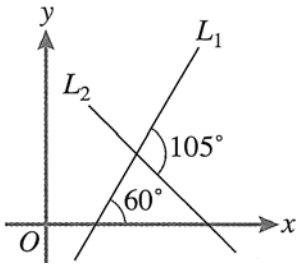
C.



D.



19. In the figure, the slope of L_2 is



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

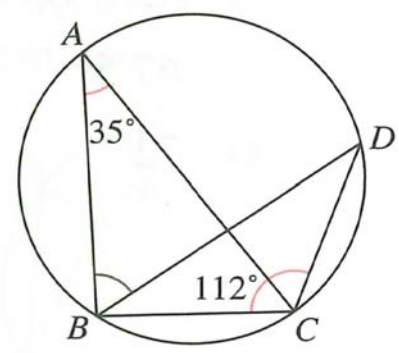
20. $M(2, 5)$ is the mid-point of AB. If the coordinates of the point B are (0, 3), find the equation of the straight line passes through the point A and perpendicular to AB.

A. $x+y+1=0$
B. $x-y+3=0$
C. $x+y-5=0$
D. $x+y-11=0$

21. For $0° \le \theta \le 180°$, find the greatest value of $\dfrac{5}{3+2\sin\theta}$.

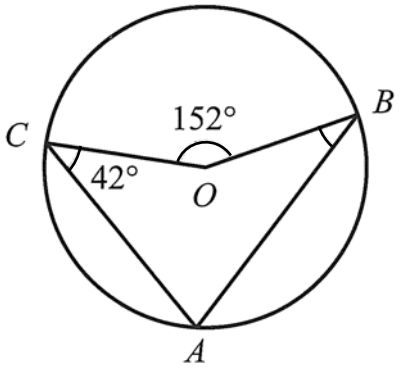
A. 1
B. $\dfrac{5}{3}$
C. $\dfrac{5}{2}$
D. 5

22. In the figure, AC is a diameter of the circle $ABCD$. If $\angle BAC = 35°$ and $\angle BCD = 112°$, find $\angle ABD$.



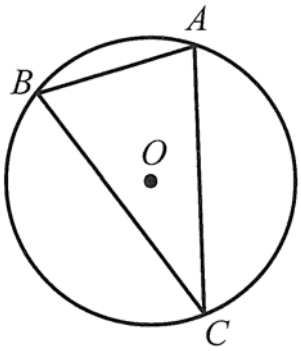
A. 33°
B. 43°
C. 57°
D. 77°

23. In the figure, O is the centre of the circle ABC. If $\angle ACO = 42°$ and $\angle BOC = 152°$, $\angle ABO =$



A. 34°.
B. 36°.
C. 38°.
D. 42°.

24. In the figure, O is the centre of the circle ABC and $\angle ABC = 2\angle ACB$. Which of the following must be true?



I. $\overset{\frown}{AC} = 2\overset{\frown}{AB}$
II. $AC = 2AB$
III. Area of sector AOC : Area of sector $AOB = \angle ABC : \angle ACB$

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

Section B

25. The H.C.F of $3c^2-12,\ 6(c-2)^2$ and $3c^3-24$ is

A. $c-2$.
B. $3(c-2)$.
C. $6(c-2)^2$.
D. $6(c-2)(c+2)^2(c^2+2c+4)$.

26. $\dfrac{x}{x^2-4}-\dfrac{1}{2x-4}=$

A. $-\dfrac{1}{2(x-2)}$.
B. $\dfrac{1}{2(x-2)}$.
C. $\dfrac{x}{2(x+2)}$.
D. $\dfrac{1}{2(x+2)}$.

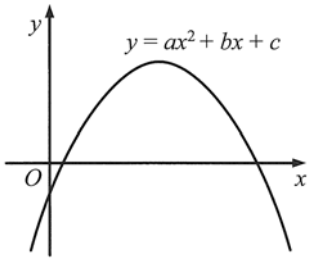
27. If $\alpha\neq\beta$ and $\begin{cases}\alpha^2=3\alpha+4\\ \beta^2=3\beta+4\end{cases}$, then $\alpha^2+\beta^2=$

A. 1.
B. 9.
C. 17.
D. 21.

28. If the roots of the equation $(\log x)^2-6\log x+20=3\log x$ are α and β, then $\alpha\beta=$

A. $\log 9$.
B. $\log 20$.
C. 10^9.
D. 10^{20}.

29. The graphs of $y=ax^2+bx+c$ is shown below. Which of the following is/are true?



I. $a>0$
II. $b>0$
III. $b^2>4ac$

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

30. Solve the equation $\begin{cases}3^{x+2y}=729\\ 2^{3x-4y}=256\end{cases}$.

A. $x=-2,\ y=4$.
B. $x=4,\ y=1$.
C. $x=3,\ y=\dfrac{3}{2}$.
D. $x=\dfrac{5}{2},\ y=\dfrac{1}{2}$.

31. For $0°<x<360°$, how many solutions does the equation $\sin x\tan x=\sin x$ have?

A. 2
B. 3
C. 4
D. 5

32. Which of the following is/are identity/identities?

I. $(\log_a b)(\log_b c)(\log_c a) = 1$

II. $\dfrac{\log_{bc} a}{\log_b a} = 1 + \log_b c$

III. $\dfrac{\log_a c}{\log_{\frac{a}{b}} c} = 1 - \log_a b$

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

33. Which of the following statements about the graph $y = (x-3)(4-x)+12$ is/are true?

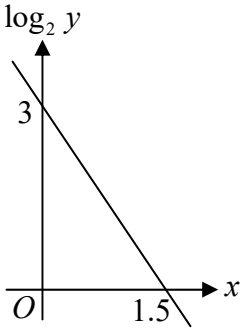
I. The graph opens downwards and passes through the origin.
II. The x-intercepts of the graph are 3 and 4.
III. The coordinates of the vertex of the graph are $\left(\dfrac{7}{2}, \dfrac{49}{4}\right)$.

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

34. Solve $\sqrt{5x^2+1} + 3x = 0$.

A. $x = -\dfrac{1}{2}$
B. $x = 0$
C. $x = \dfrac{1}{2}$
D. $x = -\dfrac{1}{2}$ or $x = \dfrac{1}{2}$

35. The graph in the figure shows the linear relation between x and $\log_2 y$. If $y = ab^x$, then



A. $a = 8$ and $b = \dfrac{1}{4}$.
B. $a = 8$ and $b = 4$.
C. $a = 3$ and $b = -4$.
D. $a = 3$ and $b = \dfrac{1}{4}$.

36. If k and $\dfrac{5}{2-i} + ki$ are real numbers, then $k =$

A. $-\dfrac{5}{3}$.
B. -1.
C. 1.
D. $\dfrac{5}{3}$.

END OF PAPER