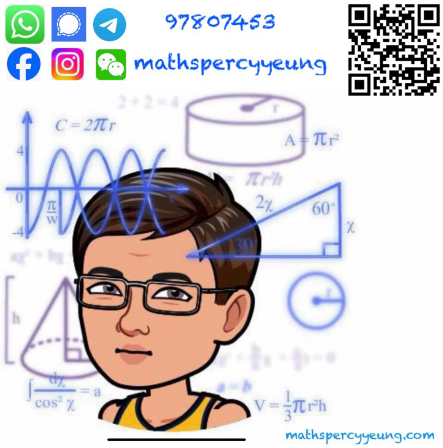
2024 – 2025
Second Term Examination
S.4 Mathematics Compulsory Part Paper 2

Name:_____ S.4_____ ( )

There are 26 questions in Section A and 13 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. Factorize $9h^2+24hk+16k^2-6h-8k$.
   A. $(3h+4k)(3h+4k+2)$
   B. $(3h+4k)(3h+4k-2)$
   C. $(3h-4k)(3h-4k+2)$
   D. $(3h-4k)(3h-4k-2)$

2. If $\frac{2a+1}{c}=\frac{2a-2}{b}$, then $a=$
   A. $\frac{b+2c}{2b-2c}$.
   B. $\frac{b+2c}{2c-2b}$.
   C. $\frac{2b-2c}{b+2c}$.
   D. $\frac{2b+2c}{2c-b}$.

3. Let p and q be constants. If $x^2+px+q(2x+3)\equiv(x+4)(x-2)+q$, then $p=$
   A. –4.
   B. –2.
   C. 6.
   D. 10.

4. If $a-b-4=3a-b-2=5$, then $b=$
   A. –10.
   B. –8.
   C. –5.
   D. 1.

2024 – 2025
Second Term Examination
S.4 Mathematics Compulsory Part Paper 2

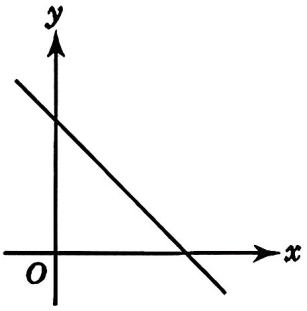
Name:_____ S.4_____ ( )

5. 0.002602 =
   A. 0.00260 (correct to 3 significant figures)
   B. 0.00260 (correct to 3 decimal places)
   C. 0.00260 (correct to 4 significant figures)
   D. 0.00260 (correct to 4 decimal places)

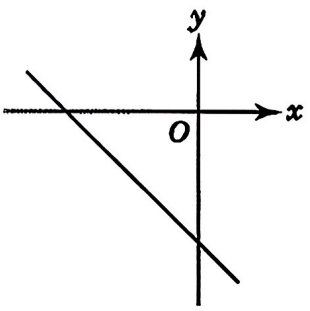
6. The base length and height of a triangle is measured as 7 cm and 22 cm respectively, correct to the nearest cm. Find the least possible area of the triangle.
   A. 63 cm^2
   B. 69.875 cm^2
   C. 77 cm^2
   D. 84.375 cm^2

7. If $a < 0$ and $b < 0$, which of the following shows the graph of the straight line $5x + ay - b = 0$?

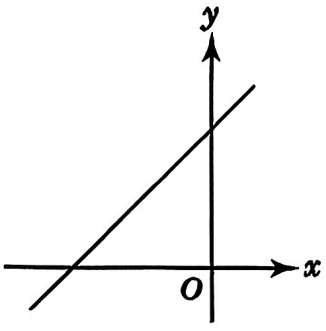
A.



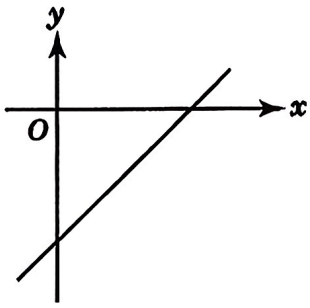
B.



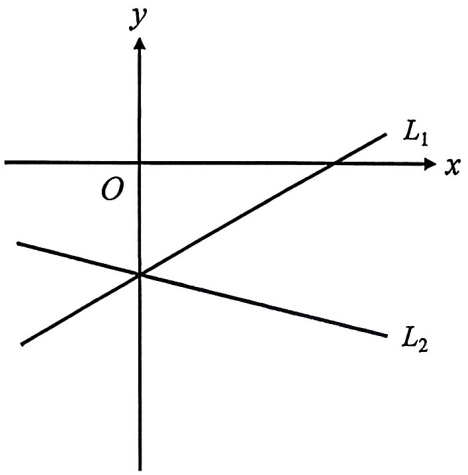
C.



D.



8. In the figure, the straight line $L_1: y = ax + b$ and $L_2: y = cx + d$ intersect at a point on the negative y-axis. Which of the following must be true?



A. $ac = bd$
B. $ad = bc$
C. $cd > 0$
D. $ab > 0$

9. If the straight lines $2x + 3y - 1 = 0$ and $4x - ky + 1 = 0$ are parallel to each other, find k.
A. 6
B. –6
C. 3
D. –3

10. The straight lines L_1 and L_2 intersect at $(2, -6)$. It is given that $L_1 \perp L_2$, and the equation of L_1 is $kx + 2y + 18 = 0$. Find the equation of L_2.
A. $3x + 2y + 22 = 0$
B. $3x - 2y - 22 = 0$
C. $2x + 3y + 14 = 0$
D. $2x - 3y - 14 = 0$

11. Let the equations of L_1 and L_2 be $x + 2y - 4 = 0$ and $y = x - 4$ respectively. Find the area bounded by L_1, L_2 and the y-axis.
A. 8
B. 12
C. 16
D. 20

Go on to the next page

2024 – 2025
Second Term Examination
S.4 Mathematics Compulsory Part Paper 2

Name:_____ S.4_____ ( )

12. Find the range of values of k such that the quadratic equation $kx^2 - 12x + 7 = -2$ has no real roots.

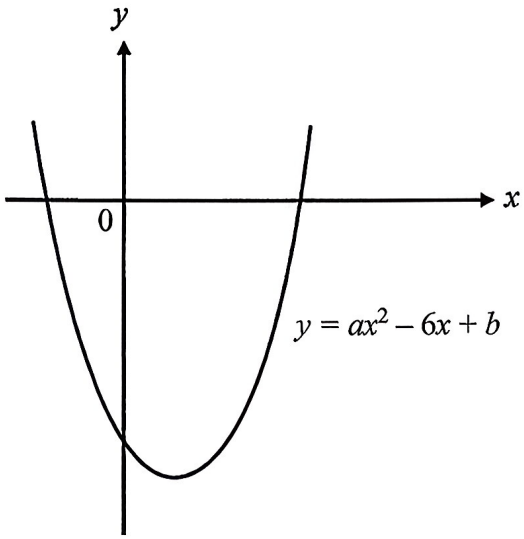
A. $k > 4$

B. $k < 4$

C. $k > \frac{36}{7}$

D. $k < \frac{36}{7}$

13. The figure shows the graph of $y = ax^2 - 6x + b$, where a and b are constants. Which of the following is/are true?



I. $a > 0$

II. $b < 0$

III. $ab < 9$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

14. Which of the following is the domain of the function $f(x)=\dfrac{1}{x^2-1}$?

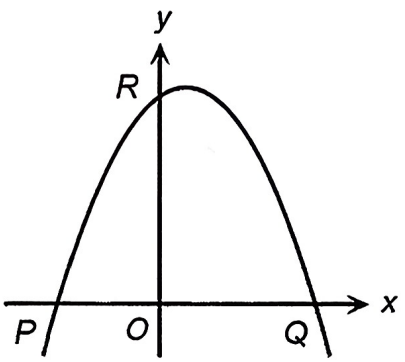
A. All real numbers.
B. All real numbers greater than 1.
C. All positive numbers except 1.
D. All real numbers except 1 and –1.

15. If $g(x)=2x^2-10$, then $2g(x)-g(2x)=$

A. 0
B. $2x^2-10$
C. $-4x^2-10$
D. $4x^2+10$

16. The figure shows the graph of $y=-x^2+x+6$.
Find $PO:RO$.

A. 1:1
B. 1:2
C. 1:3
D. 2:3

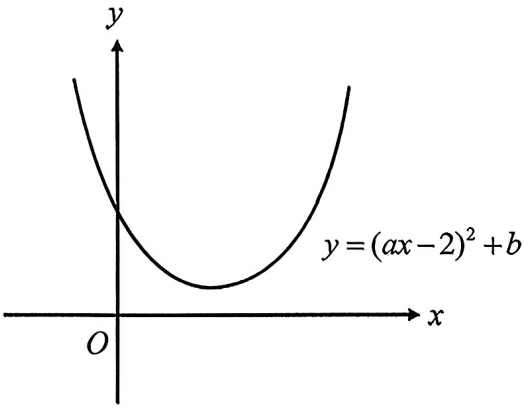


17. Which of the following statements about the graph of $y=15(2-x)^2-42$ is true?

A. The y-intercept of the graph is –42.
B. The graph opens downwards.
C. The equation of the axis of symmetry of the graph is $x=2$.
D. The graph passes through the origin.

18. The figure shows the graph of $y=(ax-2)^2+b$, where a and b are constants. Which of the following is true?

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



Go on to the next page

2024 – 2025
Second Term Examination
S.4 Mathematics Compulsory Part Paper 2

Name:_____ S.4_____ ( )

19. Let $p(x) = kx^2 + 6x - 4$. If the graph of $y = p(x)$ passes through (–1, –11), find the y-intercept of the graph of $y = 2p(x) + 5$.
    A. –13
    B. –3
    C. 3
    D. 13

20. Rose and Bruno are given a total of 21 cards. Find the maximum value of the product of the number of cards they own after Rose removes 3 cards from her pile.
    A. 81
    B. 24
    C. 12
    D. 9

21. When a polynomial $f(x)$ is divided by $3x^2 + 2x + 18$, the quotient and the remainder are $2x - 1$ and $2x - 21$ respectively. Find $f(x)$.
    A. $6x^3 + x^2 + 32x + 3$
    B. $6x^3 + x^2 + 36x - 39$
    C. $6x^3 - x^2 - 4x - 39$
    D. $6x^3 - x^2 - 8x - 3$

22. Let $f(x) = 3x^4 + kx + 12$. If $f(x)$ is divisible by $x + 1$, find the remainder when $f(x)$ is divided by $x - 2$.
    A. 90
    B. 30
    C. 15
    D. –21

23. It is given that when a polynomial $P(x)$ is divided by $x - 2$, the remainder is 5, and $P(x)$ is divisible by $x + 3$. Find the remainder when $P(x)$ is divided by $(x - 2)(x + 3)$.
    A. $x - 3$
    B. $x + 3$
    C. $3x - 1$
    D. $3x + 1$

24. Consider the exponential function $y = a^x$, where $a > 1$. Which of the following statements are true?

I. The domain of the function is all real numbers.
II. The graph of the function passes through (0 , 1).
III. When $x < 0, y > 1$.

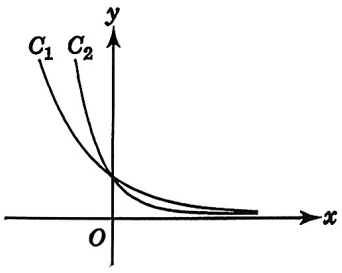
A. I and II only
B. I and III only
C. II and III only
D. I, II and III

25. $\sqrt[5]{\sqrt{x}} =$

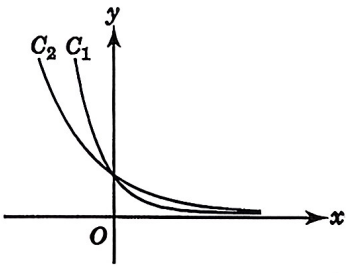
A. $\sqrt[6]{x}$
B. $\sqrt[7]{x}$
C. $\sqrt[10]{x}$
D. $\sqrt[15]{x}$

26. If the curve C_1 represents the graph of $y = \left(\frac{1}{2}\right)^x$ and the curve C_2 represents the graph of $y = \left(\frac{1}{3}\right)^x$, which of the following shows the possible graphs of C_1 and C_2?

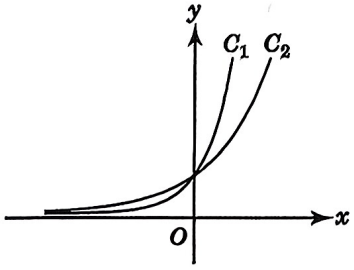
A.



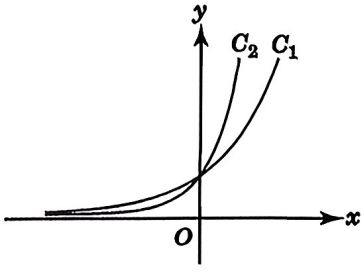
B.



C.



D.



Go on to the next page

2024 – 2025
Second Term Examination
S.4 Mathematics Compulsory Part Paper 2

Name:_____ S.4_____ ( )

SECTION B

27. Which of the following statements is FALSE?

A. $0.7\dot{5}$ is a rational number.

B. $\frac{2}{5}i$ is a purely imaginary number.

C. sin 45° is an irrational number.

D. –6 is a natural number.

28. Let $z=(2a+3i)(24-ai)$, where a is a positive real number. If z is a real number, then $a=$

A. 3.

B. 6.

C. 12.

D. 24.

29. If m is a real number, then $\frac{9m^2+25}{3m+5i}=$

A. $5m+3i$.

B. $5m-3i$.

C. $3m+5i$.

D. $3m-5i$.

30. If $\alpha \neq \beta$ and $\begin{cases} 3\alpha = 2\alpha^2 - 14 \\ 3\beta = 2\beta^2 - 14 \end{cases}$, then $\alpha^2\beta+\alpha\beta^2=$

A. $-\frac{21}{2}$.

B. $-\frac{28}{3}$.

C. $\frac{28}{3}$.

D. $\frac{21}{2}$.

31. The coordinates of A and B are (–2, 4) and (8, 6) respectively. C is a point on the coordinate plane such that the equation of the perpendicular bisector of BC is $2x + 3y = 8$. Find the coordinates of the circumcentre of $\triangle ABC$.

A. (3, 2)

B. (5, 1)

C. (–1, –1)

D. (4, 0)

32. If $\dfrac{49^{3x} \cdot 7^{-y}}{343^{x}} = 1$, then $x : y =$

A. 3 : 1.

B. 3 : 2.

C. 2 : 3.

D. 1 : 3.

33. If $\log_3(2x+1) - \log_3(3x-2) = 1$, where $x > 0$, then $x =$

A. 1.

B. $\dfrac{1}{3}$.

C. $\dfrac{5}{7}$.

D. 2.

34. If $\log_2 k = a$, then $\log_k 8 =$

A. $\dfrac{1}{3a}$.

B. $\dfrac{1}{4a}$.

C. $\dfrac{3}{a}$.

D. $\dfrac{4}{a}$.

35. Which of the following is the greatest?

A. 1234^{9753}

B. 2345^{7531}

C. 3456^{5319}

D. 4567^{3197}

Go on to the next page

2024 – 2025
Second Term Examination
S.4 Mathematics Compulsory Part Paper 2

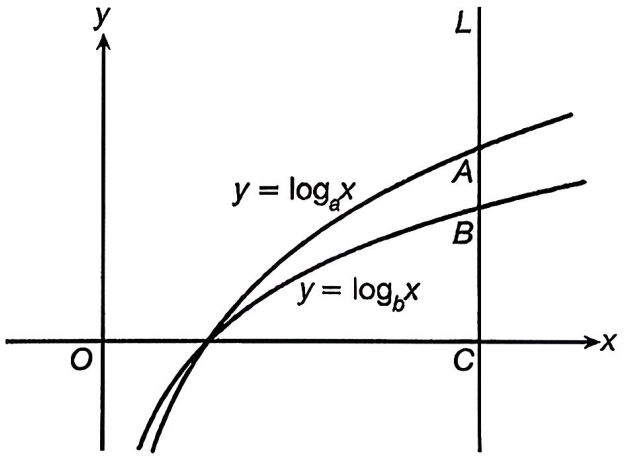
Name:_____ S.4_____ ( )

36. The figure shows the graph of $y = \log_a x$ and the graph of $y = \log_b x$ on the same rectangular coordinate system, where a and b are constants. If a vertical line L cuts the graph of $y = \log_a x$, the graph of $y = \log_b x$ and the x-axis at A, B and C respectively, which of the following are true?

I. $\frac{a}{b} > 1$

II. $ab > 1$

III. $\frac{AC}{BC} = \log_a b$

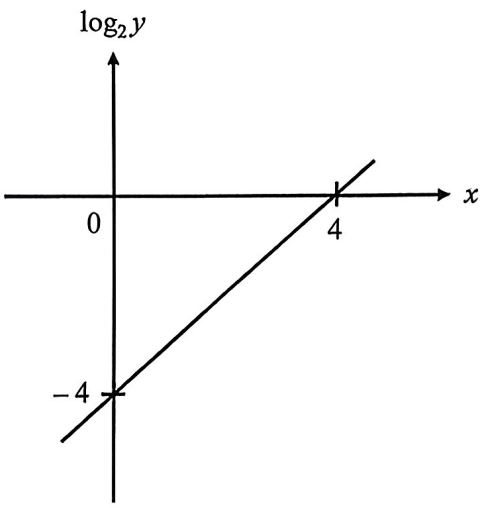


A. I and II only
B. I and III only
C. II and III only
D. I, II and III

37. The sound intensity level β (in dB) of a sound is defined as $\beta = 10\log\left(\frac{I}{I_0}\right)$, where I is the sound intensity (in W/m^2) measured, and $I_0 = 10^{-12}$ W/m^2. If the intensity level of the sound produced by a moving bus is 85 dB, find the corresponding sound intensity.

A. 85 W/m^2
B. $10^{-8.5}$ W/m^2
C. $10^{-4.5}$ W/m^2
D. $10^{-3.5}$ W/m^2

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



A. -4.

B. $\frac{1}{4}$.

C. $\frac{1}{16}$.

D. 2.

39. Compare $x^{1\,997} \div (x-1)$ and $6^{1\,997} \div (6-1)$ to find the remainder when $6^{1\,997}$ is divided by 5.

A. 0

B. 1

C. 2

D. 1 997

End of Paper

Go on to the next page