Standardized Test 2024 – 2025
S.5 Mathematics

Name : _____ ( )

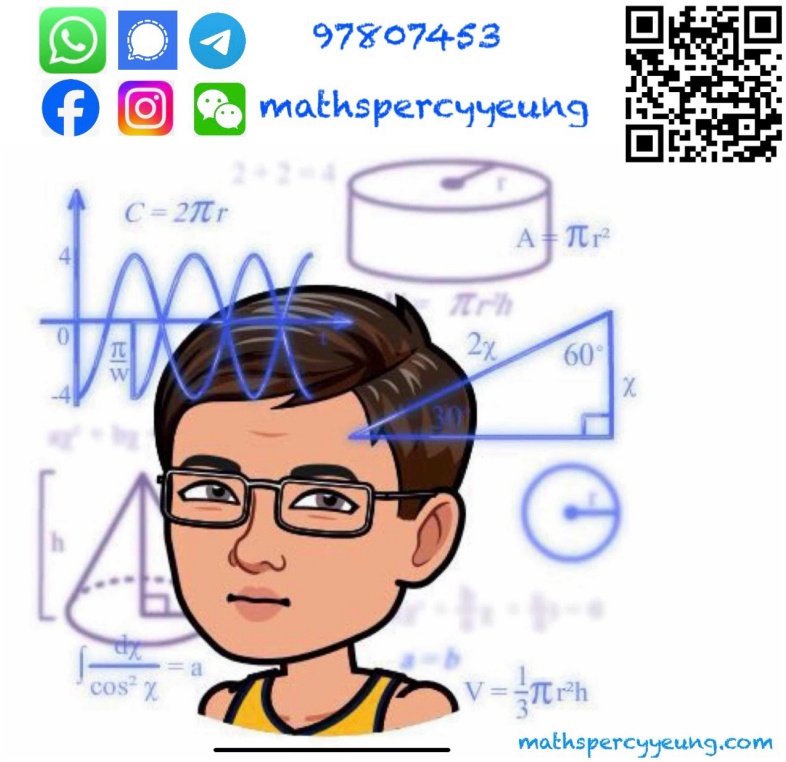
Class : S. 5 _____

Date : 28th March 2025

Time : 08:30 – 09:30 (1 hour)

Past Paper Revision for 2526 S.5

Section	Marks
A	/ 18
B	/ 30
PP–_____	
Total	/ 48

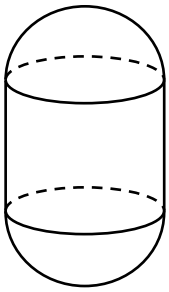


Section A : Multiple Choice Questions [18 marks]

1. A point $P(-1, 2)$ is first translated 4 units to the left and then rotated anti-clockwise through $90°$ about the origin to Q. Find the coordinates of Q.

A. $(2, 5)$
B. $(-2, -5)$
C. $(-2, 3)$
D. $(2, -3)$

2. The figure shows a solid consisting of two hemispheres and a right circular cylinder with common bases. It is given that the radii of the hemispheres are 5 cm and the height of the solid is 17 cm. Find the total surface area of the solid.



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A. 170π cm^2
B. 237π cm^2
C. 270π cm^2
D. 312π cm^2

3. $101101001101_2 =$

A. $45\times2^6+13$.
B. $45\times2^7+13$.
C. $45\times2^6+26$.
D. $45\times2^7+26$.

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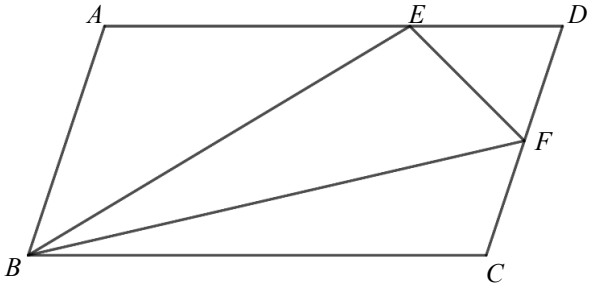
4. In the figure, $ABCD$ is a parallelogram. E is a point on AD such that $AE : AD = 2 : 3$, and F is the mid-point of DC. If the area of ΔDEF is 3 cm^2, find the area of ΔEBF.

A. 6 cm^2
B. 9 cm^2
C. 12 cm^2
D. 36 cm^2



5. If $\cos\theta = -\frac{24}{25}$ and $\sin\theta < 0$, then $\tan\theta =$

A. $\frac{7}{24}$.

B. $\frac{7}{25}$.

C. $-\frac{7}{24}$.

D. $-\frac{7}{25}$.

6. If $0° \le x \le 360°$, then the minimum value of $\frac{2}{3+\cos x}$ is

A. 0.

B. $\frac{1}{2}$.

C. $\frac{2}{3}$.

D. 1.

7. The coordinates of the points A and B are (1, 0) and (5, 2) respectively. If P is a moving point in the rectangular coordinate plane such that the distance between P and the mid-point of AB is $\frac{AB}{2}$, then the locus of P is

A. the perpendicular bisector of AB.
B. a line segment parallel to AB.
C. a pair of line segments parallel to AB.
D. the circle with AB as the diameter.

8. The coordinates of the points A and B are $(-10, 6)$ and $(0, 4)$ respectively. If P is a point lying on the straight line $x + y + 6 = 0$ such that $AP = PB$, then the y-coordinate of P is

A. -6.
B. -5.
C. 0.
D. 5.

9. Denote the circle $2x^2 + 2y^2 - 8x + 20y + 26 = 0$ by C. Which of the following are true?

I. $(1, -1)$ lies outside C.
II. The diameter of C is 4.
III. The centre of C lies on the straight line $y = -x - 3$.

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

10. Q is a point on the circle $x^2 + y^2 - 8x - 4y - 16 = 0$ such that it is the farthest from $P(0, 5)$. Find the distance between P and Q.

A. 1
B. 5
C. 6
D. 11

11. For $0° \le x < 360°$, how many real root(s) does the equation $2\sin x \cos x = \cos x$ have?

A. 1
B. 2
C. 3
D. 4

12. It is given that (1, 4) is the vertex of graph of $y = \mathrm{f}(2x) - 1$ where $y = \mathrm{f}(x)$ is a quadratic function in x. Which of the following statements about the graph of $y = \mathrm{f}(x)$ are correct?

I. The x-coordinate of its vertex is 1.
II. The y-coordinate of its vertex is 5.
III. The equation of the axis of symmetry is $x = 2$.

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

Section B : Conventional Questions **[30 marks]**

1. **(a)** Simplify $\dfrac{1+\cos(180°-\theta)}{\tan(270°+\theta)}+\tan\theta$. **(3 marks)**

(b) Solve $3\sin^2\theta = 5+14\left(\dfrac{1+\cos(180°-\theta)}{\tan(270°+\theta)}+\tan\theta\right)$ for $0° \le \theta \le 360°$. **(2 marks)**

2. A right circular cone with base radius 24 cm and height 45 cm is divided into a smaller cone X and a frustum Y by a plane which is parallel to its base. It is given that the height of X is 15 cm.

(a) Find the volume of Y in terms of π. **(3 marks)**

(b) Another right circular cone is divided into a smaller cone and a frustum Z by a plane which is parallel to its base. The height and the curved surface area of Z are 10 cm and 120π cm^2 respectively. Are Y and Z similar? Explain your answer. **(3 marks)**

You may use this space to sketch the diagrams and put down the relevant information.
Sketching is not carrying any marks. It will not be marked.

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3. The coordinates of points A and B are $(2,1)$ and $(-6,5)$ respectively. Let P be a moving point in the rectangular coordinate plane such that $PA = PB$. Denote the locus of P by Γ_1.

(a) Find the equation of Γ_1. **(2 marks)**

(b) Γ_1 is translated downwards by k units to Γ_2.

(i) Write down the equation of Γ_2 in terms of k.

(ii) If Γ_2 passes through $(4,10)$, find the value of k. **(3 marks)**

You may use this space to sketch the diagrams and put down the relevant information.
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4. It is given that C is a circle such that it touches the x-axis and the y-axis at $A(4, 0)$ and $B(0, 4)$ respectively.

(a) Find the equation of C. **(2 marks)**

(b) L is the straight line passing through A and B. The equation of another straight line ℓ is $y = -x + 2k + 4$, where k is a constant. P is a moving point in the rectangular coordinate plane such that the perpendicular distance from P to L equals the perpendicular distance from P to ℓ. Denote the locus of P by Γ.

(i) Describe the geometric relationship between Γ and L.

(ii) Find the range of the values of k such that Γ intersects C at two distinct points.

(4 marks)

You may use this space to sketch the diagrams and put down the relevant information.
Sketching is not carrying any marks. It will not be marked.

5. The equations of the straight lines L_1 and L_2 are $3x+y-6=0$ and $x-3y-8=0$ respectively. L_1 cuts the y-axis at P while L_2 cuts the x-axis at Q. R is the intersection of L_1 and L_2. Denote the circle passing through P, Q and R by C, and the centre of C by G.

(a) Find the equation of C. **(3 marks)**

(b) ℓ_1 is a tangent to C at P.

(i) Find the equation of ℓ_1.

(ii) ℓ_2 is obtained by a reflecting of ℓ_1 with respect to a horizontal line passing through G. ℓ_1 and ℓ_2 intersects at E and ℓ_2 touches C at H. Someone claims that the area of ΔEPQ is larger than that of ΔGHQ. Do you agree? Explain your answer.

(5 marks)

You may use this space to sketch the diagrams and put down the relevant information.
Sketching is not carrying any marks. It will not be marked.

END OF PAPER