

MATHEMATICS PAPER 1
Question-Answer Book

8.30 am – 10.30 am (2 hours)

This paper must be answered in English

1. Write your Candidate Number, Centre Number and Seat Number in the spaces provided on this cover.
2. This paper consists of THREE sections, A(1), A(2) and B. Each section carries 33 marks.
3. Attempt ALL questions in Sections A(1) and A(2), and any THREE questions in Section B. Write your answers in the spaces provided in this Question-Answer Book. Supplementary answer sheets will be supplied on request. Write your Candidate Number on each sheet and fasten them with string inside this book.
4. Write the question numbers of the questions you have attempted in Section B in the spaces provided on this cover.
5. Unless otherwise specified, all working must be clearly shown.
6. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
7. The diagrams in this paper are not necessarily drawn to scale.

Candidate Number									
Centre Number									
Seat Number									

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Section A Question No.	Marks	Marks
1-3		
4-5		
6-7		
8		
9		
10		
11		
12		
13		
Section A Total		

Checker's Use Only	Section A Total		
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Section B Question No.*	Marks	Marks
Section B Total		

**To be filled in by the candidate.*

Checker's Use Only	Section B Total		
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Checker No.	
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FORMULAS FOR REFERENCE

SPHERE	Surface area	$= 4\pi r^2$
	Volume	$= \frac{4}{3}\pi r^3$
CYLINDER	Area of curved surface	$= 2\pi rh$
	Volume	$= \pi r^2 h$
CONE	Area of curved surface	$= \pi rl$
	Volume	$= \frac{1}{3}\pi r^2 h$
PRISM	Volume	$= \text{base area} \times \text{height}$
PYRAMID	Volume	$= \frac{1}{3} \times \text{base area} \times \text{height}$

SECTION A(1) (33 marks)

Answer ALL questions in this section and write your answers in the spaces provided.

1. Make m the subject of the formula $mx = 2(m + c)$. (3 marks)

2. Find the range of values of x which satisfy both $\frac{3-5x}{4} \geq 2-x$ and $x+8 > 0$. (3 marks)

3. Factorize

(a) $x^2 - (y - z)^2$,

(b) $ab - ad - bc + cd$.

(3 marks)

6. There are only two kinds of tickets for a cruise: first-class tickets and economy-class tickets. A total of 600 tickets are sold. The number of economy-class tickets sold is three times that of first-class tickets sold. If the price of a first-class ticket is \$850 and that of an economy-class ticket is \$500, find the sum of money for the tickets sold. (4 marks)

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7. Consider the arithmetic sequence 2, 5, 8, Find
(a) the 10th term of this sequence,
(b) the sum of the first 10 terms of this sequence. (4 marks)

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9. At 1:00 a.m., a ship S is 100 km due east of a lighthouse L . S is moving at a speed of 20 km/h in the direction $N 30^\circ W$ as shown in Figure 2.

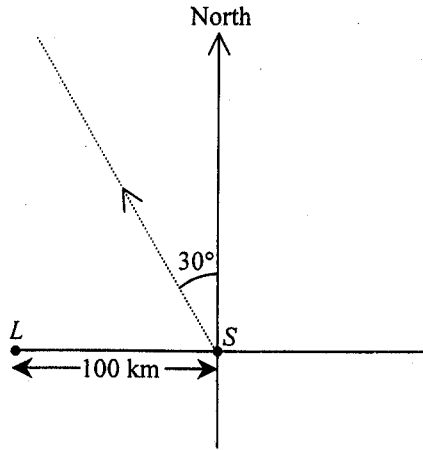


Figure 2

- (a) Find the shortest distance between the ship and the lighthouse, correct to the nearest km.
 (b) At what time will the ship be nearest to the lighthouse?

(5 marks)

Section A(2) (33 marks)

Answer ALL questions in this section and write your answers in the spaces provided.

10. The speed of a solar-powered toy car is V cm/s and the length of its solar panel is L cm, where $5 \leq L \leq 25$. V is a function of L . It is known that V is the sum of two parts, one part varies as L and the other part varies as the square of L . When $L = 10$, $V = 30$ and when $L = 15$, $V = 75$.

- (a) Express V in terms of L .

(3 marks)

- (b) Find the range of values of L when $V \geq 30$.

(4 marks)

11. (a) For the set of data 10, 10, 11, 12, 13, 16, find

- (i) the mode,
- (ii) the median,
- (iii) the mean,
- (iv) the range.

(4 marks)

(b) Four unknown data are combined with the six data in (a) to form a set of ten data.

- (i) Find the least and the greatest possible values of the median of the combined set of ten data.
 - (ii) If the mean of the four unknown data is 11, find the mean of the combined set of ten data.
- (4 marks)

12. In Figure 3, AP is an altitude of the triangle ABC . It cuts the y -axis at H .

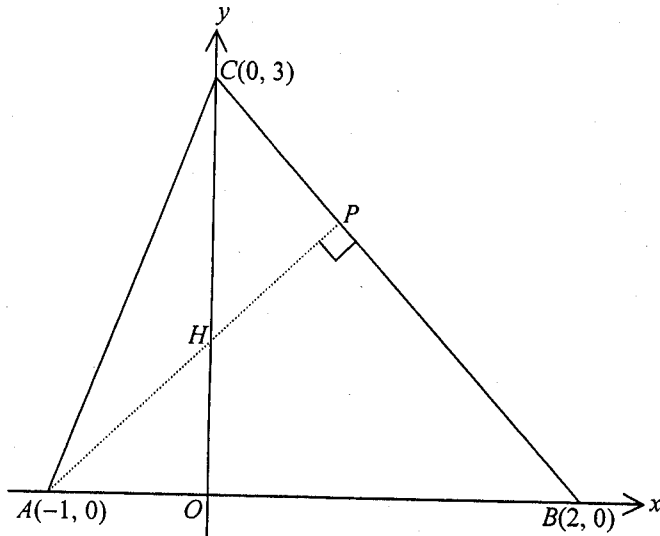


Figure 3

- (a) Find the slope of BC . (1 mark)

- (b) Find the equation of AP . (3 marks)

- (c) (i) Find the coordinates of H .
- (ii) Prove that the three altitudes of the triangle ABC pass through the same point.

(5 marks)

13. Sector OCD is a thin metal sheet. The sheet $ABCD$ is formed by cutting away sector OBA from sector OCD as shown in Figure 4(a).

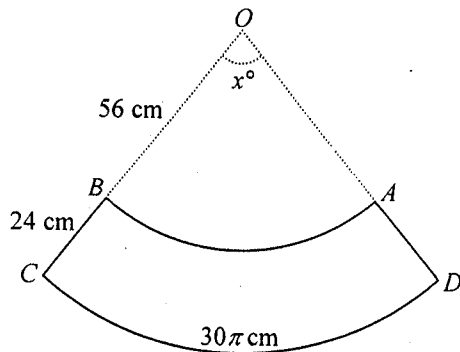


Figure 4(a)

It is known that $\angle COD = x^\circ$, $AD = BC = 24\text{ cm}$, $OA = OB = 56\text{ cm}$ and $\widehat{CD} = 30\pi\text{ cm}$.

- (a) (i) Find x .
 (ii) Find, in terms of π , the area of $ABCD$.

(4 marks)

(b)



Figure 4(b)

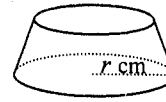
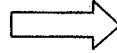


Figure 4(c)

Figure 4(b) shows another thin metal sheet $EFGH$ which is similar to $ABCD$. It is known that $FG = 18$ cm.

- (i) Find, in terms of π , the area of $EFGH$.
- (ii) By joining EH and FG together, $EFGH$ is then folded to form a hollow frustum of base radius r cm as shown in Figure 4(c). Find r .

(5 marks)

Area for student response with horizontal dotted lines.

SECTION B (33 marks)

Answer any **THREE** questions in this section and write your answers in the spaces provided. Each question carries 11 marks.

14.

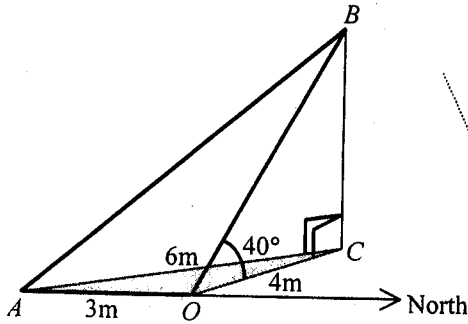


Figure 5(a)

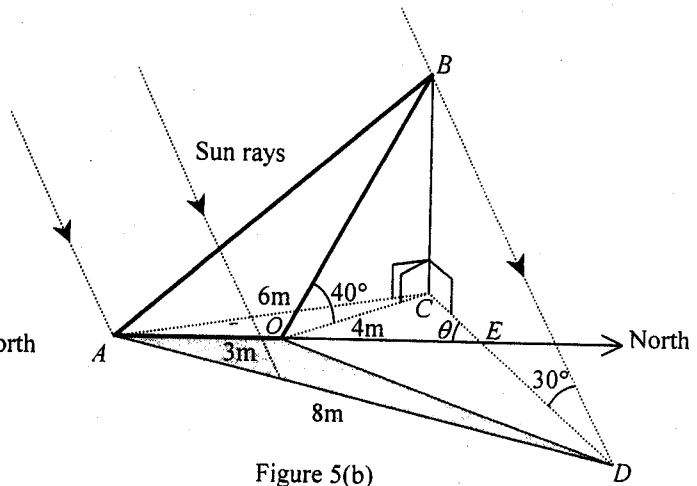


Figure 5(b)

Figure 5(a) shows a triangular metal plate OAB standing on the horizontal ground. The side OA lies along the north-south direction on the ground. OB is inclined at an angle of 40° to the horizontal. The overhead sun casts a shadow of the plate, OAC , on the ground. $OA = 3\text{ m}$, $OC = 4\text{ m}$ and $AC = 6\text{ m}$.

- (a) Find $\angle OAC$. (2 marks)
- (b) In Figure 5(b), OAD is the shadow of the plate cast on the horizontal ground when the sun shines from $S\theta W$ with an angle of elevation 30° . AO is produced to cut CD at E . $AD = 8\text{ m}$.
 - (i) Find CD .
 - (ii) Find $\angle CAD$.
 - (iii) Using $CE + ED = CD$, or otherwise, find θ .

(9 marks)

Lined writing area with horizontal lines and a vertical dashed line on the right side.

15.

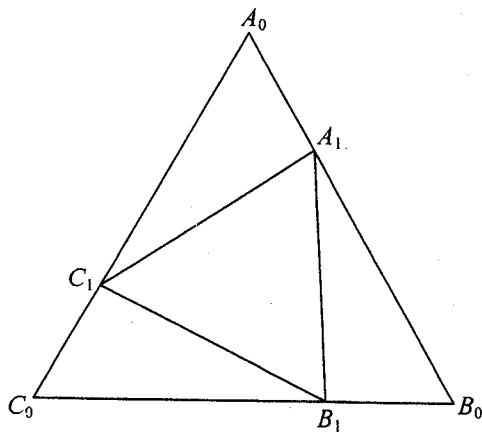


Figure 6(a)

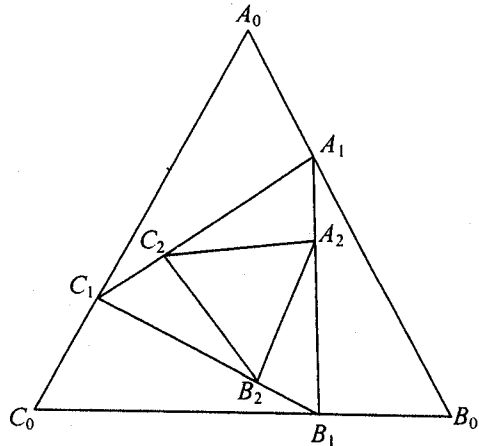


Figure 6(b)

Figure 6(a) shows an equilateral triangle $A_0B_0C_0$ of side 1 m. Another triangle $A_1B_1C_1$ is inscribed in triangle $A_0B_0C_0$ such that $\frac{A_0A_1}{A_0B_0} = \frac{B_0B_1}{B_0C_0} = \frac{C_0C_1}{C_0A_0} = k$, where $0 < k < 1$. Let $A_1B_1 = x$ m.

- (a) (i) Express the area of triangle $A_1B_0B_1$ in terms of k .
 (ii) Express x in terms of k .
 (iii) Explain why $A_1B_1C_1$ is an equilateral triangle.

(5 marks)

- (b) Another equilateral triangle $A_2B_2C_2$ is inscribed in triangle $A_1B_1C_1$ such that

$$\frac{A_1A_2}{A_1B_1} = \frac{B_1B_2}{B_1C_1} = \frac{C_1C_2}{C_1A_1} = k \text{ as shown in Figure 6(b).}$$

- (i) Prove that the triangles $A_1B_0B_1$ and $A_2B_1B_2$ are similar.
 (ii) The above process of inscribing triangles is repeated indefinitely to generate equilateral triangles $A_3B_3C_3$, $A_4B_4C_4$, $A_5B_5C_5$, Find the total area of the triangles $A_1B_0B_1$, $A_2B_1B_2$, $A_3B_2B_3$,

(6 marks)

Lined writing area with 25 horizontal lines.

16. John will participate in a contest to be held at a university. If John wins the contest, he will go to Canteen X for lunch. Otherwise, he will go to Canteen Y . The following table shows the types of set lunches and the prices served in the two canteens. He will choose one type of set lunch randomly.

Canteen	Set lunch	Price (\$)
X	A	40
	B	50
Y	C	15
	D	20

- (a) If the probability of John winning the contest is $\frac{1}{10}$, find the probability that he will spend \$15 for lunch. (2 marks)
- (b) If John takes a bus leaving at 8:00 a.m. to the university, his probability of winning the contest will be $\frac{1}{10}$. If he misses the bus, he will take a train leaving at 8:20 a.m. Owing to his nervousness, his probability of winning will be reduced to $\frac{2}{25}$.
- (i) Suppose John misses the bus, find the probability that he will spend \$15 for lunch.
- (ii) The following table shows the cost of a single trip by bus or train:

Transportation	Cost of a single trip (\$)
Bus	4.5
Train	7.5

It is known that the probability of John taking the bus is twice that of taking the train.

- (1) Find the probability that John will spend \$15 for lunch after the contest.
- (2) If John goes home by train after lunch, find the probability that he will spend more than a total of \$30 for the lunch and the transportation of the two trips. (9 marks)

Lined writing area consisting of approximately 30 horizontal lines across the page.

17.

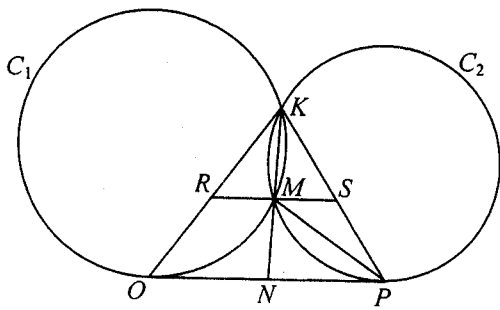


Figure 7(a)

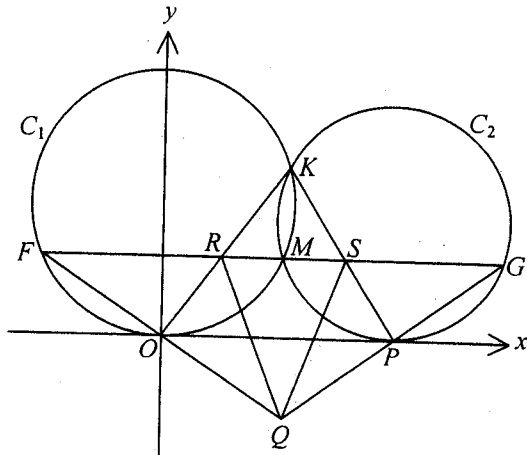


Figure 7(b)

- (a) In Figure 7(a), OP is a common tangent to the circles C_1 and C_2 at the points O and P respectively. The common chord KM when produced intersects OP at N . R and S are points on KO and KP respectively such that the straight line RMS is parallel to OP .
- (i) By considering triangles NPM and NKP , prove that $NP^2 = NK \cdot NM$.
 - (ii) Prove that $RM = MS$.
- (5 marks)
- (b) A rectangular coordinate system, with O as the origin, is introduced to Figure 7(a) so that the coordinates of P and M are $(p, 0)$ and (a, b) respectively (see Figure 7(b)). The straight line RS meets C_1 and C_2 again at F and G respectively while the straight lines FO and GP meet at Q .
- (i) Express FG in terms of p .
 - (ii) Express the coordinates of F and Q in terms of a and b .
 - (iii) Prove that triangle QRS is isosceles.
- (6 marks)

MATHEMATICS PAPER 2

11.15 am – 12.45 pm (1½ hours)

Subject Code 180

1. Read carefully the instructions on the Answer Sheet and insert the information required (including the Subject Code) 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 mark all your answers on the Answer Sheet.
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 36 questions in Section A and 18 questions in Section B.
The diagrams in this paper are not necessarily drawn to scale.
Choose the best answer for each question.

FORMULAS FOR REFERENCE

SPHERE	Surface area	$= 4\pi r^2$
	Volume	$= \frac{4}{3}\pi r^3$
CYLINDER	Area of curved surface	$= 2\pi rh$
	Volume	$= \pi r^2 h$
CONE	Area of curved surface	$= \pi rl$
	Volume	$= \frac{1}{3}\pi r^2 h$
PRISM	Volume	$= \text{base area} \times \text{height}$
PYRAMID	Volume	$= \frac{1}{3} \times \text{base area} \times \text{height}$

Section A

1. If $f(x) = 2x^2 + kx - 1$ and $f(-2) = f\left(\frac{1}{2}\right)$, then $k =$
- A. $-\frac{17}{3}$
B. -5
C. 3
D. $\frac{31}{5}$
2. Let $f(x) = x^3 + 2x^2 + k$, where k is a constant. If $f(-1) = 0$, find the remainder when $f(x)$ is divided by $x - 1$.
- A. -1
B. 0
C. 2
D. 6

3. If $a = \frac{b-1}{b-2}$, then $b =$

A. $\frac{2a-1}{a-1}$

B. $\frac{2a-1}{a+1}$

C. $\frac{1}{a-1}$

D. $\frac{1}{a+1}$

4. $3^x \cdot 9^y =$

A. 3^{x+2y}

B. 3^{x+3y}

C. 27^{x+y}

D. 27^{xy}

5. If the equation $x^2 - 4x + k = 1$ has no real roots, then the range of values of k is

A. $k > 4$

B. $k \geq 4$

C. $k > 5$

D. $k \geq 5$

6. If $(2x+3)(x-a) \equiv 2x^2 + b(x+1)$, then

A. $a = -3$ and $b = 9$

B. $a = \frac{-1}{3}$ and $b = \frac{11}{3}$

C. $a = \frac{1}{3}$ and $b = \frac{7}{3}$

D. $a = 3$ and $b = -9$

7. If $\begin{cases} y = x^2 + 4 \\ y = -3x + 4 \end{cases}$, then $y =$

A. 0

B. 13

C. 0 or -3

D. 4 or 13

8. The solution of $x > 1$ and $13 < 3x - 2 < 25$ is

A. $x > 1$

B. $1 < x < 5$

C. $1 < x < 9$

D. $5 < x < 9$

9. If $0.8448 < a < 0.8452$, which of the following must be true?

- A. $a = 0.9$ (correct to 1 significant figure)
- B. $a = 0.85$ (correct to 2 significant figures)
- C. $a = 0.845$ (correct to 3 significant figures)
- D. $a = 0.8450$ (correct to 4 significant figures)

10. The sum of the 4th term and the 5th term of a geometric sequence is -4 . If the sum of the first two terms is 32 , find the first term of the sequence.

- A. -6
- B. $\frac{-1}{2}$
- C. 19
- D. 64

11. John's daily working hours have increased from 8 hours to 10 hours but his hourly pay has decreased by 25% . Find the percentage change in John's daily income.

- A. A decrease of 6.67%
- B. A decrease of 6.25%
- C. 0%
- D. An increase of 6.67%

12. A sum of $\$8000$ is deposited at 1% p.a., compounded yearly. Find the interest earned after 4 years. Give the answer correct to the nearest dollar.

- A. $\$303$
- B. $\$320$
- C. $\$324$
- D. $\$325$

13. If $81^x = 27^{2y}$ and x, y are non-zero integers, then $x : y =$

- A. $2:3$
- B. $3:4$
- C. $4:3$
- D. $3:2$

14. Suppose z varies directly as x^2 and inversely as y . When $x = 4$ and $y = 3$, $z = 2$. When $x = 2$ and $z = 3$, $y =$

- A. $\frac{1}{2}$
- B. 1
- C. 2
- D. 18

15. The scale of a map is 1 : 4 000 . If the actual area of a sports field is 8 000 m² , find its area on the map.

- A. 0.02 cm²
- B. 0.05 cm²
- C. 2 cm²
- D. 5 cm²

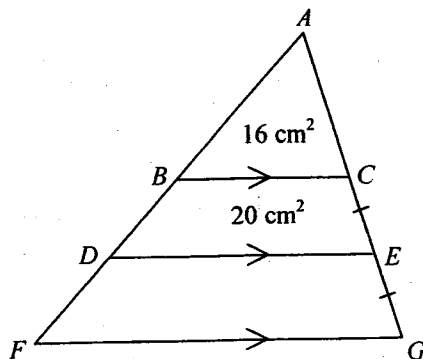
16. The length of a side of a regular 8-sided polygon is 6 cm . Find its area, correct to 3 significant figures.

- A. 27.6 cm²
- B. 29.8 cm²
- C. 66.5 cm²
- D. 174 cm²

99

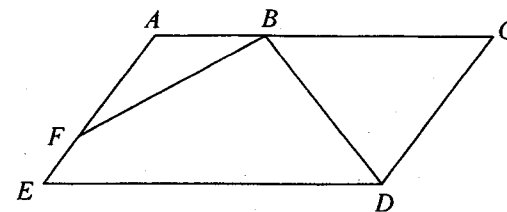
17. In the figure, $ABDF$ and $ACEG$ are straight lines. If the area of $\triangle ABC$ is 16 cm² and the area of quadrilateral $BDEC$ is 20 cm², then the area of quadrilateral $DFGE$ is

- A. 24 cm² .
- B. 28 cm² .
- C. 36 cm² .
- D. 44 cm² .



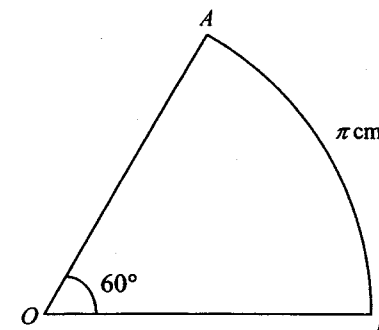
18. In the figure, $AEDC$ is a parallelogram. If $AB : BC = 1 : 2$ and $AF : FE = 2 : 1$, then area of $\triangle ABF$: area of $\triangle BCD =$

- A. 1 : 2 .
- B. 1 : 3 .
- C. 1 : 4 .
- D. 2 : 9 .



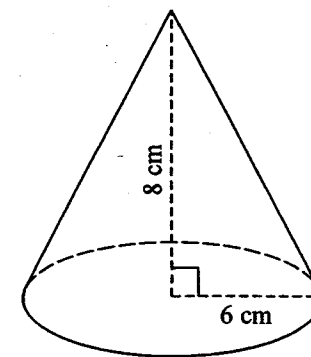
19. In the figure, OAB is a sector and $\widehat{AB} = \pi$ cm . Find the area of the sector.

- A. $\frac{3}{2} \pi$ cm²
- B. 3π cm²
- C. $\frac{9}{2} \pi$ cm²
- D. 6π cm²



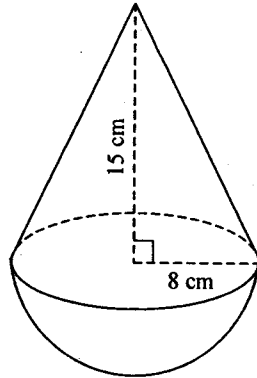
20. The figure shows a right circular cone of base radius 6 cm and height 8 cm . Find its volume.

- A. 32π cm³
- B. 60π cm³
- C. 96π cm³
- D. 288π cm³



21. In the figure, the solid consists of a right circular cone and a hemisphere with a common base. Find the total surface area of the solid.

- A. $136\pi \text{ cm}^2$
 B. $248\pi \text{ cm}^2$
 C. $264\pi \text{ cm}^2$
 D. $392\pi \text{ cm}^2$

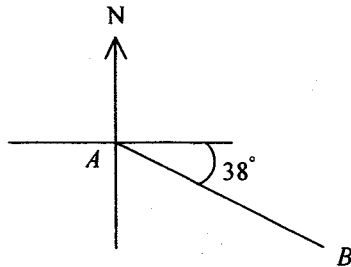


22. If θ is an acute angle and $\sin \theta = \cos \theta$, then $\cos \theta =$

- A. $\frac{1}{2}$
 B. $\frac{\sqrt{2}}{2}$
 C. $\frac{\sqrt{3}}{2}$
 D. 1.

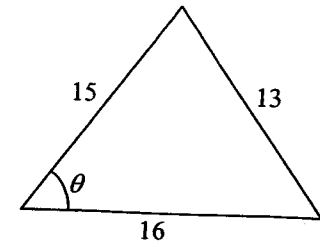
23. In the figure, the bearing of A from B is

- A. $N 38^\circ W$
 B. $N 52^\circ W$
 C. $S 38^\circ E$
 D. $S 52^\circ E$



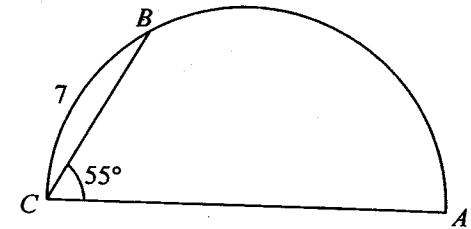
24. In the figure, $\cos \theta =$

- A. $\frac{15}{16}$
 B. $\frac{13}{20}$
 C. $\frac{25}{52}$
 D. $\frac{23}{65}$



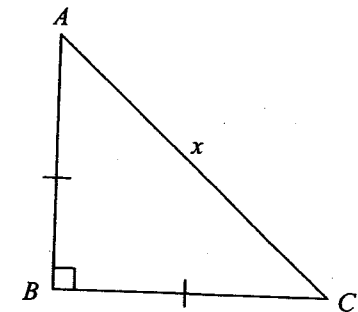
25. In the figure, ABC is a semicircle with $\widehat{BC} = 7$ and $\angle ACB = 55^\circ$. Find \widehat{AB} .

- A. 9
 B. 10
 C. 11
 D. 14



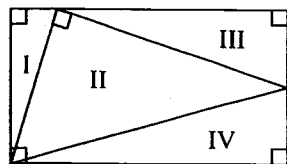
26. In the figure, $AB =$

- A. $\frac{x}{2}$
 B. $\frac{\sqrt{2}}{2}x$
 C. $\frac{\sqrt{3}}{2}x$
 D. $\sqrt{2}x$



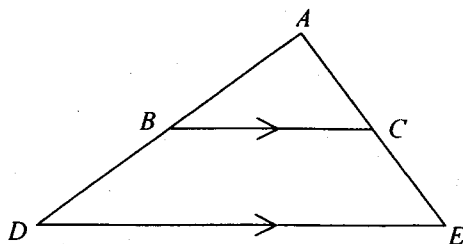
27. Which of the following statements about the triangles in the figure must be true?

- A. I and III are similar.
 B. I and IV are similar.
 C. II and III are similar.
 D. II and IV are similar.



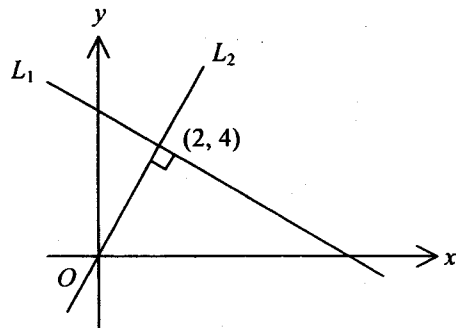
28. In the figure, ABD and ACE are straight lines. If $AC : CE = 3 : 4$, then $BC : DE =$

- A. $1 : 2$.
 B. $3 : 4$.
 C. $3 : 7$.
 D. $4 : 7$.



29. In the figure, the straight lines L_1 and L_2 intersect at $(2, 4)$. Find the equation of L_1 .

- A. $x + 2y = 10$
 B. $x - 2y = -6$
 C. $2x + y = 8$
 D. $2x - y = 0$



30. If the straight line $2x + y + k = 0$ passes through the point of intersection of the two straight lines $x + y - 3 = 0$ and $x - y + 1 = 0$, find k .

- A. -4
 B. -2
 C. 2
 D. 4

31. $P(-10, -8)$ and $Q(4, 6)$ are two points. If R is a point on the x -axis such that $PR = RQ$, then the coordinates of R are

- A. $(-4, 0)$.
 B. $(-3, -1)$.
 C. $(-3, 0)$.
 D. $(-2, 0)$.

32. The mean mark of a mathematics test was 63 marks. Peter got 75 marks in the test and his standard score was 0.75. If Mary got 83 marks in the same test, then her standard score would be

- A. 0.83.
 B. 1.25.
 C. 2.22.
 D. 5.

33. The median of the five numbers 15 , $x - 1$, $x - 3$, $x - 4$ and $x + 17$ is 8 . Find the mean of the five numbers.

- A. 8
- B. 12
- C. 13.6
- D. 14.4

34. A bag contains 2 black balls, 2 green balls and 2 yellow balls. Peter repeats drawing one ball at a time randomly from the bag without replacement until a green ball is drawn. Find the probability that he needs at most 4 draws.

- A. $\frac{1}{15}$
- B. $\frac{2}{15}$
- C. $\frac{14}{15}$
- D. $\frac{65}{81}$

35. $1232\star$ is a 5-digit number, where \star is an integer from 0 to 9 inclusive. The probability that the 5-digit number is divisible by 4 is

- A. $\frac{1}{3}$
- B. $\frac{1}{4}$
- C. $\frac{1}{5}$
- D. $\frac{3}{10}$

36. x is the mean of the group of numbers $\{a, b, c, d, e\}$. Which of the following statements about the two groups of numbers $\{a, b, c, d, e\}$ and $\{a, b, c, d, e, x\}$ must be true?

- I. The two groups of numbers have the same mean.
- II. The two groups of numbers have the same range.
- III. The two groups of numbers have the same standard deviation.

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

Section B

$$37. \frac{10}{x^2+x-6} - \frac{2}{x-2} =$$

A. $\frac{2}{x+3}$

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

C. $\frac{13-2x}{(x+3)(x-2)}$

D. $\frac{16-2x}{(x+3)(x-2)}$

38. The L.C.M. of $210xy^2$ and $30x^2yz$ is

A. $30xy$

B. $70xyz$

C. $210x^2y^2z$

D. $630x^3y^3z$

$$39. x^3 - \frac{27}{x^3} =$$

A. $(x + \frac{3}{x})(x^2 - 6 + \frac{9}{x^2})$

B. $(x + \frac{3}{x})(x^2 - 3 + \frac{9}{x^2})$

C. $(x - \frac{3}{x})(x^2 + 6 + \frac{9}{x^2})$

D. $(x - \frac{3}{x})(x^2 + 3 + \frac{9}{x^2})$

40. If $10^{a+b} = c$, then $b =$

A. $\log c - a$

B. $a - \log c$

C. $\frac{c}{10} - a$

D. $c - 10^a$

41. Let k be a constant. If α and β are the roots of the equation $x^2 - 3x + k = 0$, then $\alpha^2 + 3\beta =$

A. $3 - k$

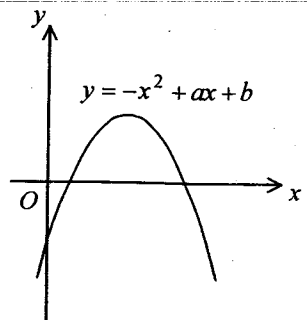
B. $3 + k$

C. $9 - k$

D. $9 + k$

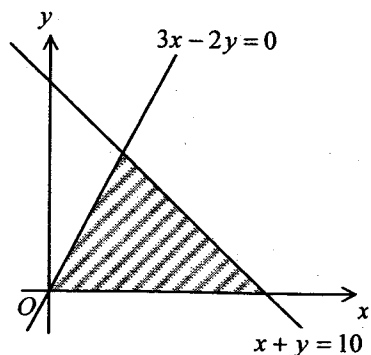
42. The figure shows the graph of $y = -x^2 + ax + b$. Which of the following is true?

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

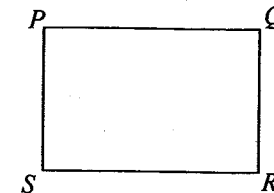
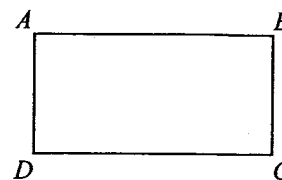


43. Which of the following systems of inequalities has its solution represented by the shaded region in the figure?

- A. $\begin{cases} 3x - 2y \leq 0 \\ x + y \geq 10 \\ x \geq 0 \end{cases}$
 B. $\begin{cases} 3x - 2y \geq 0 \\ x + y \leq 10 \\ x \geq 0 \end{cases}$
 C. $\begin{cases} 3x - 2y \leq 0 \\ x + y \geq 10 \\ y \geq 0 \end{cases}$
 D. $\begin{cases} 3x - 2y \geq 0 \\ x + y \leq 10 \\ y \geq 0 \end{cases}$



44. In the figure, $ABCD$ and $PQRS$ are two rectangles of equal perimeter. If $AB : BC = 3 : 2$ and $PQ : QR = 4 : 3$, then area of $ABCD$: area of $PQRS =$



- A. 1 : 1.
 B. 1 : 2.
 C. 25 : 49.
 D. 49 : 50.

45. For $0^\circ \leq \theta < 360^\circ$, how many roots does the equation $2 \cos^2 \theta - 5 \sin \theta - 4 = 0$ have?

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

46. $\frac{\tan(180^\circ - \theta)}{\cos(90^\circ - \theta)} =$

A. $\frac{1}{\cos \theta}$

B. $\frac{-1}{\cos \theta}$

C. $\frac{\sin \theta}{\cos^2 \theta}$

D. $\frac{-\sin \theta}{\cos^2 \theta}$

47. 1 degree =

A. $\frac{\pi}{180}$ radian.

B. $\frac{180}{\pi}$ radians.

C. $\frac{1}{180\pi}$ radian.

D. 180π radians.

48. The figure shows a cuboid. Which of the following are right angles?

I. $\angle CAF$

II. $\angle DHG$

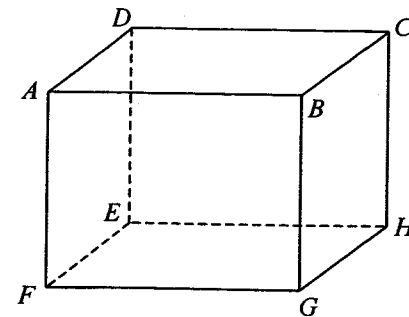
III. $\angle AGC$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III



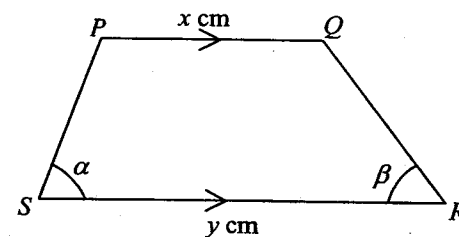
49. In the figure, $PQ = x$ cm and $SR = y$ cm. Find PS .

A. $\frac{y-x}{2 \cos \alpha}$ cm

B. $\frac{y}{2 \cos(\alpha + \beta)}$ cm

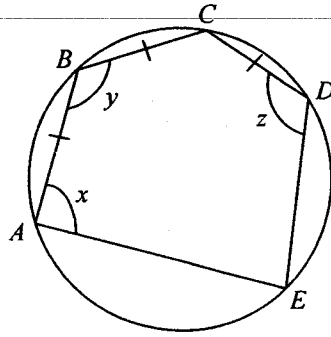
C. $\frac{x \sin \beta}{\sin \alpha}$ cm

D. $\frac{(y-x) \sin \beta}{\sin(\alpha + \beta)}$ cm



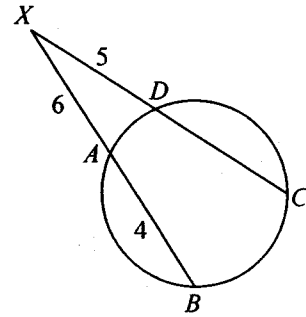
50. The figure shows a circle with diameter AD . If $AB = BC = CD$, find $x + y + z$.

- A. 315°
 B. 324°
 C. 330°
 D. 360°



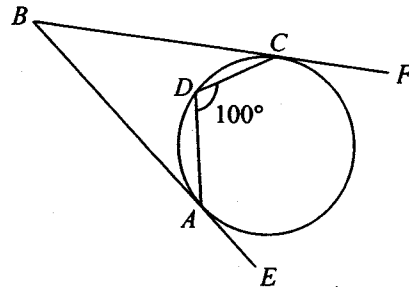
51. In the figure, XAB and XDC are straight lines. If $DX = 5$, $AX = 6$ and $AB = 4$, find CD .

- A. 5
 B. 7
 C. $\frac{10}{3}$
 D. $\frac{24}{5}$



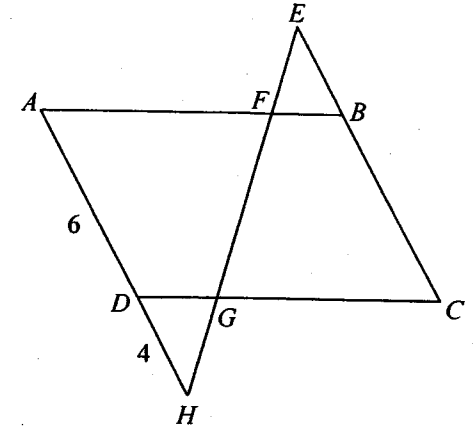
52. In the figure, BE and BF are tangents to the circle at A and C respectively. If $\angle ADC = 100^\circ$, then $\angle ABC =$

- A. 20°
 B. 30°
 C. 40°
 D. 50°



53. In the figure, $ABCD$ is a parallelogram and ADH , EBC and $EFGH$ are straight lines. If $AD = 6$, $DH = 4$ and $EB : BC = 3 : 4$, then $EF : GH =$

- A. 1 : 1.
 B. 3 : 4.
 C. 5 : 4.
 D. 9 : 8.



54. The circle $(x - 4)^2 + y^2 = 36$ intersects the positive x -axis and positive y -axis at A and B respectively. Find AB .

- A. $\sqrt{30}$
 B. $2\sqrt{30}$
 C. $\sqrt{34}$
 D. $2\sqrt{34}$

END OF PAPER