

# Sample Question Paper - 1



**Time: 3 Hours**

**Maximum Marks: 80**

**MATHEMATICS (Standard)**

## General Instructions:

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

## Part - A :

1. It consists two sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts.

An examinee is to attempt any 4 out of 5 sub-parts.

## Part - B :

1. Section III, Question No 21 to 26 are Very short answer Type questions of 2 marks each,
2. Section IV, Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Section V, Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

## PART - A

### Section - I

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Calculate the largest number which divides 80 and 115, leaves remainders 5 and 8, respectively.

**OR**

If  $k$  is a prime number, then find LCM of  $k, k^2$  and  $k^3$ .

2. Explain why 3146789533261123 is a composite number?

**OR**

A number is chosen at random from the numbers  $-3, -2, -1, 0, 1, 2, 3$ .

What will be the probability that square of this number is less than or equal to 4.

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3. How many polynomials can be formed with  $-7$  and  $5$  as zeroes?

4. Graphically, the pair of equations:

$$2x - 3y + 10 = 0$$

$$2x + 5y + 9 = 0$$

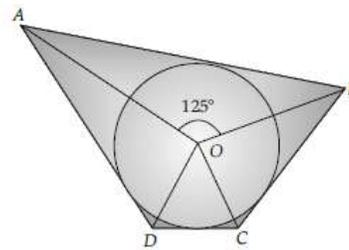
Represents what kind of lines

5. Is the equation  $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$  quadratic? Justify

6. Find the 25th term of the A.P., :  $7, 4, 1, \dots$

7. Find the distance of the point  $(7, -2)$  from the x-axis (in units).

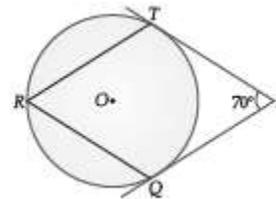
8. In the given figure, if  $\angle AOB = 125^\circ$ , then find  $\angle COD$ .



OR

In figure, O is the centre of a circle. PT and PQ are tangents to the circle from an external point P.

If  $\angle TPQ = 70^\circ$ , then find  $\angle TRQ$ .

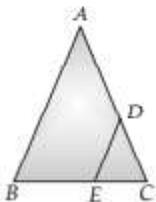


9. What will be the relation between area of circle and area of square? If the circumference of a circle and the perimeter of a square are equal.

10. During conversion of a solid from one shape to another, what will be the ratio of two shape?

11. In the figure of  $\triangle ABC$ , the points D and E are on the sides CA, CB respectively such that  $DE \parallel AB$ ,

$AD = 3x$ ,  $DC = x - 2$ ,  $BE = x + 2$  and  $CE = x$ . Then, the value of x is.....



12. Find the value of  $\sin^2(30^\circ) + 2 \tan 45^\circ - \cos^2(60^\circ)$

If  $\sin A = 3/4$ , then find value of  $\sec A$ .

13. Find the area (in  $\text{cm}^2$ ) of the circle that can be inscribed in a square of side 10 cm.

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14. The curved surface area of a cylinder is  $264 \text{ m}^2$  and its volume is  $924 \text{ m}^3$ .

Find the ratio of its height to its diameter

15. If the distance between the points  $(a,1)$  and  $(1, 2)$  is 4, then what can be the possible values of  $a$  ?

OR

Write the co-ordinates of a point P on x-axis which is equidistant from the points  $A(-4, 0)$  and  $B(8, 0)$ .

16. For the following distribution:

Find the sum of the lower limit of the median class and the upper limit of the modal class

Classes	10-20	20 -30	30-40	40 - 50	50-60	60-70
Frequency	2	3	6	9	4	3

## Section - II

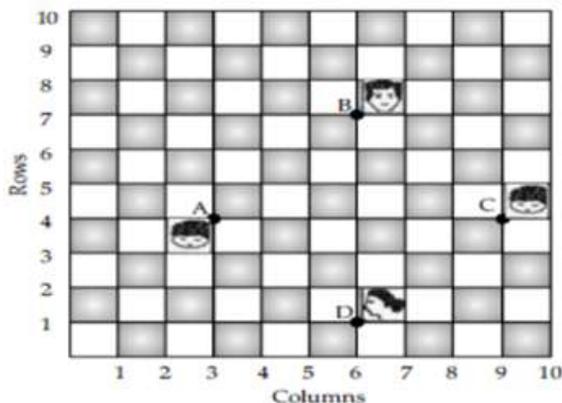
Case study based questions are compulsory. Attempt any four sub parts of each question.

Each subpart carries 1 mark.

17. Case Study based 1 :

In a room, 4 friends are seated at the points A, B, C and D as shown in figure. Reeta and Meeta walk into the room and after observing for a few minutes Reeta asks Meeta.

Asks Meeta



(a) What is the position of A?

- (i)  $(4, 3)$                       (ii)  $(3, 3)$                       (iii)  $(3, 4)$                       (iv) None of these

(b) What is the middle position of B and C?

- (i)  $\left(\frac{15}{2}, \frac{11}{2}\right)$                       (ii)  $\left(\frac{2}{15}, \frac{11}{2}\right)$                       (iii)  $\left(\frac{1}{2}, \frac{1}{2}\right)$                       (iv) None of these

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(c) What is the position of D?

- (i) (6, 0)                      (ii) (0, 6)                      (iii) (6, 1)                      (iv) (1, 6)

(d) What is the distance between A and B?

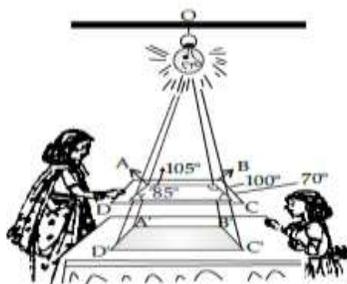
- (i)  $3\sqrt{2}$                       (ii)  $2\sqrt{3}$                       (iii)  $2\sqrt{2}$                       (iv)  $3\sqrt{3}$

(e) What is the equation of line CD?

- (i)  $x - y - 5 = 0$                       (ii)  $x + y - 5 = 0$                       (iii)  $x + y + 5 = 0$                       (iv)  $x - y + 5 = 0$

## 18. Case Study based 2 :

Seema placed a light bulb at point O on the ceiling and directly below it placed a table. Now, she put a cardboard of shape ABCD between table and lighted bulb. Then a shadow of ABCD is casted on the table as A'B'C'D' (see figure). Quadrilateral A'B'C'D' is an enlargement of ABCD with scale factor 2:1. Also,  $AB = 2$  cm,  $BC = 1.5$  cm,  $CD = 1.2$  cm and  $AD = 2.2$  cm;  $\angle A = 105^\circ$ ,  $\angle B = 100^\circ$ ,  $\angle C = 70^\circ$  and  $\angle D = 85^\circ$ .



(a) What is the measurement of angle A' ?

- (i)  $105^\circ$                       (ii)  $100^\circ$                       (iii)  $70^\circ$                       (iv)  $80^\circ$

(b) What is the length of A'B' ?

- (i) 1.5 cm                      (ii) 1 cm                      (iii) 2 cm                      (iv) 2.5 cm

(c) What is the sum of angles of quadrilateral A'B'C'D' ?

- (i)  $180^\circ$                       (ii)  $360^\circ$                       (iii)  $270^\circ$                       (iv) None of these

(d) What is the ratio of sides A'B' and A'D' ?

- (i) 22:15                      (ii) 15:22                      (iii) 1 : 1                      (iv) 1 : 2

(e) What is the sum of angles of C' and D' ?

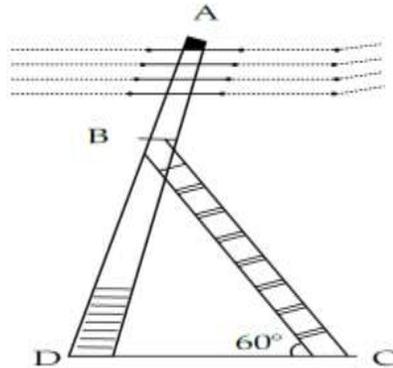
- (i)  $105^\circ$                       (ii)  $100^\circ$                       (iii)  $155^\circ$                       (iv)  $140^\circ$

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## 19. Case Study based 3 :

An electrician has to repair a electric fault on the pole of height 10 cm. She needs to reach a point 1.5 m below the top of the pole to perform the repair work (see figure)



(a) What is the length of BD ?

- (i) 7.5 m                      (ii) 5.5 m                      (iii) 8.5 m                      (iv) None of these

(b) What should be the length of Ladder, when inclined at an angle of  $60^\circ$  to the horizontal?

- (i) 9.81 m                      (ii) 9m                      (iii) 10 m                      (iv) 10.8 m

(c) How far from the foot of pole should she place the foot of the ladder ?

- (i) 4.1m                      (ii) 4m                      (iii) 4.9                      (iv) None of these

(d) If the horizontal angle is changed to  $30^\circ$ , then what should be the length of the ladder ?

- (i) 17 m                      (ii) 17.5 m                      (iii) 16 m                      (iv) 5 m

(e) What is the value of  $\angle B$  ?

- (i)  $60^\circ$                       (ii)  $90^\circ$                       (iii)  $30^\circ$                       (iv)  $180^\circ$

## 20. Case Study based 4 :

The weights (in kg) of 50 wrestlers are recorded in the following table :

Weight (in kg)	90 - 100	100 - 110	110 - 120	120 - 130	130 - 140
No. of Wrestlers	4	14	21	8	3



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- (a) What is the upper limit of modal class.  
(i) 120                      (ii) 110                      (iii) 100                      (iv) 140
- (b) What is the mode of the given data  
(i) 21                      (ii) 50                      (iii) 25                      (iv) 80
- (c) How many wrestlers weights have more than 120 kg weight ?  
(i) 32                      (ii) 39                      (iii) 15                      (iv) 11
- (d) What is the class mark for class 130 – 140 ?  
(i) 105                      (ii) 125                      (iii) 135                      (iv) 145
- (e) Which method is more suitable to find the mean of the above data ?  
(i) Direct method                      (ii) Assumed mean method  
(iii) Step-Deviation method                      (iv) None of these

## PART - B

### **Section-III**

**All questions are compulsory. In case of internal choices, attempt any one.**

**21.** Write the denominator of the rational number  $357/500$  in the form  $2^m \times 5^n$ , where  $m$  and  $n$  are nonnegative integers. Hence write its decimal expansion without actual division.

**22.** In a rectangle ABCD, E is a point on AB such that  $AE = 1/2$

AB. If  $AB = 8$  km and  $AD = 3$  km, then find DE.

**23.** If  $\sin(A + B) = 1$  and  $\sin(A - B) = 1/2$ ,  $0 \leq A + B = 90^\circ$  and  $A > B$ , then find A and B.

**OR**

Express:  $\sin A$  and  $\tan A$  in terms of  $\sec A$ .

**24.** A boy 1.5 m tall is 18.5 m away from a pole 20 m high. Find the angle of elevation of the top of the tower from his eye.

**25.** A child prepares a poster on "save water" on a square sheet whose each side measures 40 cm. At each corner of the sheet, she draws a quadrant of radius 10 cm in which she shows the ways to save water. At the center, she draws a circle of diameter 14 cm and writes a slogan save water in it. Find the area of the remaining sheet.

**26.** A teacher took a surprise test of maths. He observes the marks of five students of class. He observes the median is 40 and mode is 52. So find the mean of the marks of five students using an empirical formula.

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OR

Find the mode of the following frequency distribution

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Frequency	8	10	10	16	12	6	7

## Section - IV

All questions are compulsory. In case of internal choices, attempt any one.

27. Determine the values of  $m$  and  $n$  so that the following system of linear equations have infinite number of solutions :  $(5m - 1)x + 2y - 5 = 0$  and  $4x + (n - 1)y - 2 = 0$

OR

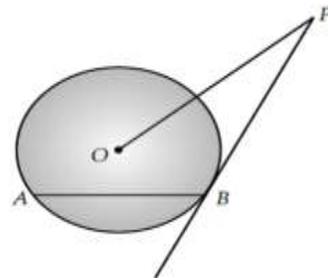
Solve for  $x$  and  $y$  :  $\frac{x}{2} + \frac{2y}{3} = -1$  and  $x - \frac{y}{3} = 3$

28. Write all the values of  $p$  for which the quadratic equation  $x^2 + px + 9 = 0$  has equal roots. Find the roots of the equation so obtained.

29. If the sum of first  $m$  terms of an AP is the same as the sum of its first  $n$  terms, show that the sum of its first  $(m + n)$  terms is zero.

30. A vertical row of trees 15 m long casts a shadow 8 m long on the ground, At the same time a tower casts the shadow 40 m long on the ground.

31.  $AB$  is a chord of circle with centre  $O$ . At  $B$ , a tangent  $PB$  is drawn such that its length is 24 cm. The distance of  $P$  from the centre is 26 cm. If the chord  $AB$  is 10 cm, find its distance from the centre.



OR

Prove that the lengths of two tangents drawn from an external point to a circle are equal.

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32. One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting  
(a) Non face card, (b) Black king or a Red queen, (c) Spade card.

33. Prove that:  $(\cot \theta - \operatorname{cosec} \theta)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$

## Section-V

34. Check whether the equation  $2x^2 + 6x - 8 = 0$  has real roots and if it has, find them by the method of completing the square. Also, verify that roots obtained satisfy the given equation.

OR

Solve  $\frac{1}{(a + b + x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$ , where  $a + b \neq 0$

35. A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 16 cm and the diameter of the cylinder is 6 cm. Find the total volume of the solid.

36. In the given figure, D and E trisect BC. Prove that  $8AE^2 = 3AC^2 + 5AD^2$ .

