

# Directorate of Education, GNCT of Delhi

## Practice Paper 1

Class – X (2020-21)

### Mathematics

Max. Marks: 80

Duration: 3 hours

#### General Instructions:

1. This question paper contains 36 questions divided into two parts A and B. All the questions are compulsory.
2. Part A consists of two sections- I and II. Section I has 16 questions of 1 mark each and Section II has 4 case study-based questions. Each case-study based questions have 5 sub-parts of 1 mark each.
3. Part B consists of 16 questions— 6 questions of 2 marks, 7 questions of 3 marks and 3 questions of 5 marks each.
4. There is no overall choice. However internal choices are provided in 5 questions of 1 mark , 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks. You have to attempt only one of the alternatives in all such questions.
5. In case-study based questions, you have to attempt only four out of five sub-parts.
6. Use of calculator is not permitted.
7. Please write down the serial number of question before attempting it.

#### Part – A

##### Section – I

*Question No 1 to 16 are of 1 mark each.*

1. HCF of co-prime numbers is always\_\_\_\_\_.
2. Write a quadratic polynomial the sum of whose zeroes is -3 and product is -10.
3. After how many decimal places will the decimal expansion of the number  $\frac{47}{2^3 \times 5^2}$  terminates?

OR

Given that HCF (336,54) is 6, find LCM (336,54).

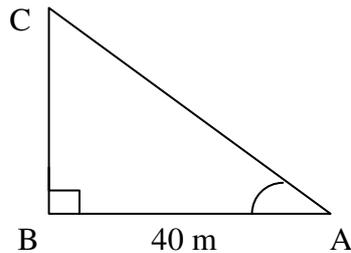
4. The diameter of a wheel is 1.54 m. How far will it travel in 200 revolutions?
5. Express 234 as the product of primes.
6. Find the area of a quadrant of a circle with radius 14 cm. (Take  $\pi = \frac{22}{7}$ )
7. A pair of linear equations of two variables has unique solution. What type of lines will its graph represent?

OR

For  $3x - 7y = 10$ , Express y in terms of x.

8. On comparing the ratios of the coefficients, find out whether the pair of linear equation  $x - 2y = 0$  and  $3x + 4y - 20 = 0$  is consistent or inconsistent .
9. Probability of happening of an event is  $\frac{3}{7}$  . What will be the probability of not happening of that event?

10. A surveyor wants to find out the height of a tower. He measures  $\angle A$  as  $\tan A = \frac{3}{4}$ . What is the height of the tower if A is 40 m from its base as shown in the figure?



11. The median of the given data with the observations in ascending order is 27.5. Find the value of x.

24, 25, 26, x+2, x+3, 30, 33, 37

12. If a line segment AB is to be divided in the ratio 5:8 internally, we draw a ray AX such that  $\angle BAX$  is an acute angle. What will be the minimum number of points to be located at equal distances on ray AX?

13. State the Pythagoras Theorem.

OR

If  $\triangle ABC \sim \triangle DEF$  and  $\angle A = 45^\circ$ ,  $\angle C = 55^\circ$ , then find  $\angle E$ .

14. A bag contains 6 red balls and 5 blue balls. One ball is drawn at random. What is the probability of getting a blue ball?

OR

A die is thrown once. What is the probability of getting an odd number?

15. If  $\sin \theta = \frac{12}{13}$ , then find  $\cos \theta$ .

16. A pendulum swings through an angle of  $30^\circ$  and describes an arc 17.6 cm in length. Find the length of pendulum.

OR

Find the area of a sector of a circle with the radius 6 cm if angle of the sector is  $60^\circ$ .

### Section – II

*Question number 17-20 are case-study based questions. Attempt any 4 sub parts from each question. Each sub part carries 1 mark.*

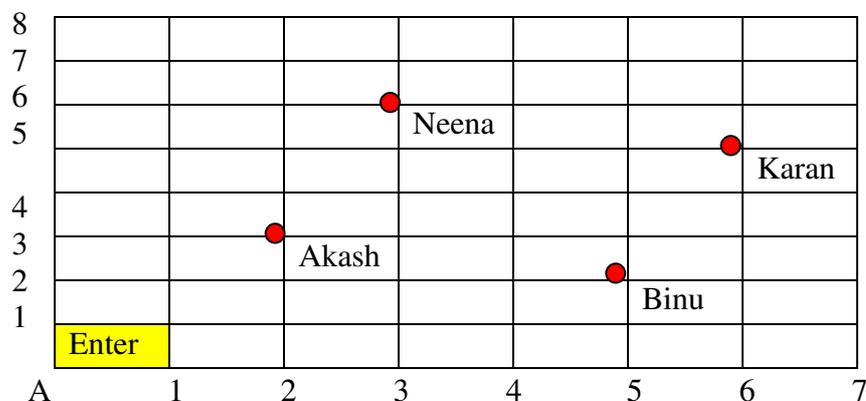
17. Raman is stitching a kite shaped patch on the cushion cover. Few questions came to his mind while stitching the patch. Give answers to his questions by looking at the figure.



- (i) Raman stitched the white thread at what angles to each other?  
 a)  $30^\circ$                       b)  $60^\circ$                       c)  $90^\circ$                       d)  $60^\circ$

- (ii) Which is the correct similarity criteria applicable for smaller triangles at the upper part of this kite?  
 a) RHS                      b) AAA                      c) SSA                      d) AAS
- (iii) Sides of two similar triangles are in the ratio 2:9. The corresponding altitudes of these triangles are in the ratio  
 a) 2:3                      b) 2:9                      c) 81:16                      d) 16:81
- (iv) Triangles stitched at the tail of the kite are congruent to each other and are similar to the lower part of the kite in the ratio 2:9. If one side of the smaller triangle is of 4 cm, then the corresponding side of the kite's lower triangle will be  
 a) 12 cm                      b) 15 cm                      c) 18 cm                      d) 8 cm
- (v) What is the area of the kite formed by two perpendicular strings of length 8 and 12cm?  
 a)  $48 \text{ cm}^2$                       b)  $14 \text{ cm}^2$                       c)  $24 \text{ cm}^2$                       d)  $96 \text{ cm}^2$

18.



Karan went to the Lab near to his home for COVID 19 test along with his family members. The seats in the waiting area were as per the norms of distancing during this pandemic (as shown in the above figure). His family member took their seats surrounded by red circular area.

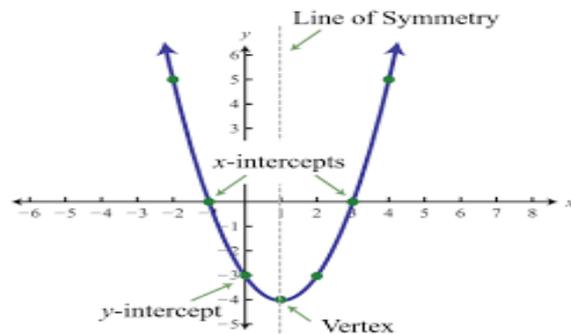
- (i) Considering A as the origin, what are the coordinates of A?  
 a) (0,1)                      b) (1,0)                      c) (0,0)                      d) (-1,-1)
- (ii) What is the distance between Neena and Karan ?  
 a) 10 units                      b)  $2\sqrt{5}$  units                      c)  $\sqrt{10}$  units                      d)  $\sqrt{8}$  units
- (iii) What are the coordinates of seat of Akash ?  
 a) (2,3)                      b) (3,2)                      c) (0,3)                      d) (2,0)
- (iv) What will be the coordinates of a point exactly between Akash and Binu where a person can be seated?  
 a) (3.5,2.5)                      b) (2.5,5)                      c) (10,5)                      d) (1.5,0.5)
- (v) Determine the shape of the figure we get on joining the points where Karan's family members are seated.  
 a) Rectangle                      b) Square                      c) Parallelogram                      d) Rhombus

19. An engineer plans to make all the pillars of the Metro green with plants to make these beautiful and to contribute for healthy environment as shown in the picture. Observe the picture and answer the questions if dimension of one pillar is 1.5 m X 1.5 m X 20 m.



- (i) The shape of the pillars is  
 a) Rectangle      b) Cube      c) Cuboid      d) Cylinder
- (ii) By using which formula he can calculate the surface area of the pillar?  
 a)  $A = 2(lb + bh + hl)$       b)  $A = 2(lb + hl)$   
 c)  $A = 2h(l + b)$       d)  $A = lb + bh + hl$
- (iii) The lateral surface area of one pillar is  
 a)  $100 \text{ m}^2$       b)  $120 \text{ m}^2$       c)  $165 \text{ m}^2$       d)  $82.5 \text{ m}^2$
- (iv) How much cement is used to fill the pillar?  
 a)  $44 \text{ m}^3$       b)  $45 \text{ m}^3$       c)  $450 \text{ m}^3$       d)  $440 \text{ m}^3$
- (v) Find the cost of the plantation if it costs Rs.50 per  $\text{m}^2$ .  
 a) Rs.6225      b) Rs. 6000      c) Rs. 5000      d) Rs. 4100

20.



A park has swings made of rubber and iron chain. Sachin who is studying in class X have noticed that this is a Mathematical shape, he has learned in Maths class. Following questions raised in his mind. Answer the questions by observing both pictures :

- (i) Name the shape in which the wire is bent.  
 a) Spiral      b) ellipse      c) linear      d) Parabola
- (ii) How many zeroes are there for the polynomial (shape of the wire)?  
 a) 2      b) 3      c) 1      d) 0
- (iii) The zeroes of the polynomial are  
 a) -1, 5      b) -1, 3      c) 3, 5      d) -4, 2
- (iv) What will be the expression of the polynomial?  
 a)  $x^2+2x -3$       b)  $x^2 -2x +3$       c)  $x^2 - 2x -3$       d)  $x^2 +2x+3$
- (v) What is the value of the polynomial if  $x = 1$ ?  
 a) -4      b) 5      c) -5      d) 6

**Part –B**

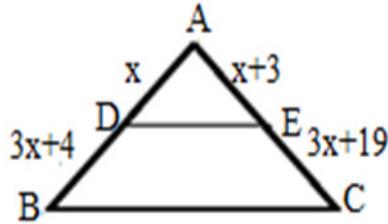
*Question No. 21 to 26 are Very short answer Type questions of 2 marks each.*

21. Find the value of a if the distance between the points A(-3, -14) and B(a, -5) is 9 units.

OR

Find a relation between x and y such that the point (x, y) is equidistant from the point (3,6) and (-3,4).

22. In the given figure DE|| BC, find the value of x.



23. The sides a, b, c of a right triangle, where c is the hypotenuse, are circumscribing a circle. Prove that the radius r of the circle is given by  $r = \frac{(a+b-c)}{2}$ .

24. Draw a line segment of length 7.6 cm and divide it internally in the ratio 3:2. Measure the two parts.

25. If  $\cos A = \frac{7}{25}$ , find the value of  $\tan A + \cot A$ .

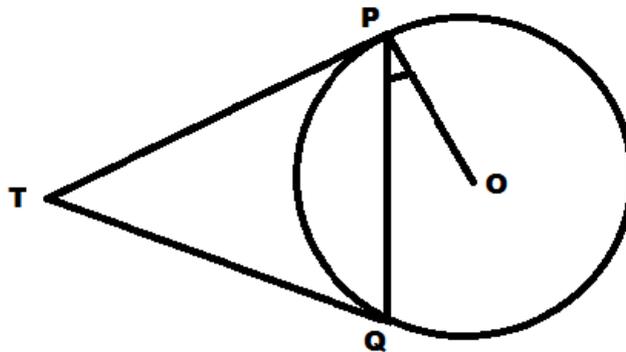
OR

If  $5x = \sec\theta$  and  $\frac{5}{x} = \tan\theta$ , then find the value of  $5 \left(x^2 - \frac{1}{x^2}\right)$ .

26. How many terms of the AP 24,21,18..... must be taken so that their sum is 78?

*Question No. 27 to 33 are Short Answer Type questions of 3 marks each.*

27. In the figure two tangents TP and TQ are drawn to a circle with centre O from an external point P. Prove that  $\angle PTQ = 2 \angle OPQ$ .



28. Sunita has some notes of Rs.50 and Rs.100 amounting to a total of Rs.15,500. If the total number of notes is 200, then find how many notes of Rs. 50 and Rs.100 each she has?

29. Prove that  $\sqrt{2}$  is an irrational number.

30. 90 cards numbered from 1 to 90 are placed in a box. If one card is drawn at random from the box find the probability that it is:
- (i) a two-digit number
  - (ii) a perfect square
  - (iii) a number divisible by 5.

OR

Red queen and a black jack are removed from a pack of 52 playing cards. Find the probability that the card drawn from the remaining cards is:

- (i) a red card
  - (ii) neither a jack nor a king
  - (iii) either a king or a queen.
31. A well of diameter 3m is dug 14m deep. The earth taken out of it has been spread evenly all-around it in the shape of a circular ring of width 4m to form an embankment. Find the height of the embankment.
32. Prove that  $\frac{(\cos \theta - \sin \theta + 1)}{(\cos \theta + \sin \theta + 1)} = \operatorname{cosec} \theta + \cot \theta$
33. A train travelling a distance of 360 km at a uniform speed would have taken 48 minutes less to travel the same distance if its speed were 5km/hour more. Find the original speed of the train.

OR

Find the roots of the following equation:

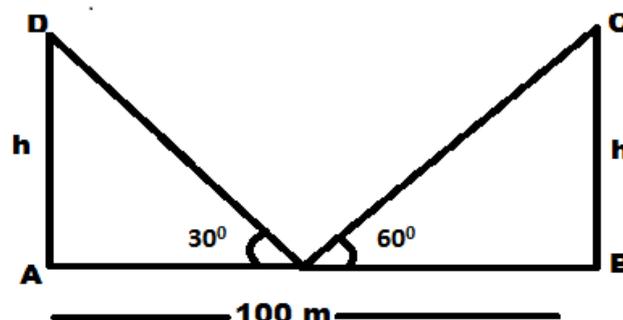
$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, \quad x \neq -4, 7$$

*Question No. 34 to 36 are Long Answer Type questions of 5 marks each.*

34. A statue which is  $x$  m tall stands on the top of 100m long pedestal on the ground. From a point on the ground, the angle of elevation of the top of the statue is  $60^\circ$  and from the same point, the angle of elevation of the top of the pedestal is  $45^\circ$ . Find the height of the statue.

OR

Two poles of equal heights are standing opposite to each other on either side of the road, which is 100m wide. The angles of elevation of the top of the poles, from a point between them on the road are  $30^\circ$  and  $60^\circ$ , respectively. Find the height of the poles and the distances of the point from the poles. (See in figure)



35. Find the number of terms in an A.P. 18,15,12,....., - 48 and also find the sum of all of its terms.

36. Find the missing frequencies  $f_1$  and  $f_2$  if the mean of 50 observations given below is 38.2.

Class interval	Frequency
0 – 10	4
10 - 20	4
20 – 30	$f_1$
30 - 40	10
40 - 50	$f_2$
50 - 60	8
60 – 70	5