

Directorate of Education, GNCT of Delhi

Practice Paper 4

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. The length of the minute hand of a clock is 5 cm. Find the central angle of the sector made by the minute hand during the time period 6:00 a.m. and 6:35 a.m.
2. Write a quadratic polynomial, sum of whose zeroes is 4 and product is -8.
3. After how many places the decimal expansion of $\frac{13497}{1250}$ will terminate?

OR

Given that HCF (510,92) is 2, find LCM (510,92).

4. Show that the pair of linear equation $3x - 5y = 7$ and $6x - 10y = 3$ is inconsistent.
5. HCF of $3^3 \times 5^4$ and $3^4 \times 5^2$ is_____.
6. Find the area of a sector of a circle with radius 21 cm and angle of the sector is 60° .
7. State the Pythagoras Theorem.

OR

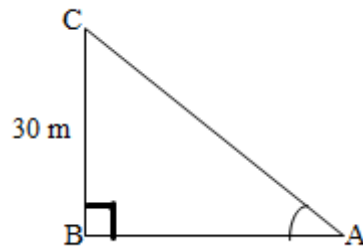
If corresponding sides of two similar triangles are in the ratio 2:3 then find the ratio of their altitudes.

8. Express 945 as the product of primes.
9. Find the circumference of a circle whose area is 616 cm^2 .

OR

If the diameter of a semi-circular protector is 14 cm then find its perimeter.

10. A surveyor wants to find out the distance of the foot of a tower from point A. He measures $\angle A$ as $\tan A = \frac{1}{2}$. What is the distance of the foot of the tower from point A, if height of the tower is 30 m as shown in the figure ?



11. The mean and mode of a data are 24 and 12 respectively. Find its median.
12. Two tangents to a circle, inclined at an angle of 80° , are to be drawn. At the centre, what angle is to be constructed between the radii of the circle?
13. The graph of a pair of linear equations of two variables represents parallel lines. Will it be consistent or inconsistent?

OR

For $2x + 3y = 4$, express y in terms of x .

14. A pen stand contains 3 red pens and 4 blue pens. One pen is drawn at random. What will be the probability of getting a blue pen ?

OR

A die is thrown once. What will be the probability of getting a multiple of 3?

15. What will be the angle of elevation of a 15 m high tower from the foot of a tree which is 15 m away from the tower?
16. The probability of happening of an event is 0.681. What will be the probability of not happening of that event?

(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.

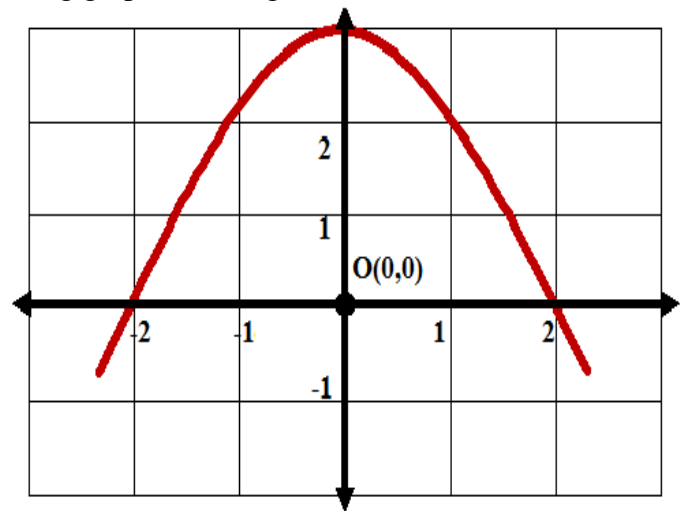
17. An engineer is planning to make all the pillars of the Metro, green with plants, to make these beautiful and to contribute for healthy environment as shown in the picture. Observe the picture and answer the questions.



- (i) Determine the shape of the pillars.
- a) Rectangle b) Cube c) Cuboid d) Cylinder

- (ii) The formula to find the volume of a the pillar is :
 a) $\pi r^2 h$ b) $\pi r l$ c) $\pi r (l + r)$ d) $2\pi r$
- (iii) The total surface area of a cylinder of base radius r and height h is :
 a) $2\pi r h$ b) $2\pi r (r + h)$ c) $\pi r l$ d) $\pi r (r + l)$
- (iv) Find the curved surface area of one pillar if height of the pillar is 21 m and radius of the base is 1m.
 a) 132 m^2 b) 144 m^2 c) 154 m^2 d) 138 m^2
- (v) How much is the total surface area of a cylinder if the height is 21 m and the radius of the base is 1m?
 a) 144 m^2 b) 138.28 m^2 c) 154 m^2 d) 166 m^2

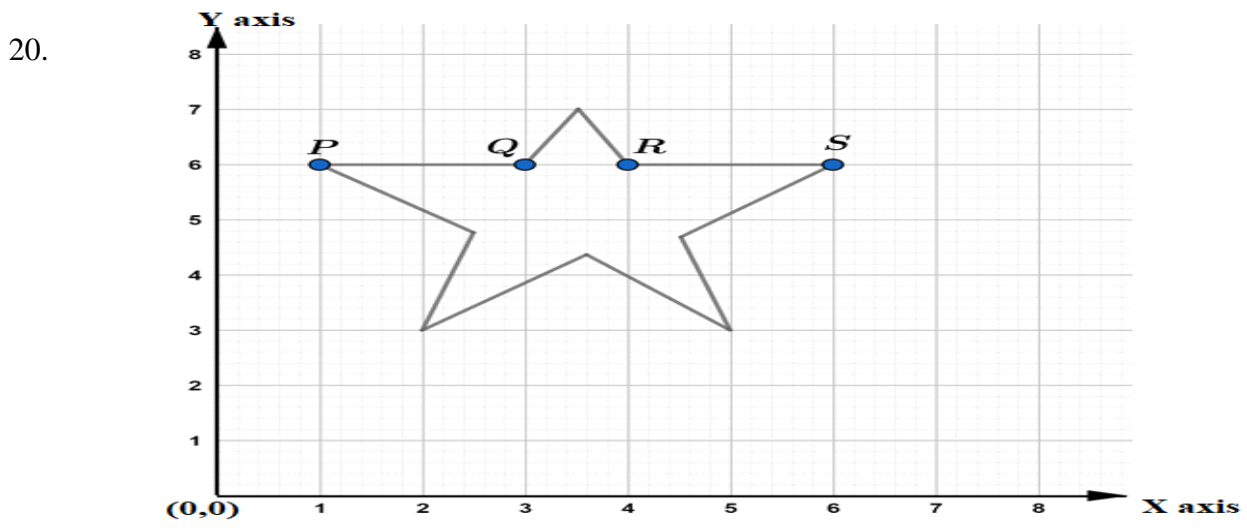
18. Seema is studying in class X. She visited Metro station several times. One day she has noticed the roof of the Metro Station. She observed that this is a Mathematical shape, she has learned in Maths class. On reaching home, Seema draw the following graph of the figure:



- (i) Seema shows the roof of metro in which shape ?
 a) Spiral b) Ellipse c) Linear d) Parabola
- (ii) How many zeroes are possible for this shape ?
 a) 2 b) 3 c) 1 d) 0
- (iii) According to graph, the zeroes of the polynomial are:
 a) -2,2 b) 0, 2 c) 2,0 d) 0,0
- (iv) What will be the expression of the polynomial?
 a) $x^2 - 4x + 4$ b) $-x^2 - 4x + 4$ c) $x^2 + 4x + 4$ d) $x^2 - 4$
- (v) What is the value of the polynomial if $x = 1$?
 a) -1 b) 3 c) -3 d) 1
19. Kunal crossed the Truss bridge. He thought about the need of Truss bridge. Truss bridges have supporting structures constructed in triangular shapes. Triangles are used in supporting the structure of the bridges because they evenly distribute the weight without changing the proportions. When force is applied on a rectangular shape, it will flatten out. He thought about triangles and about their similar properties.



- (i) Equilateral triangle has all sides equal. What is measure of each angle of such triangle?
 a) 30° b) 60° c) 90° d) 45°
- (ii) Which is not the correct similarity criteria for the two similar triangles?
 a) AAA Similarity b) SAS Similarity c) SSS Similarity d) RHS Similarity
- (iii) The height of an equilateral triangle of side 12 cm is:
 a) $2\sqrt{3}$ units b) $4\sqrt{3}$ units c) $6\sqrt{3}$ units d) $8\sqrt{3}$ units
- (iv) 'If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio' - this theorem is called :
 a) Pythagoras theorem b) Thales theorem (B.P.T.)
 c) Converse of Thales theorem d) Converse of Pythagoras theorem
- (v) In $\triangle ABC$ and $\triangle DEF$, it is given that $\frac{AB}{DE} = \frac{BC}{FD}$, then
 a) $\angle B = \angle E$ b) $\angle A = \angle D$ c) $\angle B = \angle D$ d) $\angle A = \angle F$



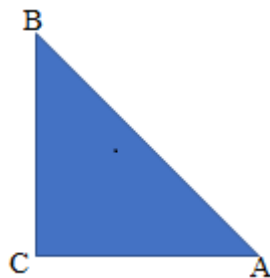
- Observe the above picture which shows a star shape on a Cartesian plane. Answer the following questions:
- (i) What are the coordinates of point P?
 a) (6,1) b) (1,6) c) (6,6) d) (0,6)
- (ii) What is not true for points P,Q,R and S?
 a) points P,Q,R and S are collinear b) ordinates of points P,Q,R and S are same
 c) PS= 6 units d) PQ = RS

- (iii) What is the distance between P and Q?
 a) 5 units b) 2 units c) 4 units d) $\sqrt{2}$ units
- (iv) What will be the coordinates of a point exactly between P and S?
 a) (6,3.5) b) (3.5,6) c) (7,12) d) (7,6)
- (v) The mid-point of line segment PQ divides it in the ratio:
 a) 2:3 b) 1:1 c) 3:2 d) 3:4

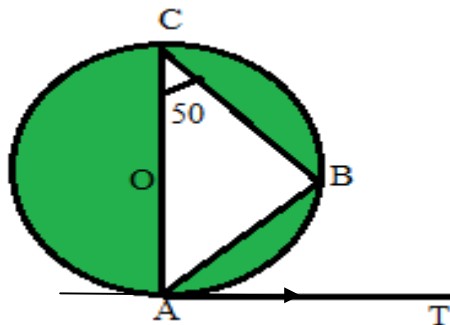
Part-B

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

21. Geometrically divide a line segment of length 8.4 in the ratio 5:2.
22. In given figure ΔABC is right angled at C and $AB^2 = 2AC^2$. Prove that ΔABC is an isosceles triangle.



23. In figure, AB is a chord of the circle and AOC is its diameter such that $\angle ACB = 50^\circ$. If AT is the tangent to the circle at the point A, then find $\angle BAT$.



24. If the mid-point of the line segment joining the points A (3,4) and B (k,6) is P (x, y) and $x + y - 10 = 0$, find the value of k.

OR

Find the value of y for which the distance between the points P (2, -3) and Q (10, y) is 10 units.

25. If $\sin A = \frac{3}{4}$, calculate $\cos A$ and $\tan A$.

OR

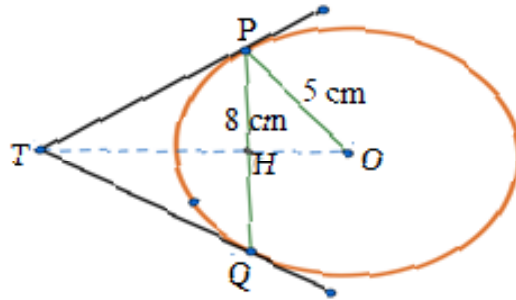
If $\cot \theta = \frac{7}{8}$, evaluate $\frac{(1 + \sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(1 - \cos \theta)}$.

26. How many two-digit numbers are divisible by 3?

Question No. 27 to 33 are short answer Type questions of 3 marks each.

27. Pallavi scored 40 marks in a test getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks were deducted for each wrong answer, then Pallavi again would have scored 40 marks. How many questions were there in the test?

28. In figure PQ is a chord of length 8 cm of a circle of radius 5cm. The tangents at P and Q intersect at a point T. Find the length TP.



29. Prove that $\sqrt{5}$ is an irrational number.
30. Cards marked 1,3,5...49 are placed in a box and mixed thoroughly. One card is drawn from the box. Find the probability that the number on the card is:
- a composite number
 - not a perfect square
 - multiple of 3 and 5.

OR

All aces and black jacks are removed from a pack of 52 playing cards. A card is drawn at random from the remaining cards after reshuffling them. Find the probability that the drawn card is:

- a black card
 - a face card
 - an ace
31. A 20 m deep well with radius 7m is dug and the earth from digging is evenly spread out to form a platform 22m X 14m. Find the height of the platform.

32. Prove that:
$$\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$$

33. Solve for x

$$\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}, x \neq 2, 4$$

OR

If the roots of quadratic equation $(b-c)x^2 + (c-a)x + (a-b) = 0$ are equal, prove that $2b = a + c$.

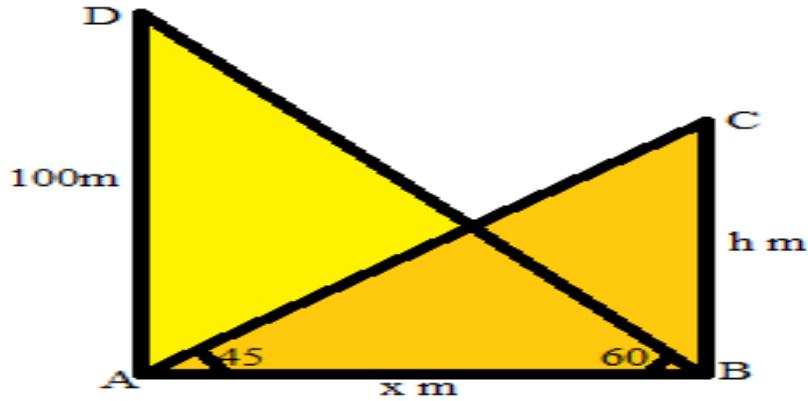
Question No. 34 to 36 are Long answer Type questions of 5 marks each.

34. If the 4th term of an A.P. is zero, prove that the 25th term of the A.P. is three times its 11th term.

35. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.

OR

The angle of elevation of the top of a building from the foot of the tower is 45° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 100 m high, find the height of the building. (See in Figure)



36. If the median of the distribution given below is 28.5, find the values of x and y .

| Class interval | Frequency |
|----------------|-----------|
| 0 - 10 | 5 |
| 10 - 20 | x |
| 20 - 30 | 20 |
| 30 - 40 | 15 |
| 40 - 50 | y |
| 50 - 60 | 5 |
| Total | 60 |