

General Instructions:

1. This question paper contains 38 questions.
2. This question paper is divided into 5 sections A, B, C, D and E.
3. In Section A, Questions 1 – 18 are multiple choice questions (MCQs) and question number 19 and 20 are Assertion – Reason based questions of 1 mark each.
4. In Section B, Questions 21 – 25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions 26 – 31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions 32 – 35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question number 36 – 38 are case study based questions, carrying 4 marks each with sub parts of the values 1, 1 and 2 marks each respectively.
8. All questions are compulsory. However, an internal choice in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = \frac{22}{7}$, wherever required if not stated.
11. Use of calculators is not allowed.

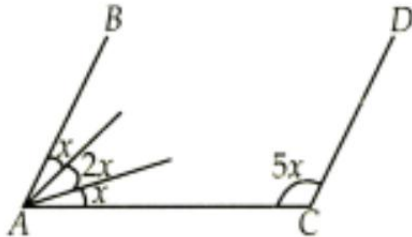
Section – A

Section A consists of 20 questions of 1 mark each.

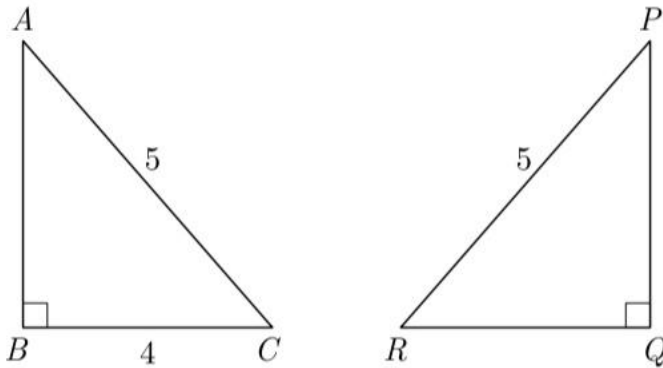
1. Class mark of the interval 6.5 – 9.5 is:
a. 8.5 b. 8 c. 7 d. 7.5
2. $\sqrt{2}$ is a polynomial of degree:
a. 0 b. 1 c. $\frac{1}{2}$ d. 2
3. If $(16)^{2x+3} = (64)^{x+3}$, then the value of x is:

- a. 1 b. 3 c. 9 d. 27
4. Degree of the zero polynomial is:
- a. 0 b. 1 c. any natural number d. not defined

5. If $AB \parallel CD$, then the value of x is:



- a. 30° b. 20° c. 40° d. 15°
6. If $\triangle ABC$ is congruent to $\triangle PQR$, then the length of QR is:



- a. 4 cm b. 8 cm c. 9 cm d. 6 cm
7. Two adjacent angles of a rhombus are $(3x - 40)^\circ$ and $(2x + 20)^\circ$. The measurement of the smaller angle is:
- a. 160° b. 80° c. 100° d. 120°
8. The quadrilateral formed by joining the mid – points of the sides of quadrilateral FAST, taken in order, is a rectangle, if:
- a. FAST is a rhombus
- b. FAST is a parallelogram
- c. diagonals of FAST are perpendicular
- d. diagonals of FAST are equal.
9. A chord is 8 cm from the centre of a circle of radius 17 cm. The length of the chord is:
- a. 25 cm b. 12.5 cm c. 30 cm d. 9 cm
10. Axioms are assumed:
- a. universal truths in all branches of mathematics

- b. universal truths specific to geometry
- c. theorems
- d. definitions

11. In a frequency distribution, the mid – value of a class is 10 and the width of the class is 6. The lower limit of the class is:

- a. 6 b. 7 c. 8 d. 12

12. The area of an equilateral triangle is $16\sqrt{3} \text{ m}^2$. Its perimeter is:

- a. 24 m b. 12 m c. 306 m d. 48 m

13. Which of the following rational numbers is equivalent to a decimal that terminates?

- a. $\frac{1}{3}$ b. $\frac{2}{3}$ c. $\frac{3}{8}$ d. $\frac{5}{6}$

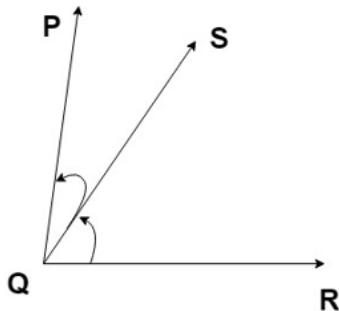
14. Find the value of k , if $x = 1, y = 2$ is a solution of the equation $2x + 3y = k$.

- a. 5 b. 6 c. 7 d. 8

15. The total surface area of a cone whose radius is $\frac{r}{2}$ and slant height is $2l$ is:

- a. $2\pi r(l + r)$ b. $\pi r \left(l + \frac{r}{4} \right)$ c. $\pi r(l + r)$ d. $2\pi rl$

16. From the given figure, which are the pairs of adjacent angles?

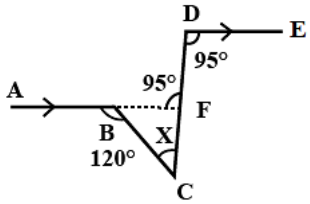


- a. $\angle PQR$ and $\angle PQS$
- b. $\angle PQR$ and $\angle SQR$
- c. $\angle PQR$ and $\angle RQP$
- d. $\angle PQS$ and $\angle SQR$

17. The base of an isosceles triangle is 30 cm. Its area is:

- a. 225 cm^2 b. $225\sqrt{3} \text{ cm}^2$ c. $225\sqrt{2} \text{ cm}^2$ d. 450 cm^2

18. Find the value of x , if $AB \parallel DE$ in the given figure.



- a. 45° b. 25° c. 55° d. 35°

Directions: In question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R).

Choose the correct option.

- a. Both assertion (A) and reason (R) are true, and reason (R) is the correct explanation of assertion (A).
 b. Both assertion (A) and reason (R) are true, and reason (R) is not the correct explanation of assertion (A).
 c. Assertion (A) is true, but reason (R) is false.
 d. Assertion (A) is false, but reason (R) is true.

19. Assertion (A): The point $(-2, 0)$ lies on y - axis and $(0, 4)$ on x - axis.

Reason (R): Every point on the x - axis has zero distance from x - axis and every point on y - axis has zero distance from y - axis.

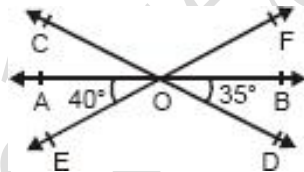
20. Assertion (A): $y = 3x$ represents a line passing through the origin.

Reason (R): Any line parallel to the x - axis is $y = a$.

Section – B

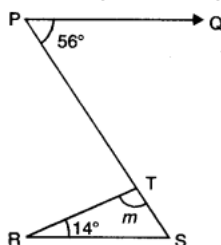
Section B consists of 5 questions of 2 marks each.

21. In the given figure, lines AB, CD and EF intersect at point O. Find the measure of $\angle COF$.



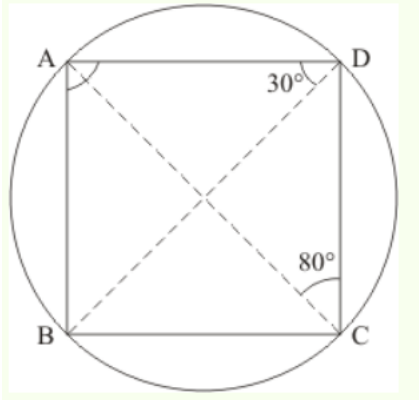
OR

In the given figure, if $PQ \parallel RS$, then find the measure of angle m .

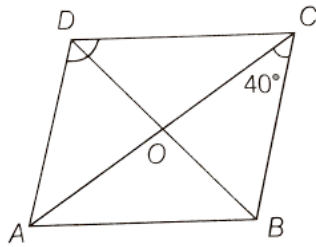


22. The radii of two cones are in the ratio 2 : 3 and their heights are in the ratio 7 : 3. Find the ratio of their volumes.

23. In the given figure, ABCD is a cyclic quadrilateral such that $\angle ADB = 30^\circ$ and $\angle DCA = 80^\circ$. Find the measure of $\angle DAB$.



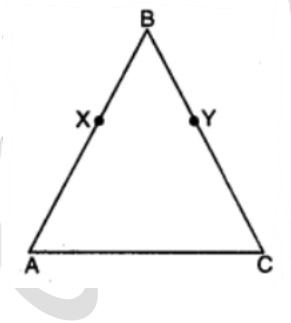
24. ABCD is a rhombus such that $\angle ACB = 40^\circ$. Find the measure of $\angle ADB$.



OR

Calculate all the angles of a parallelogram if one of its angles is twice its adjacent angle.

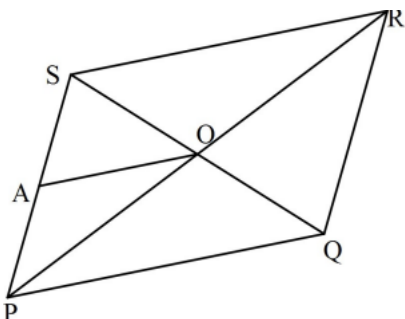
25. In the given figure, $AB = BC$, $BX = BY$, show that $AX = CY$.



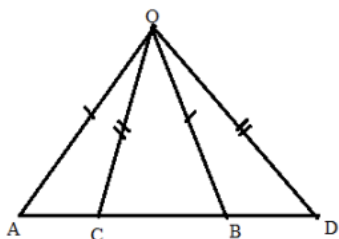
Section – C

Section C consists of 6 questions of 3 marks each.

26. The diagonals PR and QS of a parallelogram PQRS intersect at O. If A is the midpoint of PS, prove that AO is parallel to PQ.

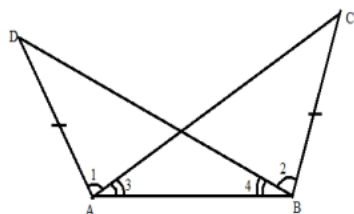


27. In the given figure, $OA = OB$, $OC = OD$ and $\angle AOB = \angle COD$. Prove that $AC = BD$.



OR

In the given figure, $\triangle ABC \cong \triangle ABD$ are such that $AD = BC$, $\angle 1 = \angle 2$ and $\angle 3 = \angle 4$. Prove that $BD = AC$.



28. Give an example of each, distinct two irrational numbers whose:

- difference is a rational number
- sum is a rational number
- quotient is a rational number

OR

Express each of the following in the form $\frac{p}{q}$, where p, q are integers and $q \neq 0$:

- 18.484848....
- 3.7999999....

29. Write the answer to each of the following questions:

- What is the name of the horizontal and the vertical lines drawn to determine the position of any point in the Cartesian plane?
- What is the name of each part of the plane formed by these two lines?

- c. Write the name of the point where these two lines intersect?
30. Find the value of k for which the point $(1, -2)$ lies on the graph of the linear equation $x - 2y + k = 0$. Hence, find two more solutions of the equation.
31. Simplify: $(2x - 5y)^3 - (2x + 5y)^3$.

Section – D

Section D consists of 4 questions of 5 marks each.

32. Find the value of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by the polynomials $(x - 1)$ and $(x - 2)$.
33. If $a = \frac{3+\sqrt{5}}{2}$, then find the value of $\left(a^2 + \frac{1}{a^2}\right)$.
34. If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, prove that the chords are equal.

OR

Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.

35. Tarini went to a stationary shop and purchased 4 pencils and 8 erasers for ₹ 40. Write a linear equation in two variables to represent this statement and draw its graph.

Section – E

Section E consists of 3 case study based questions of 4 marks each.

36. Mathematics teacher at a school took her 9th standard students to show Red Fort. It was part of the educational trip. The teacher had an interest in History as well. She narrated the facts of Red Fort to students. Then the teacher said in this monument one can find a combination of solid figures. There are 2 pillars which are cylindrical in shape. Also 2 domes at the corners which are hemispherical. 7 smaller domes at the centre. Flag hoisting ceremony on Independence Day takes place near these domes.



- (i) How much cloth will be required to cover 2 big domes each of radius 2.5 metres?
- (ii) What is the volume of a hemisphere if the radius of the base is 3.5 m?
- (iii) What is the ratio of the sum of volumes of two hemispheres of radius 1 cm each to the volume of a sphere of radius 2 cm?

OR

Write the formula for the surface area and volume of the hemisphere.

37. A stopwatch was used to find the time that it took a group of jockey to run 1000 m race.



Time (in seconds)	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Number of participants (jockey)	8	10	13	6	3

- (i) How many participants finished the race within 1 minute?
- (ii) The class mark of the class interval during which least number of participants (jockey) completed the race is _____.
- (iii) In which class interval 40 (seconds) is included? The upper class limit of the smallest class interval is _____.

OR

Formula to calculate the adjusted frequency is _____ and the formula to calculate the class mark is _____.

38. Based on the given image, answer the following questions:



- a. If the front of the tent has triangular entrance which is equilateral triangle of side length 4 m, what is the area covered by the entrance?
- b. The side lengths of the triangular back of the tent are 8 m, 8 m and 7 m. What is the area of the triangular back?

OR

Write the Heron's formula for scalene and equilateral triangle.

- c. Find the area of the tent material for 3 sides of the tent having the same measure as the back side of the tent.