Total number of printed pages : 4 *NB-N/M/1*

2021

Class IX (Phase-2)

MATHEMATICS

Total marks : 40 Time : 1½ hours

General Instructions:

i) Approximately 8 minutes is allotted to read the question paper and revise the answers.

ii) The question paper consists of 12 questions.

iii) All questions are compulsory.

iv) Internal choice has been provided in some questions.

v) Marks allocated to every question are indicated against it.

N.B: Check to ensure that all pages of the question paper is complete as indicated on the top left side.

Section - A

1. **Choose the correct answer from the given alternatives.**

(a) How many lines can pass through a single point? **1**

(i) 0 (ii) 1 (iii) 2 (iv) Infinite

(b) The sum of angles at a point is **1**

(i) 90° (ii)100° (iii) 180° (iv) 360°

(c) AD is the median of ΔABC. If ar(ΔABC) = 50 cm^2, then ar(ΔABD) is **1**

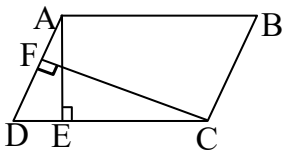
(i) 100 cm^2 (ii) 75 cm^2 (iii) 50 cm^2 (iv)25 cm^2

(d) Angle inscribed in a semi-circle is **1**

(i)60° (ii) 75° (iii) 90° (iv) 180°

Section - B

2. In the adjoining figure, ABCD is a parallelogram, AE ⊥ DC and CF ⊥ AD. If AB = 16 cm, AE = 8 cm and CF = 10 cm, find AD.



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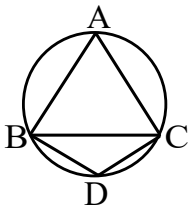
3. In the adjoining figure, ABC is an equilateral triangle and ABDC is a cyclic quadrilateral. Find ∠BDC



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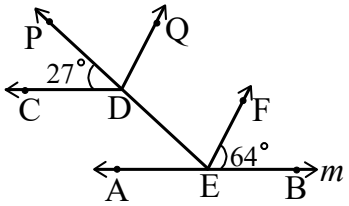
4. 29, 32, 48, 50, x, $x + 2$, 72, 78, 84, 95 are written in ascending order. If the median of the data is 63, find the value of x. **2**

Section - C

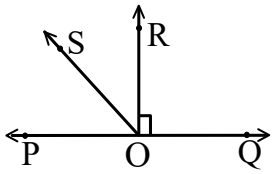
5. **a.** In the adjoining figure, EF || DQ and AB || CD. If ∠FEB = 64° and ∠PDC = 27°, then find ∠PDQ, ∠AED and ∠DEF



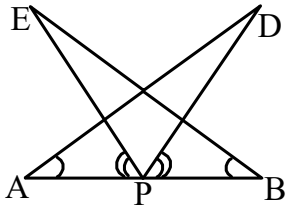
Or **3**

b. In the adjoining figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that:

$$\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$$

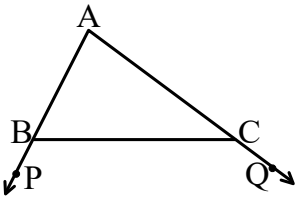


6. **a.** AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that: ∠BAD = ∠ABE and ∠EPA = ∠DPB. Show that:
(i) ΔDAP ≅ ΔEBP (ii) AD = BE



Or **3**

b. In the adjoining figure, sides AB and AC of ΔABC are extended to points P and Q respectively. Also, ∠PBC < ∠QCB. Show that AC > AB.



7. Construct a Δ XYZ in which ∠Y = 30°, ∠Z = 90° and XY + YZ + ZX = 11 cm. **3**

8. **a.** The floor of a rectangular hall has a perimeter 250 m. If the cost of painting the four walls at the rate of ₹10 per m^2 is ₹15000, find the height of the hall.

Or **3**

b. A dome of a building is in the form of a hemisphere. From inside it, it was white-washed at the cost of ₹1256. If the cost of white-washing is ₹2.00 per square metre, find the : (i) inside surface area of the dome, (ii) volume of the air inside the dome. [Use π = 3.14]

9. A study was conducted to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is as follows: **3**

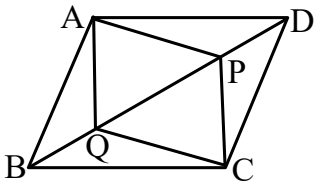
0.03 0.08 0.08 0.09 0.04 0.17 0.16 0.05 0.02 0.06 0.18 0.20
0.11 0.08 0.12 0.13 0.22 0.07 0.08 0.01 0.10 0.06 0.09 0.18
0.11 0.07 0.05 0.07 0.01 0.04

(i) Make a grouped frequency distribution table for this data with class intervals as 0.00 - 0.04, 0.04 - 0.08, and so on.

(ii) For how many days was the concentration of sulphur dioxide less than 0.08 parts per million?

Section – D

10. **a.** In parallelogram ABCD, two points P and Q are taken on diagonal BD such that DP = BQ. Show that APCQ is a parallelogram.



Or **5**

b. 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.

11. **a.** Find:

(i) the lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high.

(ii) how much steel was actually used, if $\frac{1}{12}$ of the steel actually used was wasted in making the tank.

Or **5**

b. The volume of a right circular cone is 9856 cm^3. If the diameter of the base is 28 cm, find the: (i) height of the cone, (ii) slant height of the cone, (iii) curved surface area of the cone.

12. **a.** The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is represented in the following table:

Length (in mm)	118-126	127-135	136-144	145-153	154-162	163-171	172-180
Number of leaves	3	5	9	12	5	4	2

(i) Draw a histogram to represent the given data.

(ii) Is there any other suitable graphical representation for the same data?

(iii) Is it correct to conclude that the maximum number of leaves are 153 mm long? Why?

Or **5**

b. In a city, the weekly observations made in a study on the cost of living index are given in the following table:

Cost of living index	140-150	150-160	160-170	170-180	180-190	190-200
Number of weeks	5	10	20	9	6	2

Draw a frequency polygon for the data above (without constructing a histogram).

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