THE INDIAN PUBLIC SCHOOL, DEHRADUN
ANNUAL EXAMINATION- 2021
MATHEMATICS
CLASS IX

TIME: 3 hr 15 Mins   **MM: 80**
                                                                                    RST: 40

GENERAL INSTRUCTIONS

  (i)   **This question paper contains of two parts A and B**
  (ii) **Both parts A and B have internal choice.**

Part - A consists of 20 questions.

  (i)   **Questions 1 to 16 carry 1 mark each. Internal choice is provided in 2 questions.**
  (ii) **Question 17 to 20 based on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.**
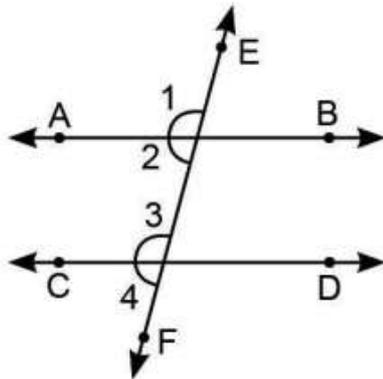
Part - A consists of 16 questions.

  (i)   **Questions 21 to 26 very short answer type questions of 2 marks.**
  (ii)   **Questions 27 to 33 short answer type questions of 3 marks.**
 **(iii)** **Questions 34 to 36 long answer type question of 5 marks each.**

Part A

(1-mark questions)

1. Simplify: $(\sqrt{3} - 1)(\sqrt{3} + 1)$
2. Find the value of the polynomial $2y^2 - 3y - 4 \ at \ (i) y = 5 \ (ii) y = -2$
3. In the given figure AB II CD, then find the value of $\angle 1 + \angle 4$

4. Find the volume of a sphere whose diameter is 14 cm.
5. In triangle ABC, the midpoints of BC, CA, AB are D, E, and F, respectively. Find the value of EF, if the value of BC = 14 cm
6. In ΔABC if BC = AB and angle B=80° then find the measure of angle A.
7. If each side of a cube is 10 cm. Find its surface area.
8. Find the mode of given data.

   15, 14, 19, 20, 14, 15, 16, 14, 15, 18, 14, 19, 15, 17, 15.
9. What is the median of 70, 40, 50, 100, 75, 75, 65 and 95?
10. Two coins are tossed simultaneously 500 times, and we get Two heads: 105 times One head : 275 times Find the probability of getting 0 head.
11. If the probability of winning a game is 0.4, what is the probability of losing it.
12. In which quadrants, the points (-5, 2) and (2, -5) lie?
13. In the given figure, find the value of x and y where O is the centre of the circle.
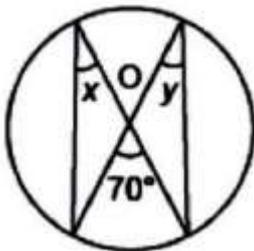
14. In the given figure, $\angle ABC = 95°, Find \angle ADC$
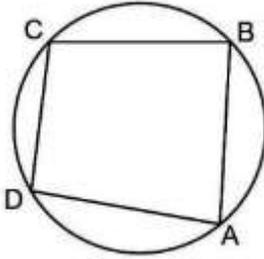
15. Find the area of an equilateral triangle with side $2\sqrt{3}$ cm.
16. Use Heron's formula to find the area of triangle whose sides are 12 cm, 6 cm, and 15 cm.
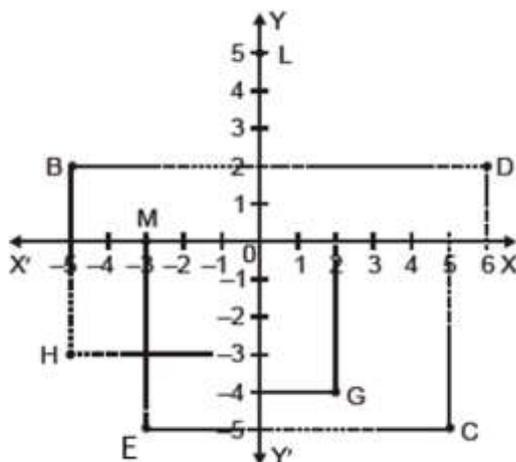

Questions based on case study.

17. **Read the passage given below and answer the any four questions.**

    Dev was doing an experiment to find the radius r of a sphere. For this he took a cylindrical container with radius R=7cm and height 10 cm.
    He filled the container almost half by water as shown in the figure. Now hr dropped the yellow sphere in the container.
    Now he observed as shown in the figure the water level in the container raised from A to B equal to 3.40 cm

Before dropping the ball   After dropping the ball
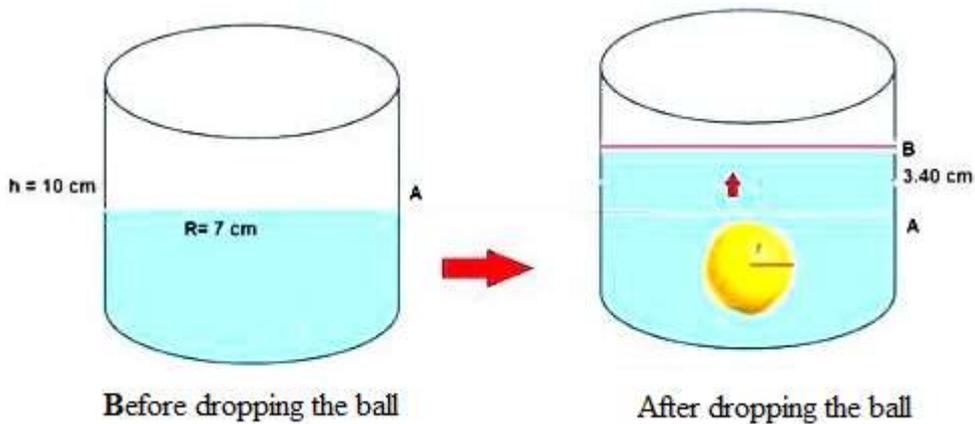
i. What is the approximate radius of the sphere?

   a. 7 cm

   b. 5 cm

   c. 4 cm

   d. 3 cm

ii. What is the volume of the cylinder?

   a. 700 cm³

   b. 500 cm³

   c. 1540 cm³

   d. 2000 cm³

iii. What is the volume of the sphere?

   a. 700 cm³

   b. 600 cm³

   c. 500 cm³

   d. 523.8 cm³

iv. How many litres water can be filled in the full container?(Take 1 litre = 1000 cm³)

   a. 1.50

   b. 1.44

   c. 1.54

   d. 2

v. What is the surface area of the sphere?

   a. $314.3 \ m^2$

   b. $300 \ m^2$

   c. $400 \ m^2$

   d. $350 \ m^2$

18. See the figure given below and write the answer of any four:

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1) The co-ordinates of B.
2) The point identified by the co-ordinates (2, –4).
3) The abscissa of the point D.
4) The ordinate of the point H.
5) The co-ordinates of the point L.

19. Read the Source/text given below and answer any four questions:

A healthcare survey was done by the state health and family welfare care board of the state of Punjab. The data is collected by forming age groups; 10-15, 20-25….. and so on. The overall data from a town is given below in the form of bar graph. Read the data carefully and answer the questions that follow:
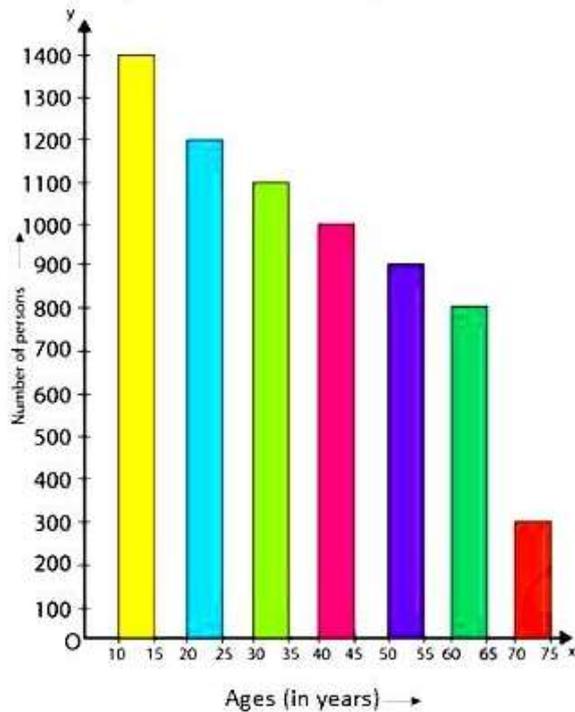
i. What is the percentage of the youngest age-group persons over those in the oldest age group?

    a. 400.56%

    b. 466.67%

    c. 500%

    d. 500.67%

ii. What is the total population of the town?

    a. 6800

    b. 7000

    c. 6700

    d. 6600

iii. How many persons are more in the age-group 10-15 than in the age group 30-35?

    a. 100

    b. 200

    c. 250

    d. 300

iv. What is the age-group of exactly 1200 persons living in the town?

    a. 20-25

    b. 10-15

    c. 15-20

    d. 25-30

v. What is the total number of persons living in the town in the age-groups 10-15 and 60-65?

    a. 2100

    b. 2000

    c. 2200

    d. 2400

20. The blood groups of 30 students of class IX are recorded as follows:

    A, B,   O, O, AB, O, A, O,   B, A, O, B, A, O, O,

    A, AB, O, A, A,   O, O, AB, B, A, O, B, A, B, O

Draw frequency table of above data

A student is selected at random from the class from blood donation.

Find the probability that the blood groups of the student chosen is:
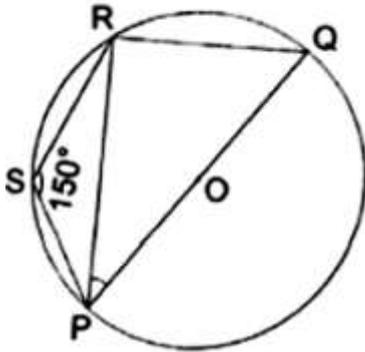
(i) A   (ii) B   (iii) AB   (iv) O

PART B
(2 marks questions)

21. The diameters of two cones are equal. If their slant heights are in the ratio 7 : 4, find the ratio of their curved surface area.

OR

In the given figure, POQ is a diameter and PORS is a cyclic quadrilateral. If $\angle PSR = 150°, \angle RPO$.

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22. Write four solution of the equation $4x + 3y = 12$

23. Find the length of the chord whose distance from the centre of a circle of radius 10 cm is 6 cm.

24. In the given figure l ‖ m, then find the value of x.
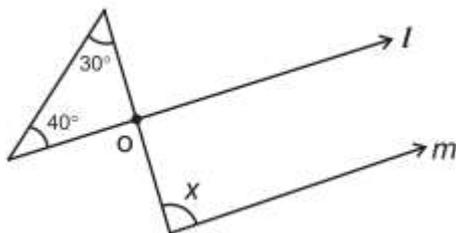
25. Represent $0.\overline{235}$ in the form of $\frac{p}{q}$ where p and q are integers and q≠0.

26. If (x − 3) is a factor of p(x) = x³ − kx² + (k + 1)x − 12, find the value of k

OR

Divided $p(x) = x^4 + x^3 - 2x^2 + x + 1$ by $(x - 1)$.

(3 marks questions)

27. A matchbox measures 4cm X 2.5 cm X 1.5 cm. what will be the volume of a packet containing 12 such boxes.

OR

Find the mean of the given below data

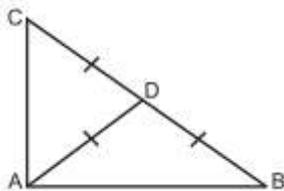| Item (x)	Frequency (f)
16	1
17	1
18	3
19	4
20	1
21	2

28. Construct a triangle whose three sides are 5.5 cm , 6 cm and 6 cm respectively.

29. If 3x + 2y = 12 and xy = 6, find the value of $9x^2 + 4y^2$.
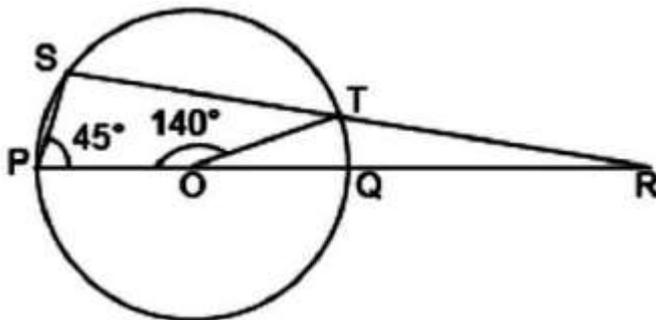
<div align="center">OR</div>

   Factorize: a) $t^2 + 5t - 6$ b) $64y^3 - 27x^3$
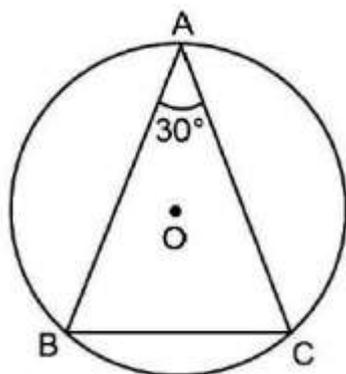
30. In the give figure, AD=BD=CD, find $\angle BAC$

31. If O is centre of circle as shown in the figure, find $\angle$ RQT and $\angle$ RTQ.

<div align="center">**OR**</div>

In the given figure, ABC is a triangle in which $\angle$ BAC = 30°. Show that BC is equal to the radius of the circumcircle of ∆ABC, whose centre is O.

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32.   Simplify: $\dfrac{\sqrt{2}}{\sqrt{6}-\sqrt{2}} - \dfrac{\sqrt{3}}{\sqrt{6}+\sqrt{2}}$

OR

Find the value of a and b

$\dfrac{4+3\sqrt{5}}{4-3\sqrt{5}} = a + b\sqrt{5}$

(5 marks questions)

34. Solve the following system of linear equations graphically.
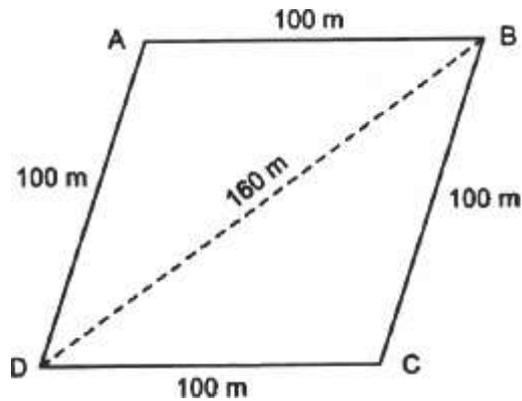
   $3x + y - 12 = 0$;

   $x - 3y + 6 = 0$

   Shade the region bounded by the lines and x-axis. Also, find the area of shaded region.

35. state and prove mid-point theorem.

OR

Parul has a piece of land which is in the shape of a rhombus (see fig.) She wants her daughter and son to work on the land and produce different crops. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonals is 160 m, how much area each of them will get for their crops?

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36. The radius and height of a right circular cone are in the ratio 4 : 3 and its volume is 2156 cu. cm. Find the curved surface area and the total surface area of the cone.

OR

Find the area of an isosceles triangle whose one side is 10 cm greater than each of its equal sides and perimeter is 100 cm.