BRAIN INTERNATIONAL SCHOOL
Session 2024-25

Class IX ANNUAL REVISION SHEET Subject - Mathematics

Sample Question Paper - 1

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment carrying 04 marks each.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

Section A

1. π is **[1]**

   a) a rational number b) an integer

   c) an irrational number d) a whole number

2. The linear equation $3x - 5y = 15$ has **[1]**

   a) no solution b) infinitely many solutions

   c) a unique solution d) two solutions

3. Two points having same abscissa but different ordinates lie on **[1]**

   a) y-axis b) x-axis

   c) a line parallel to y-axis d) a line parallel to x-axis

4. To draw a histogram to represent the following frequency distribution : **[1]**

Class interval	5-10	10-15	15-25	25-45	45-75
Frequency	6	12	10	8	15

   The adjusted frequency for the class 25-45 is

   a) 6 b) 5

   c) 2 d) 3

5. The graph of the linear equation $2x + 3y = 6$ is a line which meets the x-axis at the point **[1]**

   a) (0,3) b) (3,0)

c) (2, 0)

d) (0 ,2)

6. Euclid stated that all right angles are equal to each other in the form of **[1]**

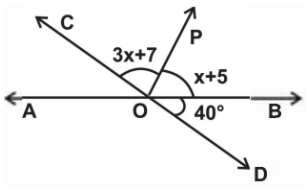
a) A postulate

b) A proof

c) An axiom

d) A definition

7. In the figure AB & CD are two straight lines intersecting at O, OP is a ray. What is the measure of $\angle AOD$. **[1]**



a) 128^o

b) 40^o

c) 140^o

d) 100^o

8. The diagonals AC and BD of a rectangle ABCD intersect each other at P. If $\angle ABD = 50^o$, then $\angle DPC$ = **[1]**

a) 70^o

b) 80^o

c) 90^o

d) 100^o

9. Zero of the zero polynomial is - **[1]**

a) every real number

b) 1

c) not defined

d) 0

10. Express y in terms of x in the equation 5x - 2y = 7. **[1]**

a) $y = \frac{5x-7}{2}$

b) $y = \frac{7-5x}{2}$

c) $y = \frac{7x+5}{2}$

d) $y = \frac{5x+7}{2}$

11. ABCD is a Rhombus such that $\angle ACB = 40^\circ$, then $\angle ADB$ is **[1]**

a) 100°

b) 40°

c) 60°

d) 50°

12. Diagonals of a quadrilateral ABCD bisect each other. If $\angle A = 45^o$, then $\angle B$ = **[1]**

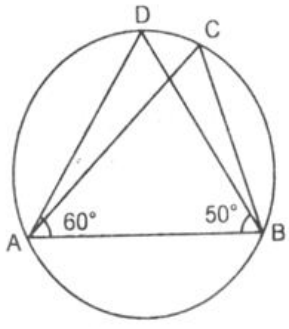
a) 125^o

b) 115^o

c) 120^o

d) 135^o

13. In the figure, if $\angle DAB = 60^o$, $\angle ABD = 50^o$, then $\angle ACB$ is equal to : **[1]**



a) 80^o

b) 60^o

c) 50^o

d) 70^o

14. The simplest form of $0.5\overline{7}$ is **[1]**

a) $\frac{26}{45}$ b) $\frac{57}{99}$

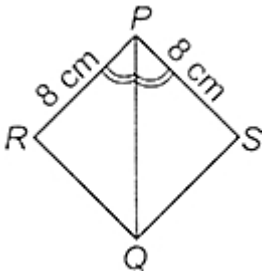
c) $\frac{57}{100}$ d) $\frac{57}{90}$

15. Which of the following point does not lie on the line y = 2x + 3? **[1]**

a) (-5, -7) b) (-1, 1)

c) (3, 9) d) (3, 7)

16. The congruence rule, by which the two triangles in the given figure are congruent is _____. **[1]**



a) ASA b) SAS

c) SSS d) RHS

17. In a histogram, which of the following is proportional to the frequency of the corresponding class? **[1]**

a) Width of the rectangle b) Length of the rectangle

c) Perimeter of the rectangle d) Area of the rectangle

18. The curved surface area of a cylinder and a cone is equal. If their base radius is same, then the ratio of the slant height of the cone to the height of the cylinder is **[1]**

a) 1 : 1 b) 2 : 3

c) 1 : 2 d) 2 : 1

19. **Assertion (A):** The sides of a triangle are 3 cm, 4 cm and 5 cm. Its area is 6 cm^2. **[1]**

Reason (R): If 2s = (a + b + c), where a, b, c are the sides of a triangle, then area = $\sqrt{(s-a)(s-b)(s-c)}$.

a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false. d) A is false but R is true.

20. **Assertion (A):** The point (1, 1) is the solution of x + y = 2. **[1]**

Reason (R): Every point which satisfy the linear equation is a solution of the equation.

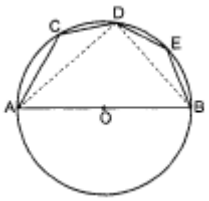
a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false. d) A is false but R is true.

Section B

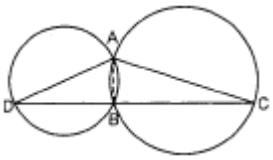
21. The base of an isosceles triangle measures 24 cm and its area is 192 cm^2. Find its perimeter. **[2]**

22. In given figure, AOB is a diameter of the circle and C, D, E are any three points on the semi-circle. Find the value of $\angle ACD + \angle BED$. **[2]**



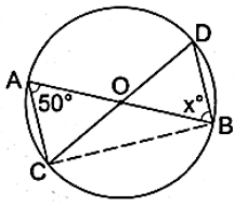
23. The outer diameter of a spherical shell is 10 cm and the inner diameter is 9 cm. Find the volume of the metal contained in the shell. **[2]**

24. In the given figure, two circles intersect at two points A and B. AD and AC are diameters to the two circles. Prove that B lies on the line segment DC. **[2]**



OR

If O is the centre of the circle, find the value of x in given figure:



25. Find whether the given equation have x = 2, y = 1 as a solution:x + y + 4 = 0. **[2]**

OR

Find whether $(\sqrt{2}, 4\sqrt{2})$ is the solution of the equation x – 2y = 4 or not?

Section C

26. Give three rational numbers between $\frac{1}{3}$ and $\frac{1}{2}$. **[3]**

27. Find the value of k, if x - 1 is a factor of p(x) in case: $p(x) = 2x^2 + kx + \sqrt{2}$ **[3]**

28. From a point in the interior of an equilateral triangle, perpendiculars are drawn on the three sides. The lengths of the perpendiculars are 14 cm, 10 cm and 6 cm. Find the area of the triangle. **[3]**

OR

The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 13 m, 14 m and 15 m. The advertisements yield an earning of Rs2000 per m^2 a year. A company hired one of its walls for 6 months. How much rent did it pay?

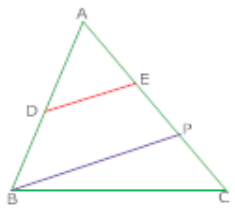
29. Find solutions of the form x = a, y = 0 and x = 0, y = b for the following pairs of equations. Do they have any common such solution? **[3]**

3x + 2y = 6 and 5x + 2y = 10

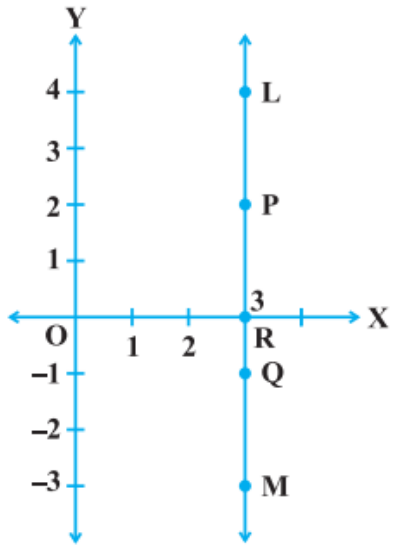
30. Show that the quadrilateral formed by joining the mid-points the sides of a rhombus, taken in order, form a rectangle. **[3]**

OR

In figure D is mid-points of AB. P is on AC such that PC = $\frac{1}{2}$ AP and DE || BP, then show that AE = $\frac{1}{3}$ AC.



31. In Figure, LM is a line parallel to the y-axis at a distance of 3 units. **[3]**



i. What are the coordinates of the points P, R and Q?

ii. What is the difference between the abscissa of the points L and M?

Section D

32. Find the values of a and b if $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}} = a + b\sqrt{5}$. **[5]**

OR

If $p = \frac{3-\sqrt{5}}{3+\sqrt{5}}$ and $q = \frac{3+\sqrt{5}}{3-\sqrt{5}}$, find the value of $p^2 + q^2$.

33. In the adjoining figure, name: **[5]**

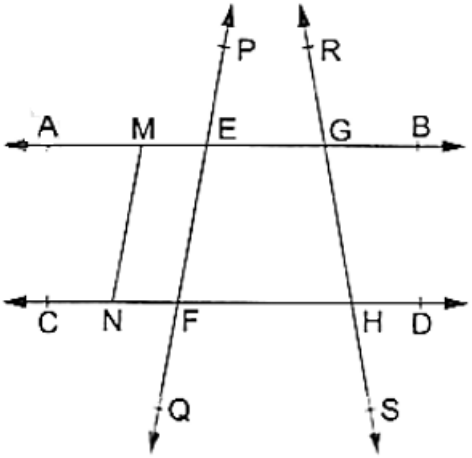
i. Six points

ii. Five line segments

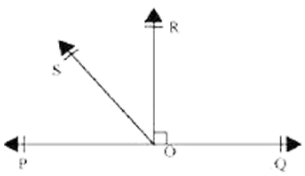
iii. Four rays

iv. Four lines

v. Four collinear points

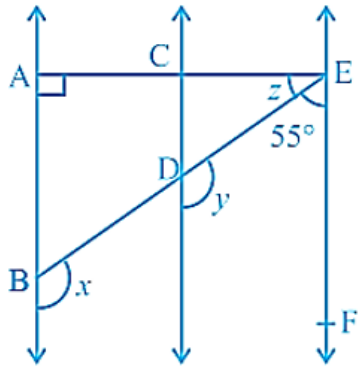


34. In the given figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$. **[5]**



OR

Fig., AB || CD and CD || EF. Also, EA ⊥ AB. If ∠BEF = 55°, find the values of x, y and z.



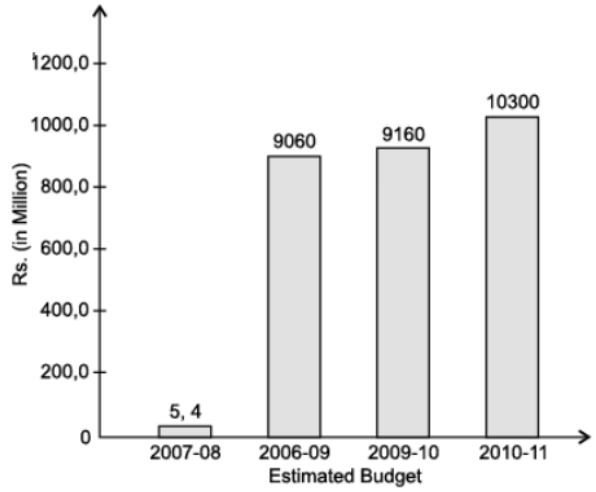
35. Find the values of a and b so that the polynomial $(x^4 + ax^3 - 7x^2 - 8x + b)$ is exactly divisible by $(x + 2)$ as well as $(x + 3)$. **[5]**

Section E

36. **Read the following text carefully and answer the questions that follow:** **[4]**

Ladli Scheme was launched by the Delhi Government in the year 2008. This scheme helps to make women strong and will empower a girl child. This scheme was started in 2008.

The expenses for the scheme are plotted in the following bar chart.



i. What are the total expenses from 2009 to 2011? (1)

ii. What is the percentage of no of expenses in 2009-10 over the expenses in 2010-11? (1)

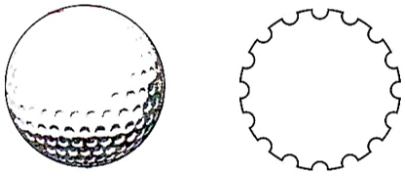
iii. What is the percentage of minimum expenses over the maximum expenses in the period 2007-2011? (2)

OR

What is the difference of expenses in 2010-11 and the expenses in 2006-09? (2)

37. **Read the following text carefully and answer the questions that follow:** **[4]**

A golf ball is spherical with about 300 - 500 dimples that help increase its velocity while in play. Golf balls are traditionally white but available in colours also. In the given figure, a golf ball has diameter 4.2 cm and the surface has 315 dimples (hemi-spherical) of radius 2 mm.



i. Find the surface area of one such dimple. (1)

ii. Find the volume of the material dug out to make one dimple. (1)

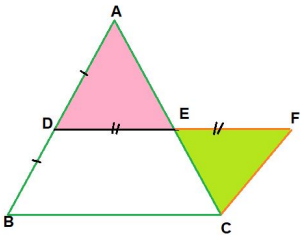
iii. Find the total surface area exposed to the surroundings. (2)

OR

Find the volume of the golf ball. (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

Haresh and Deep were trying to prove a theorem. For this they did the following



i. Draw a triangle ABC

ii. D and E are found as the mid points of AB and AC

iii. DE was joined and DE was extended to F so DE = EF

iv. FC was joined.

Questions:

i. △ADE and △EFC are congruent by which criteria? (1)

ii. Show that CF‖ AB. (1)

iii. Show that CF = BD. (2)

OR

Show that DF = BC and DF‖ BC. (2)

Sample Question Paper - 2

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment carrying 04 marks each.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

Section A

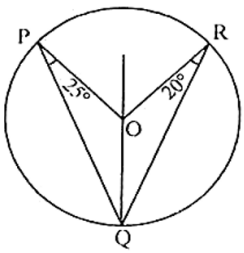
1. Abscissa of a point is negative in **[1]**

   a) quadrant IV only
   b) quadrant II and III
   c) quadrant I and IV
   d) quadrant I only

2. Each equal side of an isosceles triangle is 13 cm and its base is 24 cm Area of the triangle is : **[1]**

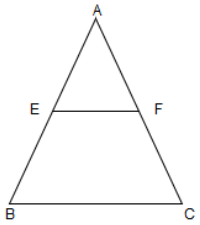
   a) $40\sqrt{3}\ cm^2$
   b) $25\sqrt{3}\ cm^2$
   c) 60 cm^2
   d) $50\sqrt{3}\ cm^2$

3. In the figure, O is the centre of the circle. If $\angle OPQ = 25^o$ and $\angle ORQ = 20^o$, then the measures of $\angle POR$ and $\angle PQR$ are respectively : **[1]**



   a) $150^o, 30^o$
   b) $120^o, 60^o$
   c) $90^o, 45^o$
   d) $60^o, 30^o$

4. E and F are the mid-points of the sides AB and AC of a △ABC. If AB = 6cm, BC = 5cm and AC = 6cm, Then EF is equal to **[1]**



a) 4 cm

b) 3 cm

c) 2.5 cm

d) 2 cm

5. The value of $\frac{2}{\sqrt{5}-\sqrt{3}}$ is **[1]**

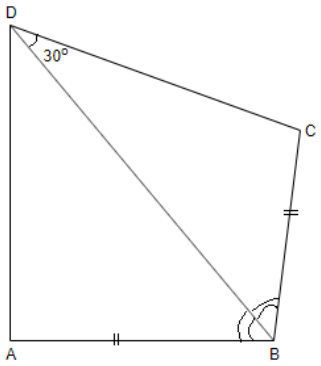
a) $\frac{1}{\sqrt{5}-\sqrt{3}}$

b) $\sqrt{5}-\sqrt{3}$

c) $\sqrt{5}+\sqrt{3}$

d) $\frac{1}{\sqrt{5}+\sqrt{3}}$

6. In the adjoining figure, AB = BC and ∠ABD = ∠CBD, then another angle which measures 30° is **[1]**



a) ∠BCA

b) ∠BCD

c) ∠BDA

d) ∠BAD

7. Express 'x' in terms of 'y' in the equation 2x – 3y – 5 = 0. **[1]**

a) $x = \frac{3y-5}{2}$

b) $x = \frac{3y+5}{2}$

c) $x = \frac{5-3y}{2}$

d) $x = \frac{3+5y}{2}$

8. Which of the following is a true statement? **[1]**

a) $5x^3$ is a monomial

b) $x^2 + 5x - 3$ is a linear polynomial

c) x + 1 is a monomial

d) $x^2 + 4x - 1$ is a binomial

9. If $x = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $y = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, then $x^2 + xy + y^2$ = **[1]**

a) 102

b) 101

c) 99

d) 98

10. In which of the following figures are the diagonals equal? **[1]**

a) Rhombus

b) Rectangle

c) Parallelogram

d) Trapezium

11. The number x = 1.242424..... can be expressed in the form $x = \frac{p}{q}$, where p and q are positive integers having no common factors. Then p + q equals **[1]**

a) 41

b) 74

c) 53

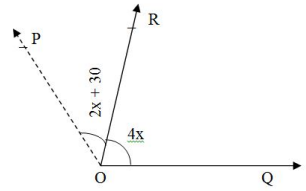
d) 72

12. The graph of the linear equation y = x passes through the point **[1]**

a) $\left(\frac{3}{2}, \frac{-3}{2}\right)$ b) $\left(0, \frac{3}{2}\right)$

c) $\left(\frac{-1}{2}, \frac{1}{2}\right)$ d) (1 ,1)

13. In the given figure, the value of x which makes POQ a straight line is: **[1]**



a) 40° b) 30°

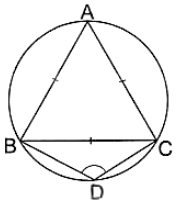
c) 35° d) 25°

14. If $\frac{3^{5x} \times 81^2 \times 6561}{3^{2x}} = 3^7$, then x = **[1]**

a) $-\frac{1}{3}$ b) 3

c) -3 d) $\frac{1}{3}$

15. In the given figure, equilateral △ABC is inscribed in a circle and ABCD is a quadrilateral, as shown. Then, ∠BDC = ? **[1]**



a) 120° b) 60°

c) 150° d) 90°

16. The co-ordinates of two points A and B are (4, 3) and (4, -5) respectively. The co-ordinates of the point at which the line segment AB meets the x-axis are **[1]**

a) (-5, 0) b) (3, 0)

c) (0, 4) d) (4, 0)

17. The graph of x + y = 6 intersect coordinate axes at **[1]**

a) Both (0, 6) and (6, 0) b) (6, 0)

c) (0, 6) d) (2, 3)

18. Let f(x) be a polynomial such that $f\left(-\frac{1}{2}\right) = 0$, then a factor of f(x) is **[1]**

a) X + 1 b) 2x + 1

c) X - 1 d) 2x - 1

19. **Assertion (A):** ABCD is a square. AC and BD intersect at O. The measure of ∠AOB = 90^o. **[1]**

Reason (R): Diagonals of a square bisect each other at right angles.

a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false. d) A is false but R is true.

20. **Assertion (A):** 0.271 is a terminating decimal and we can express this number as $\frac{271}{1000}$ which is of the form $\frac{p}{q}$, where p and q are integers and q $\neq$ 0. **[1]**

Reason (R): A terminating or non-terminating decimal expansion can be expressed as rational number.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

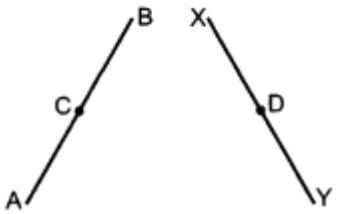
c) A is true but R is false.

d) A is false but R is true.

Section B

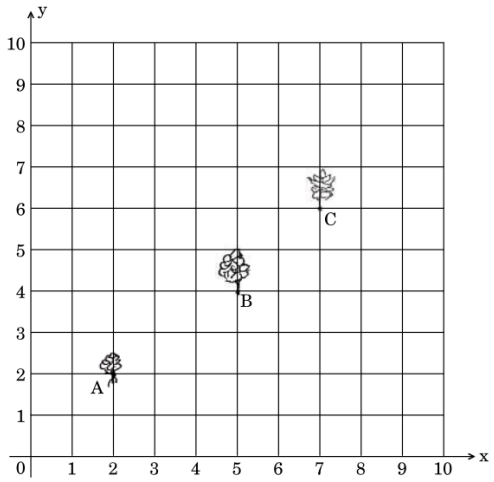
21. Look at the Fig. Show that length AH > sum of lengths of AB + BC + CD. **[2]**

22. In fig. AC = XD, C is the mid-point of AB and D is the mid-point of XY. Using a Euclid's axiom, show that AB = XY. **[2]**



23. Seema has a 10 m $\times$ 10 m kitchen garden attached to her kitchen. She divides it into a 10 $\times$ 10 grid and wants to grow some vegetables and herbs used in the kitchen. She puts some soil and manure in that and sows a green chilly plant at A, a coriander plant at B and a tomato plant at C. **[2]**

Her friend Kusum visited the garden and praised the plants grown there. She pointed out that they seem to be in a straight line. See the below diagram carefully and answer the following questions :



i. Write the coordinates of the points A, B, and C taking the 10 $\times$ 10 grid as coordinate axes.

ii. By distance formula or some other formula, check whether the points are collinear.

24. Insert five rational numbers between $-\frac{2}{3}$ and $\frac{3}{4}$. **[2]**

OR

Evaluate: $(32)^{\frac{1}{5}} + (-7)^0 + (64)^{\frac{1}{2}}$.

25. The surface areas of two spheres are in the ratio 1 : 4. Find the ratio of their volumes. **[2]**

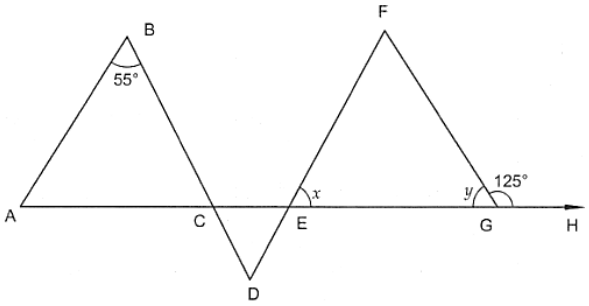
OR

A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius is 1 m, then find the volume of the iron used to make the tank.

Section C

26. Represent $\sqrt{9.3}$ on the number line. **[3]**

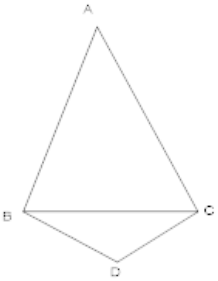
27. In Fig., if AB||DE and BD||FG such that ∠FGH = 125° and ∠B = 55°, find x and y. **[3]**



28. ABC is a triangle. D is a point on AB such that AD = $\frac{1}{4}$ AB and E is a point of AC such that AE = $\frac{1}{4}$ AC. Prove that DE = $\frac{1}{4}$ BC. **[3]**

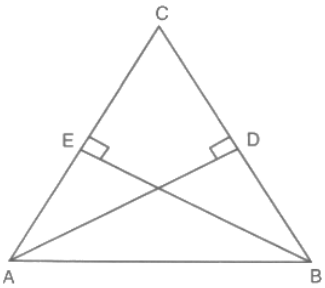
29. Find four solutions for the following equation :12x + 5y = 0 **[3]**

30. In the given figure, ABC and DBC are two triangles on the same base BC such that AB = AC and DB = DC. Prove that ∠ABD = ∠ACD, **[3]**



OR

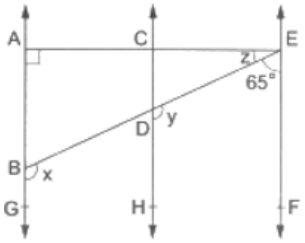
In given figure, AD and BE are respectively altitudes of a triangle ABC such that AE = BD. Prove that AD = BE.



31. Factorise: $2x^3 - 3x^2 - 17x + 30$ **[3]**

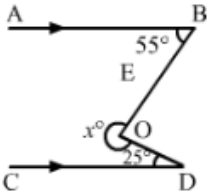
Section D

32. In the given figure, AB || CD || EF, $\angle DBG = x, \angle EDH = y, \angle AEB = z, \angle EAB = 90^\circ$ and $\angle BEF = 65^\circ$. Find the values of x, y and z. **[5]**



OR

In each of the figures given below, AB || CD. Find the value of x°



33. The diagonals of a quadrilateral ABCD are perpendicular. Show that the quadrilateral, formed by joining the mid-points of its sides, is a rectangle. **[5]**

34. The difference between the sides at right angles in a right-angled triangle is 14 cm. The area of the triangle is 120 cm^2. Calculate the perimeter of the triangle. **[5]**

OR

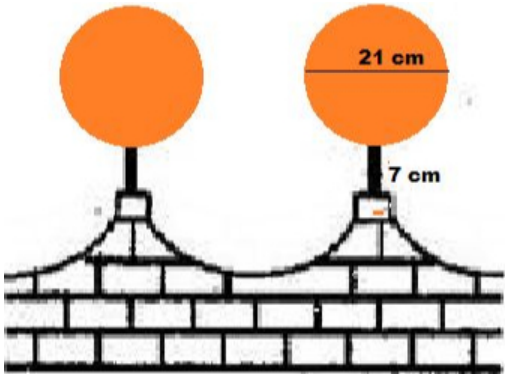
If each side of a triangle is doubled, then find the ratio of area of new triangle thus formed and the given triangle.

35. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $x + 1$ leave remainder 19. Find the remainder when p(x) is divided by $x + 2$. **[5]**

Section E

36. **Read the following text carefully and answer the questions that follow:** **[4]**

The front compound wall of a house is decorated by wooden spheres of diameter 21 cm, placed on small supports as shown in figure. 25 such spheres are used for this purpose and are to be painted silver. Each support is a cylinder and is to be painted black.



i. what will be the total surface area of the spheres all around the wall? (1)

ii. Find the cost of orange paint required if this paint costs 20 paise per cm^2. (1)

iii. How much orange paint in liters is required for painting the supports if the paint required is 3 ml per cm^2? (2)

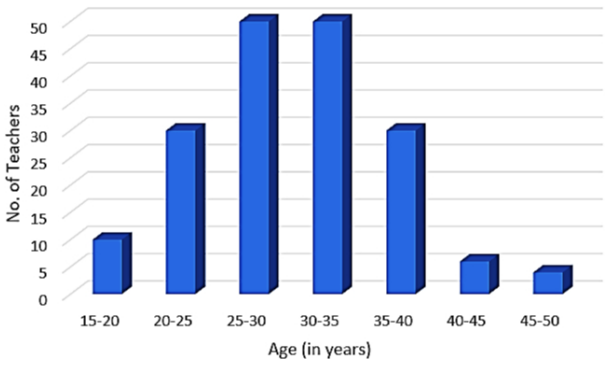
OR

What will be the volume of total spheres all around the wall? (2)

37. **Read the following text carefully and answer the questions that follow:** **[4]**

A teacher is a person whose professional activity involves planning, organizing, and conducting group activities to develop student's knowledge, skills, and attitudes as stipulated by educational programs. Teachers may work with students as a whole class, in small groups or one-to-one, inside or outside regular classrooms. In this indicator, teachers are compared by their average age and work experience measured in years.

For the same in 2015, the following distribution of ages (in years) of primary school teachers in a district was collected to evaluate the teacher on the above-mentioned criterion.



i. What is the total no of teachers? (1)

ii. Find the class mark of class 15 - 20, 25 - 30 and 45 - 50? (1)

iii. What is the no of teachers of age range 25 - 40 years? (2)

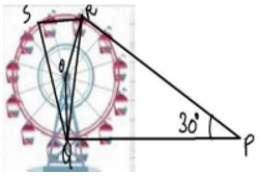
OR

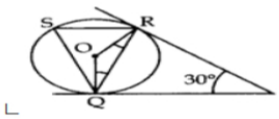
Which classes are having same no. of teachers? (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

A Ferris wheel (or a big wheel in the United Kingdom) is an amusement ride consisting of a rotating upright wheel with multiple passenger-carrying components (commonly referred to as passenger cars, cabins, tubs, capsules, gondolas, or pods) attached to the rim in such a way that as the wheel turns, they are kept upright, usually by gravity.

After taking a ride in Ferris wheel, Aarti came out from the crowd and was observing her friends who were enjoying the ride . She was curious about the different angles and measures that the wheel will form. She forms the figure as given below





i. Find ∠ROQ. (1)

ii. Find ∠RQP. (1)

iii. Find ∠RSQ. (2)

OR

Find ∠ORP. (2)

Sample Question Paper - 3

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment carrying 04 marks each.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

Section A

1. The point which lies on y-axis at a distance of 6 units in the positive direction of y-axis is **[1]**

   a) (-6, 0) b) (0, -6)

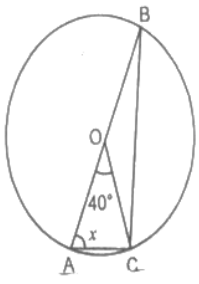
   c) (6, 0) d) (0, 6)

2. The perimeter of an equilateral triangle is 60 m. The area is **[1]**

   a) $10\sqrt{3}\ m^2$ b) $20\sqrt{3}\ m^2$

   c) $15\sqrt{3}\ m^2$ d) $100\ \sqrt{3}\ m^2$

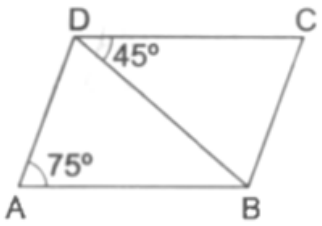
3. In a figure, O is the centre of the circle with AB as diameter. If $\angle AOC = 40^o$, the value of x is equal to **[1]**



   a) 80^o b) 50^o

   c) 70^o d) 60^o

4. In the given figure, ABCD is a parallelogram in which ∠BDC = 45° and ∠BAD = 75°. Then, ∠CBD = ? **[1]**



a) 60^o b) 45^o

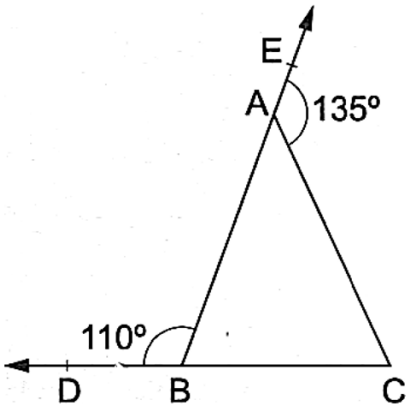
c) 75^o d) 55^o

5. The product $\sqrt[3]{2} \cdot \sqrt[4]{2} \cdot \sqrt[12]{32}$ is equal to **[1]**

a) $\sqrt[12]{2}$ b) 2

c) $\sqrt{2}$ d) $\sqrt[12]{32}$

6. In the given figure, the sides CB and BA of $\triangle$ABC have been produced to D and E respectively such that $\angle ABD = 110^\circ$ and $\angle CAE = 135^\circ$. Then, $\angle ACB$ = ? **[1]**



a) 35^o b) 45^o

c) 65^o d) 55^o

7. If x = 3 and y = -2 satisfies 5x - y = k, then the value of k is **[1]**

a) 3 b) 17

c) 12 d) -2

8. The degree of the zero polynomial is **[1]**

a) 0 b) any natural number

c) 1 d) not defined

9. The decimal form of $\frac{2}{11}$ is **[1]**

a) 0.018 b) 0.18

c) $0.\overline{18}$ d) $0.0\overline{18}$

10. If one angle of a parallelogram is 24^o less than twice the smallest angle, then the measure of the largest angle of the parallelogram is **[1]**

a) 112^o b) 68^o

c) 176^o d) 102^o

11. $9^3 + (-3)^3 - 6^3$ = ? **[1]**

a) 540 b) 486

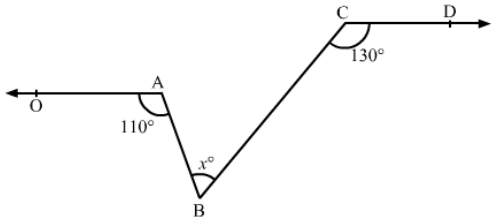
c) 270 d) 432

12. The equation x - 2 = 0 on number line is represented by **[1]**

a) infinitely many lines b) two lines

c) a point d) a line

13. In the given figure, ∠OAB = 110^o and ∠BCD = 130^o then ∠ABC is equal to **[1]**



a) 50^o b) 60^o

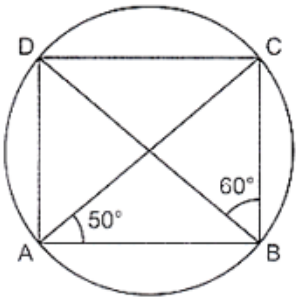
c) 40^o d) 70^o

14. If $\frac{5-\sqrt{3}}{2+\sqrt{3}} = x + y\sqrt{3}$, then **[1]**

a) x = -13, y = - 7 b) x = 13, y = -7

c) x = -13, y = 7 d) x = 13, y = 7

15. In Fig. ABCD is a cyclic quadrilateral. If $\angle BAC = 50^\circ$ and $\angle DBC = 60^\circ$ then find $\angle BCD$. **[1]**



a) 50° b) 60°

c) 70^o d) 55°

16. Which of the following points lies on the line y = 2x + 3? **[1]**

a) (2,8) b) (5,15)

c) (3,9) d) (4,12)

17. How many lines pass through two points? **[1]**

a) many b) three

c) two d) only one

18. Which one of the following is a polynomial? **[1]**

a) $\frac{x-1}{x+1}$ b) $\sqrt{2x} - 1$

c) $x^2 + \frac{3x^{\frac{3}{2}}}{\sqrt{x}}$ d) $\frac{x^2}{2} - \frac{2}{x^2}$

19. **Assertion (A):** In ΔABC, median AD is produced to X such that AD = DX. Then ABXC is a parallelogram. **[1]**

Reason (R): Diagonals AX and BC bisect each other at right angles.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** Three rational numbers between $\frac{2}{5}$ and $\frac{3}{5}$ are $\frac{9}{20}, \frac{10}{20}$ and $\frac{11}{20}$ **[1]**

Reason (B): A rational number between two rational numbers p and q is $\frac{1}{2}(p+q)$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

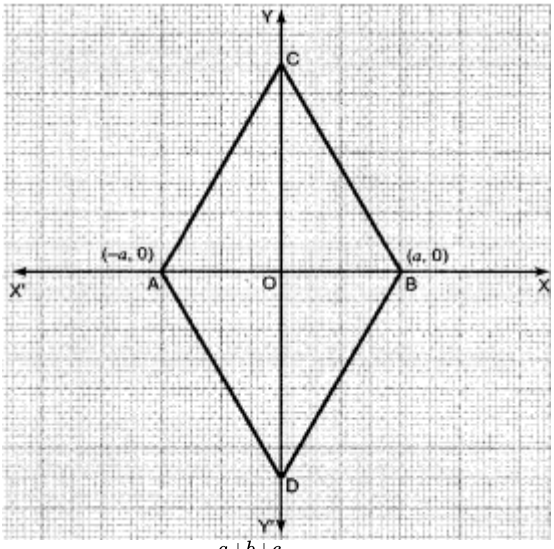
d) A is false but R is true.

Section B

21. If a point O lies between two points P and R such that PO = OR then prove that $\boldsymbol{PO = \frac{1}{2}PR}$. **[2]**

22. Why is Axiom 5, in the list of Euclid's axioms, considered a **universal truth**? **[2]**

23. In Fig., if ABC and ABD are equilateral triangles then find the coordinates of C and D. **[2]**



24. Prove that: $\frac{a+b+c}{a^{-1}b^{-1}+b^{-1}c^{-1}+c^{-1}a^{-1}}$ = abc **[2]**

OR

Express $0.3\overline{57}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

25. If the volume of a right circular cone of height 9 cm is 48π cm^3, find the diameter of its base. **[2]**

OR

A team of 10 interns and 1 professor from zoological department visited a forest, where they set up a conical tent for their accommodation. There they perform activities like planting saplings, yoga, cleaning lakes, testing the water for contaminants and pollutant levels and desilt the lake bed and also using the silt to strengthen bunds.

Find the radius and height of the tent if the base area of tent is 154 cm^2 and curved surface area of the tent is 396 cm^2.

Section C

26. Represent $\sqrt{4.5}$ on the number line. **[3]**

27. Draw a histogram for the daily earnings of 30 drug stores in the following table: **[3]**

Daily earnings (in ₹):	450 - 500	500 - 550	550 - 600	600 - 650	650 - 700
Number of Stores:	16	10	7	3	1

28. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC **[3]**

intersects AC at D. Show that

i. D is the mid-point of AC

ii. MD $\perp$ AC

iii. CM = MA = $\frac{1}{2}$AB

29. Write linear equation 3x + 2y =18 in the form of ax + by + c = 0. Also write the values of a, b and c. Are (4, 3) and (1, 2) solution of this equation? **[3]**

30. Following are the marks of a group of 92 students in a test of reading ability : **[3]**

Marks	50-52	47-49	44-46	41-43	38-40	35-37	32-34	Total
Number of students	4	10	15	18	20	12	13	92

Construct a frequency polygon for the above data.

OR

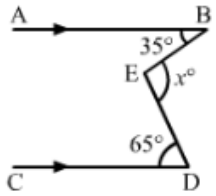
Draw a frequency polygon for the following distribution:

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	7	10	6	8	12	3	2	2

31. The polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by (x - 4) leave the remainders R_1 and R_2 respectively. Find the values of a if $R_1 + R_2 = 0$ **[3]**

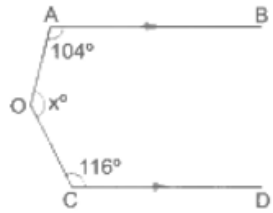
Section D

32. In each of the figures given below, AB $\parallel$ CD. Find the value of x° in each case. **[5]**



OR

In the given figure, AB $\parallel$ CD and $\angle AOC = x^\circ$. If $\angle OAB = 104^\circ$ and $\angle OCD = 116^\circ$, find the value of x.



33. An iron pillar consists of a cylindrical portion 2.8 m high and 20 cm in diameter and a cone 42 cm high is surmounting it. Find the weight of the pillar, given that 1 cm^3 of iron weighs 7.5 g. **[5]**

34. Find the percentage increase in the area of a triangle if its each side is doubled. **[5]**

OR

The sides of a triangle are in the ratio 5 : 12 : 13 and its perimeter is 150 m. Find the area of the triangle.

35. Find the integral roots of the polynomial $f(x) = x^3 + 6x^2 + 11x + 6$. **[5]**

Section E

36. **Read the following text carefully and answer the questions that follow:** **[4]**

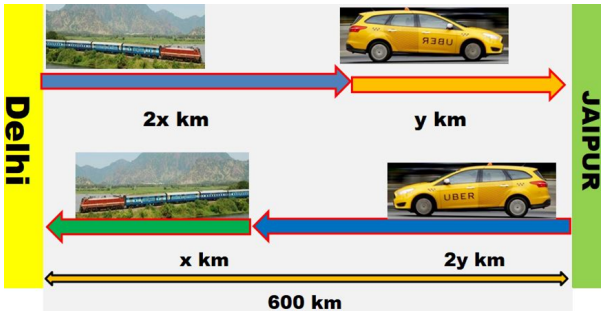
Ajay lives in Delhi, The city of Ajay's father in laws residence is at Jaipur is 600 km from Delhi. Ajay used to travel this 600 km partly by train and partly by car.

He used to buy cheap items from Delhi and sale at Jaipur and also buying cheap items from Jaipur and sale at

Delhi.

Once From **Delhi to Jaipur** in forward journey he covered 2x km by train and the rest y km by taxi.

But, while returning he did not get a reservation from Jaipur in the train. So first 2y km he had to travel by taxi and the rest x km by Train. From Delhi to Jaipur he took 8 hrs but in returning it took 10 hrs.



i. Write the above information in terms of equation. (1)

ii. Find the value of x and y? (1)

iii. Find the speed of Taxi? (2)

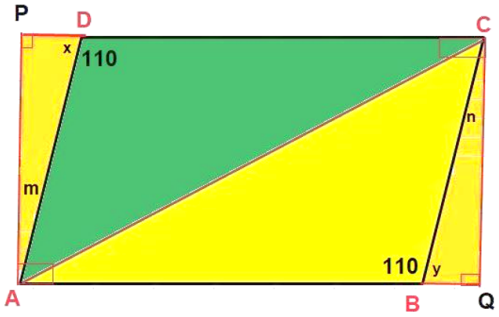
OR

Find the speed of Train? (2)

37. **Read the following text carefully and answer the questions that follow:** **[4]**

In the middle of the city, there was a park ABCD in the form of a parallelogram form so that AB = CD, AB||CD and AD = BC, AD || BC.

Municipality converted this park into a rectangular form by adding land in the form of ΔAPD and Δ BCQ. Both the triangular shape of land were covered by planting flower plants.



i. Show that ΔAPD and ΔBQC are congruent. (1)

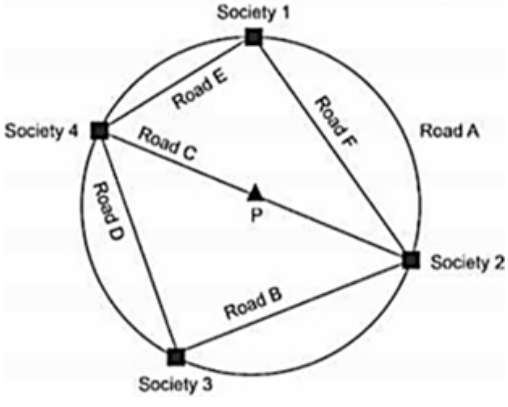
ii. PD is equal to which side? (1)

iii. Show that ΔABC and ΔCDA are congruent. (2)

OR

What is the value of ∠m? (2)

38. Two new roads, Road E and Road F were constructed between society 4 and 1 and society 1 and 2. **[4]**



i. What would be the measure of the sum of angles formed by the straight roads at Society 1 and society 3?

a. 60^o

b. 90^o

c. 180^o

d. 360^o

ii. Krish says, The distance to go from society 4 to society 2 using Road D will be longer that the distance using Road E. Is Krish correct? Justify your answer with examples.

iii. Road G, perpendicular to Road F was constructed to connect the park and Road F. Which of the following is true for Road G and Road F?

a. Road G and road F are of same length.

b. Road F divides Road G into two equal parts.

c. Road G divides Road F into two equal parts.

d. The length of road G is one-fourth of the length of Road F.

iv. Priya said, Minor arc corresponding to Road B is congruent to minor arc corresponding to Road D. Do you agree with Priya? Give reason to supportyour answer.

Sample Question Paper -4

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment carrying 04 marks each.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

Section A

1. $\sqrt[5]{6} \times \sqrt[5]{6}$ is equal to **[1]**

   a) $\sqrt[5]{36}$ b) $\sqrt[5]{6}$

   c) $\sqrt[5]{6 \times 0}$ d) $\sqrt[5]{12}$

2. For the equation 5x – 7y = 35, if y = 5, then the value of 'x' is **[1]**

   a) 12 b) -12

   c) -14 d) 14

3. Point (- 10,0) lies **[1]**

   a) on the negative direction of the y-axis b) on the negative direction of the X-axis

   c) in the third quadrant d) in the fourth quadrant

4. In a bar graph if 1 cm represents 30 km, then the length of bar needed to represent 75 km is **[1]**

   a) 3.5 cm b) 2.5 cm

   c) 2 cm d) 3 cm

5. The force applied on a body is directly proportional to the acceleration produced on it. The equation to represent the above statement is **[1]**

   a) y = kx b) y = x

   c) y + x = 0 d) y - x = 0

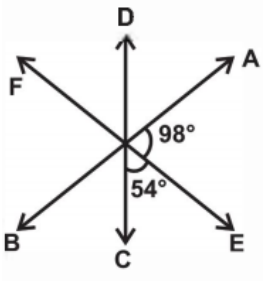
6. How many dimensions does a point have? **[1]**

a) 3 b) 2

c) 0 d) 1

7. In the figure AB, CD & EF are three Straight lines intersecting at O. **[1]**

The measure of $\angle AOF$ is-



a) 82° b) 152°

c) 54° d) 98°

8. ABCD is a trapezium in which AB || DC. M and N are the mid-points of AD and BC respectively. If AB = 12 cm, MN = 14 cm, then CD = **[1]**

a) 10 cm b) 14 cm

c) 12 cm d) 16 cm

9. The value of 'a' for which (x + a) is a factor of the polynomial $x^3 + ax^2 - 2x + a + 6$ is **[1]**

a) 0 b) 1

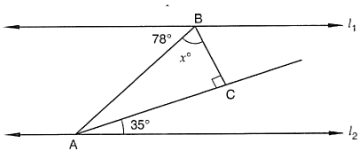
c) 2 d) -2

10. If we multiply both sides of a linear equation with a non-zero number, then the solution of the linear equation: **[1]**

a) Remains the same b) Changes in case of multiplication only

c) Changes in case of division only d) Changes

11. In figure, for which value of x is $l_1 \| l_2$? **[1]**



a) 43 b) 37

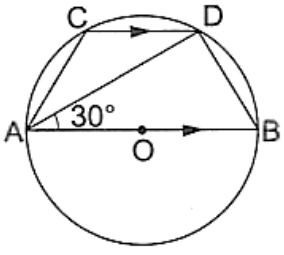
c) 45 d) 47

12. The figure formed by joining the mid-points of the adjacent sides of a rhombus is a **[1]**

a) trapezium b) rectangle

c) square d) Parallelogram

13. In the given figure, AOB is a diameter of a circle and CD || AB. If $\angle BAD = 30°$, then $\angle CAD$ = ? **[1]**



a) 45°

b) 60°

c) 50°

d) 30°

14. The value of $\sqrt[4]{(64)^{-2}}$ is **[1]**

a) $\frac{1}{2}$

b) $\frac{1}{8}$

c) $\frac{1}{16}$

d) $\frac{1}{4}$

15. The equation of x-axis is **[1]**

a) y = 0

b) x = 0

c) y = k

d) x = k

16. In $\triangle$PQR, $\angle$R = $\angle$P and QR = 4 cm and PR = 5 cm. Then the length of PQ is **[1]**

a) 2.5 cm

b) 4 cm

c) 5 cm

d) 2 cm

17. The value of $\frac{(0.013)^3+(0.007)^3}{(0.013)^2-0.013\times0.007+(0.007)^2}$, is **[1]**

a) 0.0091

b) 0.02

c) 0.006

d) 0.00185

18. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1cm and the height of the cone is equal to its radius. The volume of the solid is **[1]**

a) $\pi\ cm^3$

b) $4\pi\ cm^3$

c) $2\pi\ cm^3$

d) $3\pi\ cm^3$

19. **Assertion (A):** The sides of a triangle are in the ratio of 25 : 14 : 12 and its perimeter is 510 cm. Then the area of the triangle is 4449.08 cm^2. **[1]**

Reason (R): Perimeter of a triangle = a + b + c, where a, b, c are sides of a triangle.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) R is not the correct explanation of A.

d) A is false but R is true.

20. **Assertion (A):** The equation of 2x + 5 = 0 and 3x + y = 5 both have degree 1. **[1]**

Reason (R): The degree of a linear equation in two variables is 2.

a) Both A and R are true and R is the correct explanation of A.

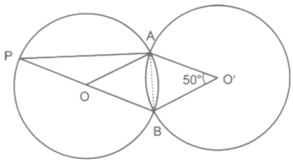
b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

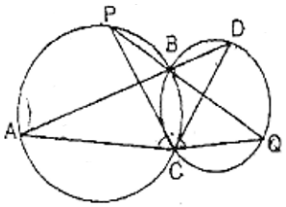
Section B

21. In a given figure, two congruent circles with centres O and O' intersect at A and B. If $\angle$AOB = 50°, then find $\angle$APB. **[2]**



22. Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540 cm. Find its area. **[2]**

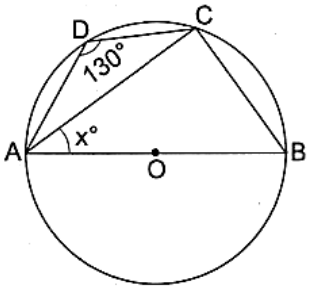
23. Two circles intersect at two points B and C. Through B, two line segments ABD and PBQ are drawn to intersect the circles at A, D, P, Q respectively (see figure). Prove that ACP = QCD. **[2]**



24. Find the length of a chord which is at a distance of 5 cm from the centre of a circle of radius 10 cm. **[2]**

OR

In the given figure, O is the centre of a circle and ∠ADC = 130°. If ∠BAC = x°, then find the value of x.



25. Find whether (2, 0) is the solution of the equation x – 2y = 4 or not? **[2]**

OR

Find whether the given equation have x = 2, y = 1 as a solution:

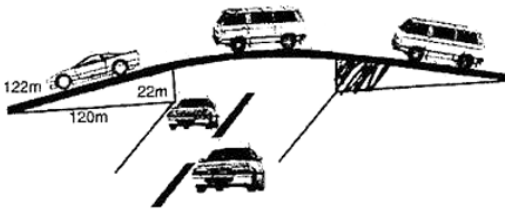
2x – 3y = 1

Section C

26. You know that $\frac{1}{7} = 0.\overline{142857}$. Can you predict what the decimal expansions of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$ are, without actually doing the long division? If so, how? **[3]**

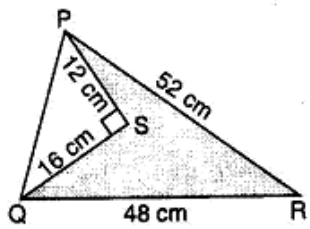
27. Find the value of the polynomial $3x^3 - 4x^2 + 7x + 5$, when x = 3 and also when x = - 3. **[3]**

28. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m (see Fig.). The advertisements yield an earning of ₹ 5000 per m^2 per year. A company hired one of its walls for 3 months. How much rent did it pay? **[3]**



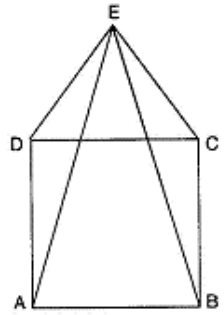
OR

Find the area of the shaded region in figure.



29. The internal and external diameters of a hollow hemispherical vessel are 20 cm and 28 cm respectively. Find the cost of painting the vessel all over at 35 paise per cm^2. **[3]**

30. ABCD is a square and DEC is an equilateral triangle. Prove that AE = BE. **[3]**



OR

BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

31. Draw the graphs of y = x and y = -x in the same graph. Also find the co-ordinates of the point where the two lines intersect. **[3]**

Section D

32. Represent each of the numbers $\sqrt{5}, \sqrt{6}$ and $\sqrt{7}$ the real line. **[5]**

OR

Simplify: $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$.

33. In the adjoining figure, name: **[5]**

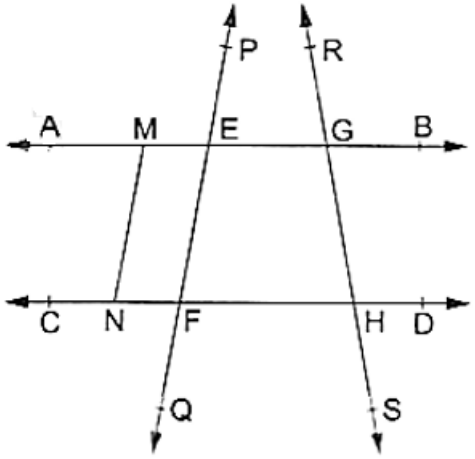
i. Six points

ii. Five line segments

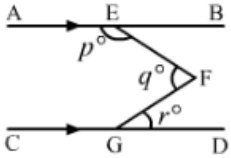
iii. Four rays

iv. Four lines

v. Four collinear points



34. In the given figure, AB || CD. Prove that p + q - r = 180. **[5]**



OR

If two lines intersect, prove that the vertically opposite angles are equal.

35. The following table gives the distribution of students of two sections according to the marks obtained by them: **[5]**

Section A		**Section B**	
Marks	Frequency	Marks	Frequency

0-10	3	0-10	5
10-20	9	10-20	19
20-30	17	20-30	15
30-40	12	30-40	10
40-50	9	40-50	1

Represent the marks of the students of both the sections on the same graph by frequency polygons. From the two polygons compare the performance of the two sections.

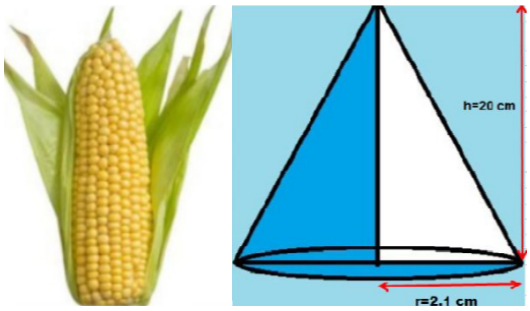
Section E

36. **Read the following text carefully and answer the questions that follow:** **[4]**

Once upon a time in Ghaziabad was a corn cob seller. During the lockdown period in the year 2020, his business was almost lost.

So, he started selling corn grains online through Amazon and Flipcart. Just to understand how many grains he will have from one corn cob, he started counting them.

Being a student of mathematics let's calculate it mathematically. Let's assume that one corn cob (see Fig.), shaped somewhat like a cone, has the radius of its broadest end as 2.1 cm and length as 20 cm.



i. Find the curved surface area of the corn cub. (1)

ii. What is the volume of the corn cub? (1)

iii. If each 1 cm^2 of the surface of the cob carries an average of four grains, find how many grains you would find on the entire cob? (2)

OR

How many such cubs can be stored in a cartoon of size 20 cm $\times$ 25 cm $\times$ 20 cm. (2)

37. **Read the following text carefully and answer the questions that follow:** **[4]**

Peter, Kevin James, Reeta and Veena were students of Class 9th B at Govt Sr Sec School, Sector 5, Gurgaon.

Once the teacher told **Peter to think a number x and to Kevin to think another number y** so that the difference of the numbers is 10 (x > y).

Now the teacher asked James to add double of Peter's number and that three times of Kevin's number, the total was found 120.

Reeta just entered in the class, she did not know any number.

The teacher said Reeta to form the 1st equation with two variables x and y.

Now Veena just entered the class so the teacher told her to form 2nd equation with two variables x and y.

Now teacher Told Reeta to find the values of x and y. Peter and kelvin were told to verify the numbers x and y.

i. What are the equation formed by Reeta and Veena? (1)

ii. What was the equation formed by Veena? (1)

iii. Which number did Peter think? (2)

OR

Which number did Kelvin think? (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

Harish makes a poster in the shape of a parallelogram on the topic SAVE ELECTRICITY for an inter-school competition as shown in the follow figure.

i. If $\angle A = (4x + 3)^o$ and $\angle D = (5x - 3)^o$, then find the measure of $\angle B$. (1)

ii. If $\angle B = (2y)^o$ and $\angle D = (3y - 6)^o$, then find the value of y. (1)

iii. If $\angle A = (2x - 3)^o$ and $\angle C = (4y + 2)^o$, then find how x and y relate. (2)

OR

If AB = (2y - 3) and CD = 5 cm then what is the value of y? (2)