



DELHI PUBLIC SCHOOL
SAIL TOWNSHIP, RANCHI
ANNUAL EXAMINATION (2017-18)

Class:- IX
Time- 3 Hrs.

Subject:- Mathematics
M.M. - 80

General Instructions:-

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into 4 sections A,B,C, and D.
Section A comprises of 6 questions of 1 mark each.
Section B comprises of 6 questions of 2 marks each.
Section C comprises of 10 questions of 3 marks each.
Section D comprises of 8 questions of 4 marks each.
3. Use of calculator in not permitted.

SECTION-A

- Q.1. Evaluate : $(25)^{1/3} \times (5)^{1/3}$.
- Q.2. What is the distance of the point $(-1, -6)$ from y axis?
- Q.3. An angle is equal to five times its complement. Determine its measure.
- Q.4. In $\triangle ABC$, if $\angle A=40^\circ$ and $\angle B = 60^\circ$, then find which out of AB, BC or AC is the longest side of $\triangle ABC$.
- Q.5. Find the edge of a cube whose total surface area is 294 cm^2 .
- Q.6. In a cricket match, a batswoman hits a boundary 6 times out of 30 balls she plays. Find the probability that she did not hit a boundary.

SECTION-B

- Q.7. Check whether the polynomial $q(t) = 4t^3 + 4t^2 - t - 1$ is a multiple of $2t + 1$.
- Q.8. If $a+b+c = 9$ and $ab + bc + ca = 40$, then find the value of $a^2 + b^2 + c^2$.
- Q.9. Factorise $8a^3 - b^3 - 64c^3 - 24abc$
- Q.10. Show that the diagonals of a parallelogram divide it into four triangles of equal area.
- Q.11. Find the area of a triangle whose sides are 13 cm, 14cm and 15 cm. Also find the altitude drawn to the longest side.
- Q.12. Following table shows the marks scored by a group of 90 students in a Mathematics test of 100 marks.

Marks	0-20	20-30	30-40	40-50	50-60	60-70	70-80	80-100
Number of students	7	10	19	20	10	15	5	4

Find the probability that a student selected at random obtained

- (i) less than 40% marks.
- (ii) 60 or more marks.

P.T.O

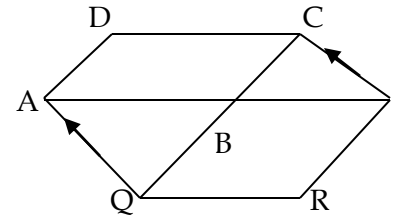
SECTION-C

Q.13 Rationalise $\frac{1}{\sqrt{7}+\sqrt{3}-\sqrt{2}}$.

Q.14 If $(x+2)$ and $(x-1)$ are the factors of $(x^3 + 10x^2 + mx + n)$, then find the values of m and n .

Q.15 Plot the points $A(1,3)$, $B(1, -1)$, $C(7,-1)$ and $D(7,3)$ in a cartesian plane. Join them in order and find the area of the figure so obtained.

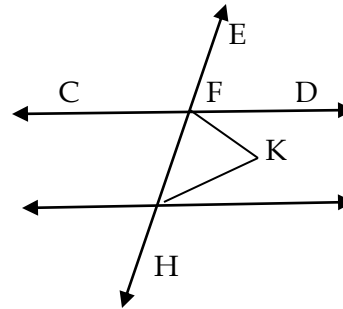
Q.16 The side AB of a parallelogram $ABCD$ is produced to any point P . A line through A and parallel to CP meets CB produced at Q and then parallelogram $PBQR$ is completed. Show that $\text{ar}(ABCD) = \text{ar}(PBQR)$



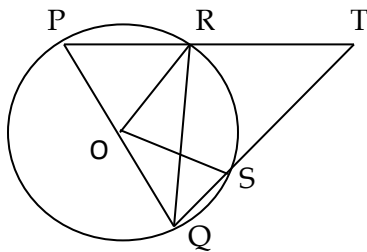
Q.17 Construct a triangle PQR in which $QR = 6\text{ cm}$, $\angle Q = 60^\circ$ and $PR - PQ = 2\text{ cm}$.

Q.18 Prove that the sum of two sides of a triangle is greater than twice the median drawn to the third side.

Q.19 In the given figure, find x, y and z if $AB \parallel CD$.



OR



In the given figure O is the centre of the circle and PQ is a diameter. If $\angle ROS = 40^\circ$, find x, y and z .

Q.20 The total surface area of a hollow cylinder which is open from both ends is 4620 cm^2 , area of base ring is 115.5 cm^2 and height 7 cm . Find the thickness of the cylinder.

OR

A semi circular metal sheet of diameter 28 cm is bent into an open conical cup. Find the depth and the capacity of the cup.

Q.21 A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm . If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel?

Q.22 Find the value of p , if the mean of the following distribution is 7.5

x	3	5	7	9	11	13
Frequency (f)	6	8	15	p	8	4

SECTION-D

Q.23 If $2^a = 3^b = 6^c$, then show that $c = \frac{ab}{a+b}$

OR

If $a = \frac{1}{7-4\sqrt{3}}$ and $b = \frac{1}{7+4\sqrt{3}}$ then find the value of $a^2 + b^2$.

Q.24 The taxi fare in a city is as follows:

For the first kilometer, the fare is Rs. 8 and for subsequent distance it is Rs. 5 per km. Taking the distance covered as x km and total fare as Rs. y , write a linear equation for this information and draw its graph. From the graph find the fare for 5 km.

Q.25 If the polynomial $2x^2 + ax^2 + 3x - 5$ and $x^3 + x^2 - 2x + a$ leave the same remainder when divided by $(x-2)$, find the value of 'a'. Also find the remainder in each case.

Q.26 In a city the weekly observation 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)

Q.27 Prove that the angle subtended by an arc (minor, semicircular or major) at the centre is double the angle subtended by it at any point on the remaining part of the circle.

OR

Bisectors of angles A, B and C of a triangle ABC intersect its circumcircle at D, E and F respectively.

Prove that the angles of ΔDEF are $90^\circ - \frac{A}{2}$, $90^\circ - \frac{B}{2}$ and $90^\circ - \frac{C}{2}$.

Q.28 A village Itwaari has a plot of land of the shape of quadrilateral. The Gram Panchayat of the village decided to take over some portion of his plot from one of the corners to construct a Health Centre. Itwaari agrees to the above proposal with the condition that he should be given equal amount of land in lieu of his land adjoining his plot so as to form a triangular plot. Explain step wise how this proposal will be implemented. What values are exhibited by the Itwaari?

Q.29 A lead pencil consist of a cylinder of wood with a solid cylinder of graphite filled into it. The external diameter of the pencil is 7mm, the diameter of the graphite cylinder is 1mm and the length of the pencil is 14cm. Find the :

(i) volume of the graphite.

(ii) volume of the wood.

(iii) the weight of the whole pencil, if the specific gravity of the wood is 0.7 gm/cm^3 and that of the graphite is 2.1 gm/cm^3 .

Q.30 In a circle of radius 5cm, PQ and RS are two parallel chords of lengths 8 cm and 6 cm respectively. Calculate the distance between the chords if :

(i) they are on the same side of the centre.

(ii) they are on the opposite side of the centre.