

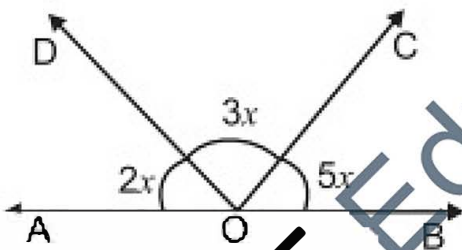
MATHEMATICS

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into four section 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 and section-D comprises of 8 questions of 4 marks each.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

Section - A

1. Find the value of $(64)^{1/2} \times (125)^{1/3}$.
2. If $p(x) = x^3 - 3x^2 + 2x$, then find the value of $p(1)$.
3. Points A (8, 4) & B (-2, 4) lie on a line. AB is parallel to which axis.
4. If the graph of equation $2x + ky = 10k$, intersect x-axis at point (5, 0). Find value of k
5. Find the value of x from the adjacent figure.



6. Find the ratio of total surface area of a sphere and a solid hemisphere of same radius.

Section-B

7. Factorise: $8a^3 + \sqrt{27}b^3$
8. Find the coordinates of the point where the graph of the equation $5x + 2y = 10$ intersect both axes.
9. The sides of a triangle are 22cm, 20cm and 18 cm. Find its area.

10. The two consecutive class marks of a distribution are 52 & 57. Find the class limits.
11. A die is rolled 200 times & its outcomes are released as below:

Outcomes	1	2	3	4	5	6
Frequency	25	35	40	28	42	30

Find the probability of getting:

- A multiple of 3.
 - not a prime number.
12. Consider the following frequency distribution which gives the weights of 38 students of a class:

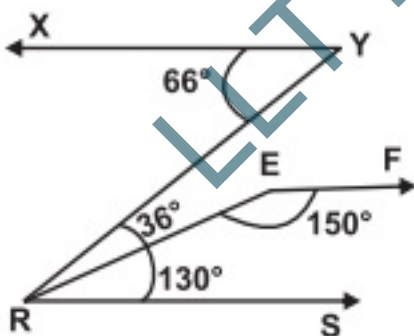
Weights (kg)	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	Total
No. of Std.	9	5	14	3	1	2	2	2	38

- Find the probability that the weight of a student in the class lies between 36-45 kg.
- Give one event in this context having probability zero.

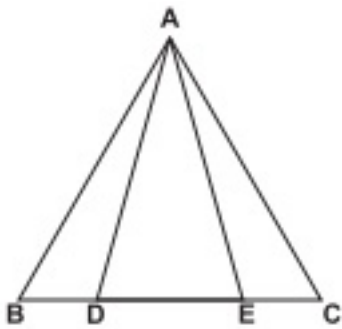
Section-C

13. If $x = 5 - 2\sqrt{6}$, find $x^2 + \frac{1}{x^2}$
14. Simplify:

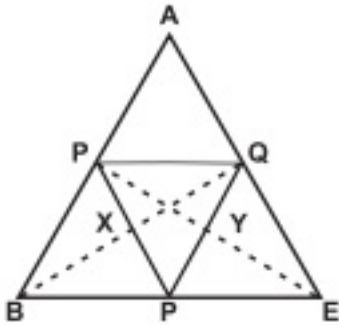
$$\left(\frac{X^a}{X^{-b}}\right)^{a-b} \left(\frac{X^b}{X^{-c}}\right)^{b-c} \left(\frac{X^c}{X^{-a}}\right)^{c-a}$$
15. Plot the points A(1,1), B(-1,5), C(7,9) and D(9,5). Name the type of figure ABCD. In which quadrant the point of intersection of diagonals lie?
16. In the given figure, Show that $XY \parallel EF$.



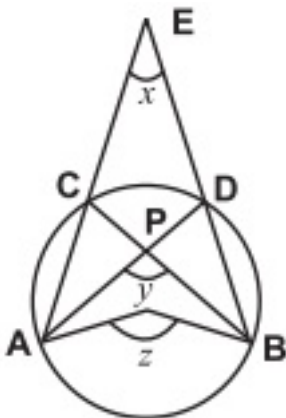
17. In the given figure, if $AB=AC$, $\angle BAD = \angle CAE$ then prove that $\triangle ADE$ is an isoscelles triangle.



18. P, Q & R are respectively, the mid points of sides BC, CA & AB of a triangle ABC. PR & BQ meet at X. CR & PQ meet at Y. Prove that $XY = \frac{1}{4}BC$.



19. In the given figure, O is the centre of a circle. Prove that $\angle x + \angle y = \angle z$.



20. Construct $\triangle ABC$ such that $BC = 8\text{cm}$, $\angle B = 45^\circ$, $AB - AC = 3.5\text{cm}$
21. If h , c and v respectively, are the height, the curved surface area and volume of a cone, prove that $3\pi v h^3 - c^2 h^2 + 9v^2 = 0$
22. The radius of a sphere is 10 cm. If the radius is increased by 1 cm. Then prove that volume of the sphere is increased by 33.1%.

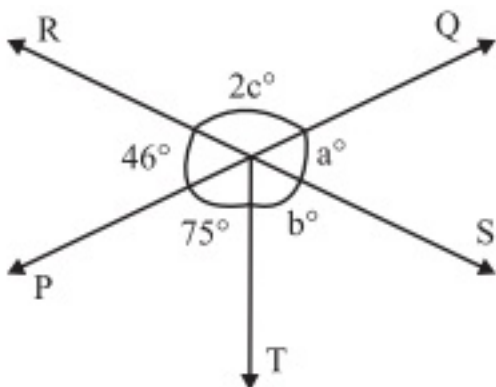
Section-D

Express $0.6 + 0.4\bar{7} + 0.\bar{7}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

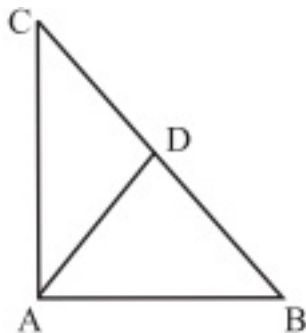
24. Verify:

$$a^3 + b^3 + c^3 - 3abc = \frac{1}{2}(a + b + c) \left[(a - b)^2 + (b - c)^2 + (c - a)^2 \right]$$

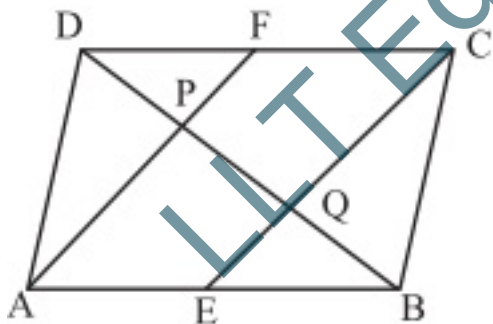
25. A pharmacist needs to strengthen a 15% alcohol solution to one of 32% alcohol. How much pure alcohol should be added to 800 ml Of 15% Solution?
26. In the figure two straight lines PQ & RS intersect each other at O. If $\angle POT = 75^\circ$, find the values of a, b & c.



27. In the given figure, if $AD=BD=CD$. Prove that $\angle BAC$ is right angle.



28. In a parallelogram ABCD, E & F are the mid Points sides AB & CD respectively. Show that the line segment AF & EC trisect the diagonal BD.



29. The residential colony has population of 5400 and 60 litres of water is required per person per day. For the effective utilization of rain water, a group of people decided for WATER HARVESTING. They constructed a water reservoir measuring 49m x 27m x 25m to collect the rain water. If this water reservoirs is full of water then for how many days it will last for the colony

30. The Following table shows the life of LED bulbs.

Life Time (in hours)	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
No. of Bulbs	14	56	60	86	74	62	48

- i. Represent the above information with the help of a histogram & frequency polygon.
- ii. How many bulbs have a lifetime of 700 hours & more?

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