

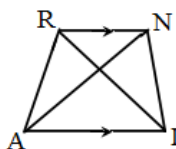
Attempt all the questions.

Group-A [3 × (1+1) = 6]

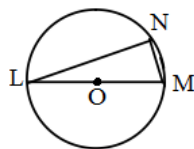
1. (a) Define Value Added Tax (VAT).
 (b) What is the area of an equilateral triangle whose each side is x cm long?

2. (a) Express the product of $x^m \times x^n$ as the single base.
 (b) If the lower quartile of a continuous series is calculated by $Q_1 = 30 + \frac{25-21}{10} \times 15$, how many terms do the data have?

3. (a) In the figure given alongside, which triangle is equal to the triangle RAN in area? Write it.



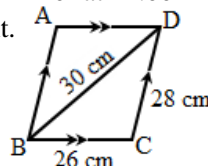
- (b) In the given figure, O is the centre of circle. What is the measure of $\angle LNM$?



Group-B [4 × (2+2) + 3 × (2+2+2) = 34]

4. (a) Malvika purchased a fancy bag for Rs 6,215 with VAT. If its cost without VAT is Rs 5,500, find the VAT rate.
 (b) The number of virus count in a sample is decreasing at 5% per hour after the use of medicine. If the number of virus in sample is 2.4×10^7 at 11:00 am, what will be its number at 1:00 pm of that day? Find it.

5. (a) In $\square ABCD$, $BC = 26$ cm, $CD = 28$ cm and $BD = 30$ cm, find its area.



- (b) Find the surface area of a spherical globe whose diameter is 42 cm.
 (c) Rijan made a conical shape from a carrot for his project work. If the conical carrot has radius 2 cm and height 8.5 cm, find its volume. (Use $\pi = 3.14$)



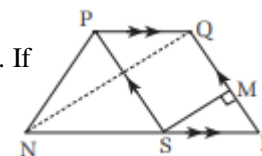
6. (a) Find the highest common factor of $x^3y - xy^3$ and $x^4y - xy^4$
 (b) Find the L.C.M. of $a^2 + 2ab + b^2 - c^2$ and $b^2 + 2bc + c^2 - a^2$

7. (a) Evaluate: $\left(\frac{8}{27}\right)^{\frac{1}{3}} \times \left(\frac{81}{16}\right)^{\frac{1}{4}} \div \left(\frac{32}{243}\right)^{\frac{1}{5}}$

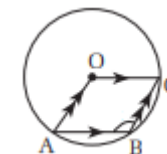
(b) Solve: $2 \times 3^{x-1} = 3 \times 2^{x-1}$

- (c) The total cost of a watch and a radio is Rs 1100. If the watch is cheaper than radio by Rs 110, find their cost.

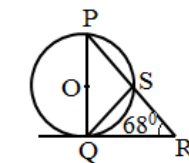
8. (a) In the given figure, PQRS is a parallelogram. If the area of triangle PQN is 20 sq. cm and $SM = 5$ cm, find the length of PS.



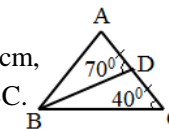
- (b) In the given figure, O is the centre of the circle, and OABC is a parallelogram, find the measure of $\angle ABC$.



- (c) In the given figure, O is centre of circle, QR is a tangent. If $\angle PRQ = 68^\circ$, find the measurement of $\angle PQS$.



9. (a) In a $\triangle ABC$, BD is a median. If $BD = 8$ cm, $BC = 14$ cm, $\angle ACB = 40^\circ$ and $\angle ADB = 70^\circ$, find the area of $\triangle ABC$.



- (b) In a continuous data, if $\sum f = 16 + k$ and $\sum fx = 80 + 5k$, find the exact mean.

10. (a) One card is drawn at random from the number cards numbered from 10 to 21. Find the probability of that the card may be even number or prime numbered card.

- (b) There are 1 red, 2 white and 3 black balls of same shape and size in a basket. If two balls are drawn in succession without replacement from the basket, show the probabilities of all possible outcomes in a tree diagram. Find the probability of getting both balls red.

Group-C (10 × 4 = 40)

10. A marketing company determined that, of 200 households surveyed, 80 used neither brand A nor brand B soaps, 60 used only brand A soap, and for every household that used both brands of soap, 3 used only brand B soap.
- (i) How many households used both brands of soap?
(ii) Draw a Venn-diagram to show the above information.
11. Abhishekh bought some Euro (€) for NRs 3,20,000 at the exchange rate of € 1 = NRs 128 to visit a few European countries. Unfortunately, because of his visa problem, he cancelled his trip. Within a week Nepali rupee is devaluated by 2%. He again, exchanged his Euro to Nepali rupee. How much did he gain or loss?
12. The prism given in the figure is $6\sqrt{3}$ cm long. If the area of its triangular surfaces is $108\sqrt{3}$ cm², calculate its volume.
13. Simplify: $\frac{y^4}{y^8-1} + \frac{y^2}{y^4-1} - \frac{1}{y^2-1}$
14. Solve: $\sqrt{x+2} + \sqrt{x+7} = \frac{15}{\sqrt{x+7}}$
15. Prove that the area of a rectangle PQRS and the area of a parallelogram AQRB standing on the same base QR and between the same parallels PB and QR are equal.
16. Construct a quadrilateral PQRS in which PQ = 6.2 cm, QR = 5.3 cm, RS = 5 cm, SP = 5.7 cm and PR = 5.6 cm. Then, construct a triangle QRT equal in area to the quadrilateral PQRS.
17. Explore experimentally the relationship between the angle at the centre and angle at the circumference of a circle subtended by the same arc. (Two circles of radii at least 3 cm are required).
18. A man 1.5 m tall standing at a distance of 50 m from the foot of the tree observes the angle of elevation of the top of the tree to be 45° . Find the height of the tree.
19. The table given below shows the ages of 40 teachers in a school. Compute the median age.

Age in years	10-20	10-30	10-40	10-50	10-60
No. of teachers	3	11	26	35	40

Group-D (4 × 5 = 20)

20. In the beginning of B.S. 2075, Narayan deposited a certain sum at a bank which pays the yearly compound interest. Mobile banking service of the bank was connected to his mobile set. If he received the messages texting Rs 1,650 as the interest of B.S. 2076 and Rs 1,815 as the interest of the B.S. 2077.
- (i) What was the rate of interest?
(ii) How much sum did he deposit in B.S. 2075?
21. Due to heavy floods during a few monsoon days, thousands of people were victimized in province 2. 150 schools collectively offered to the province government to provide the canvas for 1500 tents and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8m and height 3.5m whereas upper part of each tent is conical with the same base radius but height is 2.1m. If the cost of canvas used to make the tent was Rs. 120 per sq. m, what was the amount shared by each school to set-up the tents? Find it.
22. Last week Mrs. Gautam bought some vegetables for Rs 150. This week the rate of cost of vegetables increases by Rs 5 per kg and she can buy 1 kg less vegetables for the same amount of money.
- (i) What is the rate of cost of vegetables in this week?
(ii) By what percentage is the rate of cost of vegetables increased in this week?
23. MATH is cyclic quadrilateral in which MH//AT. MT is a diameter of the circle and it bisects AH at S. Prove that
- (i) Area of $\triangle MAH$ = Area of $\triangle HAT$
(ii) AH is also the diameter of the circle.

THE END