

Sainik School Examination Board PRE-SEE 2078 [Set - B]

Subject: Compulsory Mathematics

Time: 3: 00 hrs

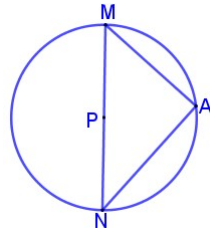
F.M.: 100

Attempt all the questions. All the working must be shown.

Group "A"

[3 × (1 + 1) = 6]

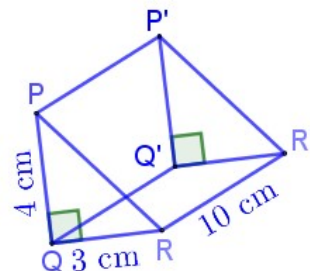
1. (a) Ramhari has just come from abroad. He wants to exchange his dollars from a bank. Which rate does the bank use, buying rate or selling rate?
(b) If s, a, b and c have their own meanings, write the formula to calculate the area of scalene triangle?
2. (a) What is the order of the surd $\sqrt[3]{x}$?
(b) What is the formula of first quartile in grouped data ?
3. (a) Write the relation between the areas of right angled triangle and acute angled triangle standing on the same base and lying between the same parallels.
(b) In the adjoining figure, P is the center of a circle. Write the measurement of $\angle MAN$.



Group "B"

[17 × 2 = 34]

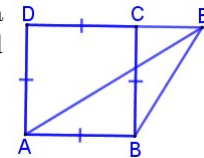
4. (a) On a certain day \$2 = Rs.264, £5 = Rs. 810 . How many US dollars(\$) be exchanged for £41?
(b) The population of a town is 1,04,040. What was the population of the town before 2 years at the growth rate of 2% per annum?
5. (a) An umbrella was made by stitching six isosceles triangular pieces of cloth of sides 13 cm, 13 cm and 10 cm. What is the area of the total cloth?
(b) Find the LSA of the given triangular based prism.



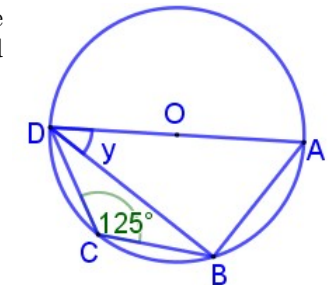
- (c) If the area of the greatest circle of the sphere is 154 cm^2 , find its Total Surface Area.

6. (a) Simplify: $\frac{64m^2}{8m-9n} + \frac{81n^2}{9n-8m}$
(b) Simplify: $\frac{a}{a-b} - \frac{a}{a+b} + \frac{2ab}{a^2+b^2}$
7. (a) If $a^m = b, b^n = c, c^p = a$, prove that: $mnp = 1$.
(b) Solve: $\frac{y-9}{\sqrt{y}+3} = 1$
(c) Simplify: $4\sqrt{72} + 7\sqrt{128} - 10\sqrt{32}$

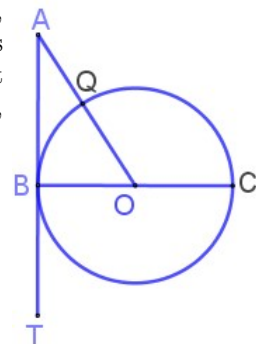
8. (a) In the adjoining figure ABCD is a square with perimeter 48 cm. Find the area of $\triangle ABE$.



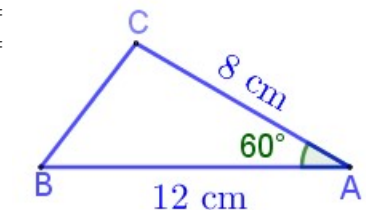
- (b) In the figure alongside O is the centre of a circle, $\angle DCB = 135^\circ$, find the value of y .



- (c) In the figure, O is centre of circle, ABT is a tangent to the circle, B is point of contact and Q is the point in the circle. Find the length of AB, if $BC = 16 \text{ cm}$, $AQ = 2 \text{ cm}$.



9. (a) In the given $\triangle ABC$, $AC = 8 \text{ cm}$, $\angle ACB = 60^\circ$ and $BC = 12 \text{ cm}$, find the area of $\triangle ABC$.



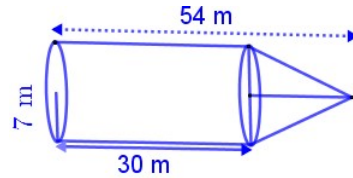
- (b) In the grouped data, if $\Sigma fm = 1345 + 26a$, $N = 55 + a$ and $\bar{x} = 25$, find the value of a .

10. (a) What is the probability of getting a multiple of 7 or a multiple of 9 when a card is drawn randomly from the number cards numbered from 8 to 28 ?
 (b) Two balls are drawn from a bag with 9 red and 5 yellow balls one after another without replacement. Show all the possible outcomes by drawing a tree diagram.

Group "C"

[10 × 4 = 40]

11. In the second terminal examination, out of 390 students, 250 obtained A^+ in Maths, 220 students obtained A^+ in Nepali and 20 students didn't obtain A^+ in both subjects.
 (a) Show the information in Venn-diagram.
 (b) Find the number of students who obtained A^+ in both subjects.
 (c) Find the number of students who obtained A^+ in exactly one subject.
12. The marked price of a scooter is Rs. 3,00,000. How much should a customer pay if 10% discount and 13% VAT is allowed ? Also find the discount amount.
13. Find the cost for colouring the given solid at the rate of Rs. 65 per m^2 .



14. Find the H.C.F. of :

$$m^3 + n^3, m^4 + m^2n^2 + n^4 \text{ and } m^3n - m^2n^2 + mn^3$$

15. Simplify:

$$\left(a^x \times \frac{1}{a^y}\right)^{x^2+xy+y^2} \times \left(a^y \times \frac{1}{a^z}\right)^{y^2+yz+z^2} \times \left(a^z \times \frac{1}{a^x}\right)^{z^2+zx+x^2}$$

16. A parallelogram PQST and a parallelogram PQMN are constructed on the same base PQ and lying between the same parallel lines. Prove that the area of parallelogram PQST = area of parallelogram PQMN.
17. Construct a quadrilateral MNOP in which MN = 5cm, NO = 4 cm, OP = 5.5 cm, PM = 5.6 cm and $\angle PMN = 60^\circ$. Then construct a triangle MPQ equal area to the quadrilateral MNOP.
18. Experimentally verify that the opposite angles of cyclic quadrilateral PQRS are supplementary. (Note: two circles having radii not less than 3 cm are required).
19. A man, 1.7 m tall, observes a bird sitting on the top of the tree in front of him and finds the angle of elevation to be 60° . If the height of a tree is 53.7 m, find the distance between the man and the tree.

20. If the median of the following data is 32, find the value of p ,

Class interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Frequency	2	3	4	p	6

Group "D"

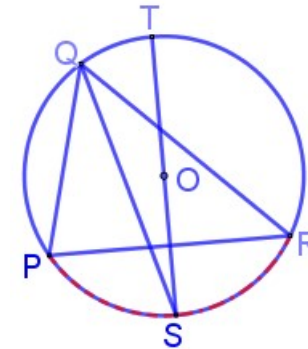
[4 × 5 = 20]

21. The following are the schemes of MEGA BANK LTD for the fixed deposit.

<u>Normal saving</u>	<u>Super Saving</u>
Interest Rate: 12% p.a. Compounded annually	Interest Rate: 10% p.a. Compounded semi - annually

A person wants to deposit Rs.3,00,000 for 2 years. Which of the above schemes is profitable for him/her and by how much?

22. A square based pyramid-shaped metallic water tank holding 1728 litre of water equal base with cemented pillar is fixed at the top of the pillar of 240cm x 240 cm. If the total cost to paint the whole pillar and outer surface of the tank at the rate of Rs.0.25 per cm^2 is Rs.11400, find the height of the cemented pillar.
23. Rojina said to Sujina, "I was twice as old as you were when I was as old as you are." If the sum of their present age is 35 years, find their present age.
24. In the given figure alongside, ST is a diameter. If $\widehat{PS} = \widehat{SR}$ Prove that $\angle QST = \frac{1}{2}(\angle QPR - \angle QRP)$



Ambik