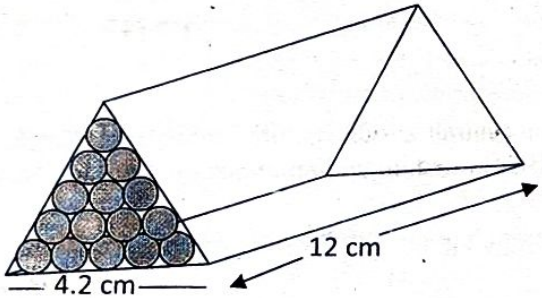
20. If the median of the following data is 52, find the value of 'p'.

Class	15 - 30	30 – 45	45 – 60	60 – 75	75 – 90
frequency	10	5	15	p	10

GROUP – 'D' [4 X 5 = 20]

21. A man working in the UAE deposits 15,000 Dirham through remittance to Citizen International Bank Nepal for 2 years in compound interest compounded annually at the rate of 11% p.a.(1 Dirham = Rs. 32). After one year he deposits another 10,000 Dirham at the same interest rate in the same bank. But this time the Nepali currency is revaluated by 5% in comparison to Dirham. Find the total compound interest paid by the bank to the man. By what percent did he get more or less interest in the first year than in the second year?

22. Fifteen cylindrical pencils with diameter of the base 0.7cm and length 12 cm are tightly packed as shown in the figure. They form an equilateral triangular-based prism. What is the percentage of volume of unoccupied space to the total volume of prism?



23. The sum of the present age of father and his daughter is 110 years. When the father's age was equal to the present age of his daughter, the sum of their ages was 50 years. Find the age of father after 9 years.

24. PQRS is a parallelogram. E is any point on PQ. SP and RE are produced to meet at M. Prove that Δ PES = ΔMEQ

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Symbol No: ..... SET 'A'

Sainik Schools' Examination Board

SEE Preparation Exam-2079

Subject: Compulsory Mathematics **Time:** 3 Hrs. **F.M:** 100

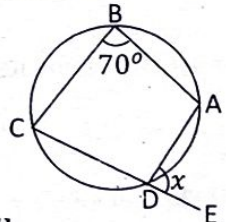
Students are encouraged to write answers in their own words as far as practicable. The figures in the margin indicate the full marks.

GROUP – 'A' [6 X 1 = 6]

1. a. What is the discount amount when the rate of discount is x % and marked price is Rs. y?
   b. Write the formula to find the area of an equilateral triangle whose one side is a cm.
2. a. What is the rationalizing factor of $(\sqrt{2}+1)$?
   b. In the table below the third quartile class is 60 – 80. What is its frequency?

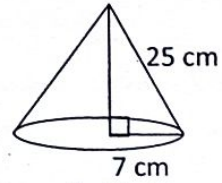
Class	0-20	20-40	40-60	60-80	80-100
c.f.	2	6	12	16	20

3. a. ΔABC and ΔADC are standing on the same base and between the same parallels. What is the area of ΔADC if the area of ΔABC is 12 cm^2 ?
   b. In the adjoining figure, ABCD is a cyclic quadrilateral and CD is produced to E. What is the value of x?



GROUP – 'B' [17 X 2 = 34]

4. a. If $1 = Rs. 130 and £ 1 = Rs. 160, convert £ 650 into US dollars.
   b. The population of Damauli Bazaar was 44,00,000 two years ago. What is the present population of the place at the population growth rate of 2% per annum?
5. a. The perimeter of a triangle is 36 ft. and its two sides are 12 ft. and 15 ft. Find the area of the triangle.
   b. Find the volume of the adjoining right circular cone with radius 7 cm and slant height 25 cm.



   c. The surface area of a spherical ball is $196\pi\ cm^2$. Find its volume.

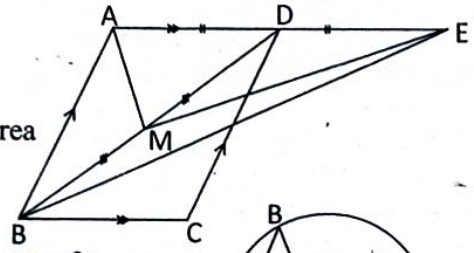
6. a. Find the HCF of: $8x^3 + 125y^3$ and $4x^2 - 25y^2$
   b. Find the LCM of: $(a-b)^2$ and $a^2b - ab^2$

7. a. Simplify: $\frac{21\times7^x - 49\times7^{x-2}}{7^{x+2} - 29\times7^x}$

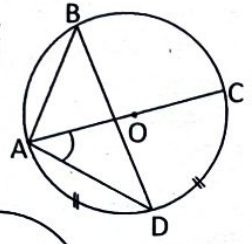
   b. Solve: $\sqrt{x^2+12} = x+2$

   c. If 7 is subtracted from the square of a number, the result is 42. Find the number.

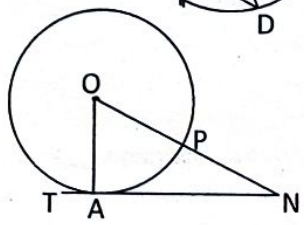
8. a. ABCD is a parallelogram, D and M are the mid-points of AE and BD respectively. If the area of the parallelogram ABCD is 60 cm^2, find the area of ΔAME.



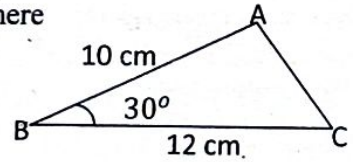
   b. In the adjoining figure, O is the centre of a circle. Arcs AD and CD are equal. Find the value of $\angle CAD$.



   c. In the adjoining figure, O is the centre of a circle, TAN is a tangent and A is the point of contact. If OA = 5cm and AN = 12cm, find the length of PN.



9. a. Find the area of the Δ ABC where AB = 10 cm, BC = 12 cm and $\angle ABC = 30^o$.



   b. In a continuous data, mean $(\bar{X}) = 10$, $\Sigma fm = 170 + 5a$ and $\Sigma f = 14 + a$. Find the value of a.

10. a. A card is chosen from the number card numbered from 12 to 35. Find the probability of getting the card which is multiple of 5 or 8.

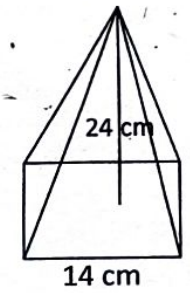
   b. A bag contains 6 black and 9 white balls of the same shape and size. Two balls are chosen one after another without replacement. Show all the possible outcomes by drawing a tree diagram.

GROUP – 'C' [10 X 4 = 40]

11. In a survey of 200 people, 75 people like only apple, 50 people like only orange and 25 of them don't like any of the fruits. Find using Venn – diagram:
   i) the number of people who like both apple and orange.
   ii) the number of people who like apple.
   ii) the number of people who like orange.

12. A business person sold a color television at Rs.18080 after allowing 20% discount and levying 13% VAT. Find the marked price and discount amount of the television.

13. Find the total surface area of the given square-based pyramid with the length of base 14 cm and height 24 cm.



14. Simplify: $yz\sqrt{\frac{a^{\frac{y}{z}}}{a^{\frac{z}{y}}}} \times zx\sqrt{\frac{a^{\frac{z}{x}}}{a^{\frac{x}{z}}}} \times xy\sqrt{\frac{a^{\frac{x}{y}}}{a^{\frac{y}{x}}}}$

15. If $a^2 = b + c$, $b^2 = c + a$ and $c^2 = a + b$, prove that:
   $\frac{1}{a+1} + \frac{1}{b+1} + \frac{1}{c+1} = 1$.

16. Prove that the central $\angle AOC$ at the centre of a circle is twice the inscribed $\angle ABC$ formed in circumference of the same circle standing on the arc AC.

17. Construct a parallelogram ABCD with AB = 6 cm, AD = 4.5 cm and $\angle DAB = 60^o$. Construct Δ AEF whose area is equal to the area of the parallelogram ABCD whose side AE = 7.5 cm.

18. If EFGH is a cyclic quadrilateral in the circle, experimentally verify that $\angle EFG + \angle EHG = 180°$. (Two circles having radii at least 3 cm are necessary).

19. A 2 m tall man is standing few meters away from the tower with the height 42 m on the same level of the ground. If he finds the angle of elevation of the top of the tower to be 60^o, how far is he from the foot of the tower? Find it.

19. A 2 m tall man is standing few meters away from the tower with the height of 32 m on the same level of the ground. If he finds the angle of elevation of the top of the tower to be 30^o, how far is he from the foot of the tower? Find it.

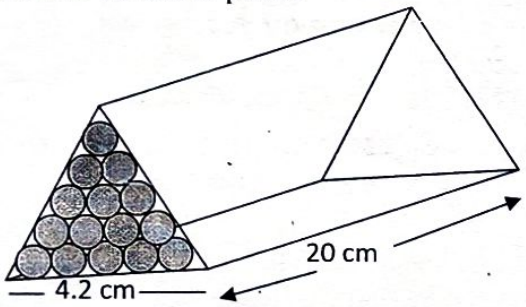
20. If the median of the following data is 34, find the value of 'm'.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
frequency	4	6	3	m	10	2

GROUP – 'D'[4 X 5 = 20]

21. A man working in the UAE deposits 15,000 Dirham through remittance to Citizen International Bank, Nepal for 2 years in compound interest compounded annually at the rate of 11% p.a.(1 Dirham = Rs. 32). After one year he deposits another 10,000 Dirham at the same interest rate in the same bank. But this time the Nepali currency is devaluated by 5% in comparison to Dirham. Find the total compound interest paid by the bank to the man. By what percent did he get more or less interest in the first year than in the second year?

22. Fifteen cylindrical pencils with diameter of the base 0.7cm and length 20 cm are tightly packed as shown in the figure. They form an equilateral triangular-based prism. What is the percentage of volume of unoccupied space to the total volume of prism?



23. The sum of the present age of father and his daughter is 110 years. When the father's age was equal to the present age of his daughter, the sum of their ages was 50 years. Find the age of the father after 9 years.

24. ABCD is a parallelogram. E is any point on AB, DA and CE are produced to meet at P. Prove that Δ BEP = Δ ADE.

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Symbol No: ..... SET B

Sainik Schools' Examination Board

SEE Preparation Exam 2079

Subject: Compulsory Mathematics **Time:** 3 Hrs. **F.M:** 100

Students are encouraged to write answers in their own words as far as practicable. The figures in the margin indicate the full marks.

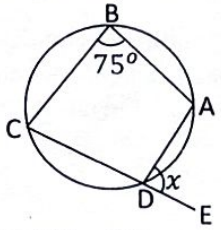
GROUP – 'A' [6 X 1 = 6]

1. a. What is the VAT amount when the rate of VAT is y % and selling price after discount is Rs. x ?
   b. Write the formula to find the area of a scalene triangle when its sides are a, b and c with semi-perimeter s.
2. a. What is the rationalizing factor of $(\sqrt{2} - 1)$?
   b. In the table below the first quartile class is 20 – 40. What is its frequency ?

Class	0-20	20-40	40-60	60-80	80-100
C.f.	2	6	12	15	20

3. a. Δ ABC and Δ ADC are standing on the same base and between the same parallels. What is the area of Δ ADC if the area of Δ ABC is 15 cm^2 ?

   b. In the adjoining figure, ABCD is a cyclic quadrilateral. What is the value of ?



GROUP – 'B'[17X 2 = 34]

4. a. If \$100 = Rs. 13000 and £ 100 = Rs. 16000, convert £65000 into US dollars.
   b. The population of Khalanga Bazaar was 2400000 two years ago. What is the present population of the place at the population growth rate of 3% per annum?

5. a. The perimeter of a triangle is 30cm and its two sides are 8 cm and 10 cm. Find the area of the triangle.
   b. Find the total surface area of the adjoining right circular cone with 7 cm radius and 24 cm height.

c. The surface area of a spherical ball is $196\pi\ cm^2$. Find its volume.

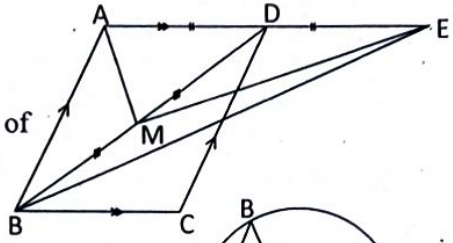
6. a. Find the HCF of: $8m^3 + 27n^3$ and $4m^2 - 9n^2$
   b. Find the LCM of : $(x+y)^2$ and $x^2y + xy^2$

7. a. Simplify: $\dfrac{29\times4^x - 16\times4^{x-2}}{4^{x+2}+3\times4^{x+1}}$

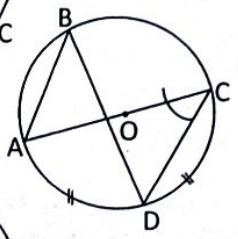
   b. Solve: $\sqrt{y^2+12} = y+2$

   c. If 7 is added to the square of a natural number, the result is 71. Find the number.

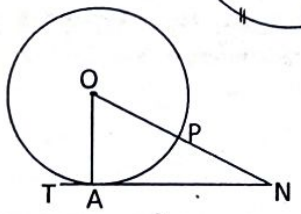
8. a. ABCD is a parallelogram, D and M are the mid-points of AE and BD respectively. If the area of the parallelogram ABCD is $50cm^2$, find the area of ΔAME.



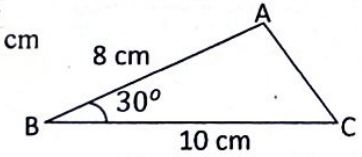
   b. In the adjoining figure O is the centre of a circle. Arcs AD and CD are equal, find the value of $\angle ACD$.



   c. In the adjoining figure, O is the centre of a circle, TAN is a tangent and A is the point of contact. If OA = 7 cm and AN = 24 cm, find the length of PN.



9. a. Find the area of the Δ ABC where AB = 8 cm, BC = 10 cm and $\angle ABC = 30^o$.



   b. In a continuous data, mean $(\bar{X}) = 15$, $\Sigma fm = 200 + 17a$ and $\Sigma f = 14 + a$. Find the value of a.

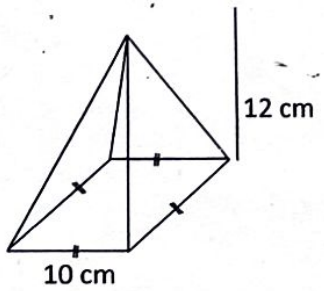
10. a. A card is chosen from the number card numbered from 2 to 35. Find the probability of getting the card which is multiple of 5 or 8.
    b. A bag contains 15 red and 10 green balls of the same shape and size. Two balls are chosen one after another without replacement. Show all the possible outcomes by drawing a tree diagram.

GROUP – 'C'[10 X 4 = 40]

11. In a survey of 200 students, 80 students obtained A^+ only in Mathematics. 70 obtained A^+ only in Science and 30 of them got the other grades in both subjects. Find using Venn – diagram:
    i) the number of students who obtained A^+ in both subjects.
    ii) the number of students who obtained A^+ in Mathematics.
    ii) the number of students who got A^+ in Science.

12. The marked price of a television is Rs.40, 000. A business person sells it after allowing 20% discount and levying 13% VAT. Find the selling price of the television and the VAT amount.

13. Find the total surface area of the given square- based pyramid with length of base 10 cm and height 12 cm.



14. Simplify: $\sqrt[bc]{\dfrac{x^{\frac{b}{c}}}{x^{\frac{c}{b}}}} \times \sqrt[ca]{\dfrac{x^{\frac{c}{a}}}{x^{\frac{a}{c}}}} \times \sqrt[ab]{\dfrac{x^{\frac{a}{b}}}{x^{\frac{b}{a}}}}$

15. If $a^2 = b + c$, $b^2 = c + a$ and $c^2 = a + b$, prove that $\dfrac{1}{a+1} + \dfrac{1}{b+1} + \dfrac{1}{c+1} = 1$.

16. Prove that the central angle $\angle MON$ at the centre of a circle is twice the inscribed angle $\angle MPN$ formed in circumference of the same circle standing on the arc MN.

17. Construct a parallelogram PQRS with PQ = 6 cm, PS = 4.5 cm and $\angle SPQ = 60^o$. Construct Δ PEF whose area is equal to the area of the parallelogram PQRS whose side PE = 7.5 cm.

18. If ABCD is a cyclic quadrilateral in the circle, experimentally verify that $\angle ABC + \angle ADC = 180°$. (Two circles with radii at least 3 cm are necessary).