RAMAGYA SCHOOL, NOIDA

X/MATHEMATICS/2017-18

OLYMPIAD PRACTICE WORKSHEET

(Concept based)

1. The remainder when the polynomial $p(x) = x^{100} - x^{97} + x^3$ is divided by x + 1 is

(A)1 (B) 22 (C) 3 (D) 4

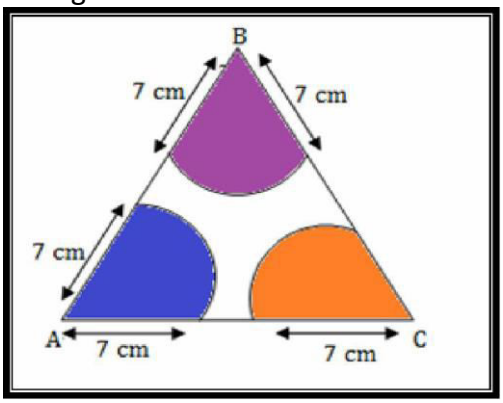
2.The mean of first five prime numbers is

(A)3.0 (B)3.6 (C)5.6 (D)7

3. A man is three years elder than his wife and four times as old as his son. If the son shall attain an age of fifteen years after three years, what is the present age of his mother?

(A) 60 years (B) 51 years (C)48 years (D) 45 years

4. The area of shaded region if each region is a sector of radius 7cm is



(A) $77m^2$ (B)$49\ cm^2$ (C) $60\ cm^2$ (D) none of these

5. If x Sin (90 – A) Cot (90 – A) = Cos (90 – A), then x =

(A) 0 (B) 1 (C)-1 (D) 2

(Application based)

6. If the sum of the zeros of the polynomial $f(x) = 2x^3 – 3kx^2 + 4x – 5$ is 6,then the value of k is

(A) 2 (B) 4 (C) -4 (D) -2

7. Three traffic lights at three different road crossing change after 48 seconds, 72 secondsand 100 seconds respectively, If they all change simultaneously at8 a. m., at what time will they again change simultaneously?

(A) 10 a.m. (B) 9 a.m. (C) 11 a.m. (D) 10.30 a.m

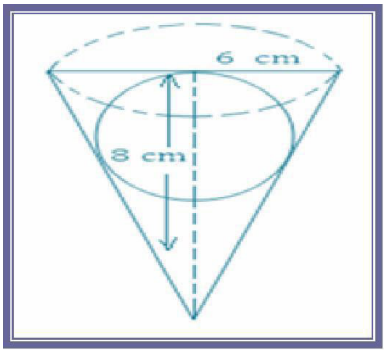
8.If $\text{Cos A} + \text{Cos}^2\text{A} = 1$, then $\text{Sin}^2\text{A} + \text{Sin}^4\text{A} =$

(A) -1 (B) 0 (C) 1 (D) None of these

9. The mean of first n odd natural numbers is $n^2/81$, then n =

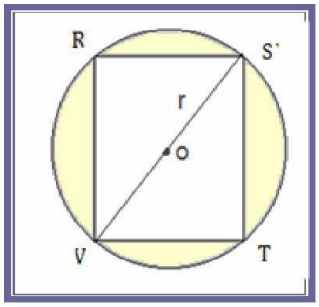
(A) 9 (B) 81 (C) 27 (D) 18

10. A conical vessel of radius 6 cm and height 8 cm is completely filled with water.A sphere is lowered into the water and its size is such that when it touches the sides, itis just immersed. What fraction of the water overflows?



(A) $\frac{2}{5}$ (B) $\frac{3}{8}$ (C) $\frac{3}{5}$ (D)$\frac{3}{4}$

11. In the given figure, RSTV is square inscribed in a circle with centre O and radius r. Thetotal area of shaded region is _____.



(A) $r^2(\pi - 2)$ (B) $2r^2(2 - \pi)$ (C) $\pi(r^2 - 2)$ (D) $8r^2 - 8r$

12. If points (a,0), (a,b) and (1,1) are collinear, then $\frac{1}{a}+\frac{1}{b}$ =

(A) 1 (B) 2 (C) 0 (D) -1

13. What is the probability that a leap year has 53 Fridays?

(A) $\frac{2}{7}$ (B) $\frac{1}{7}$ (C) $\frac{5}{7}$ (D) none of these

(Value based)

14. If α and β are roots of the polynomial $p(s) = 3s^2 – 6s + 4$, then find the value of

$\frac{\alpha}{\beta}+\frac{\beta}{\alpha}+2(\frac{1}{\alpha}+\frac{1}{\beta})+3\alpha\beta$

(A)8 (B) 2 (C) 6 (D) 0

15. If the angles of elevation of the top of a tower from two points a and b from the base and in the same straight line with it are complimentary, then the height of the tower is

(A) ab (B) √ab (C) $\frac{a}{b}$ (D)$\sqrt{\frac{a}{b}}$

(Logical Reasoning)

16. Some friends are sitting on a bench. Vijay is sitting next to Anita and Sanjay is next to Geeta.Geeta is not sitting with Ajay. Ajay is on the left end of the bench and Sanjay is in second position from right hand side. Vijay is on the right side of Anita and to the right side of Ajay, Vijay and Sanjay are sitting together.Who is sitting in the centre?

(A) Ajay (B) Vijay (C) Geeta (D) Sanjay

17.If seventh day of a month is three days earlier than Friday, what day will it be on nineteenth day of the month?

(A) Sunday (B) Monday (C) Wednesday (D) Friday

18.P, Q, R and S are playing carom game. P, R and S, Q are partners. S is to the right of Rwho is facingWest. Then Q is facing what direction?

(A) North (B) South (C) East (D) West

19A is the father of C and D is the son of B.E is the brother of A. If C is the sister of D, howis B related to E?

(A)Daughter (B) Brother-in-law (C) Husband (D) Sister-in-law

20. Ravi is not wearing white and Ajay is not wearing blue. Ravi and Sohan wear differentcolor. Sachin alone wears red. What is Sohan colored, if all four them are wearingdifferent color.

(A) red (B) blue (C) white (D) can't say