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X/MATHEMATICS/2017-18

OLYMPIAD PRACTICE WORKSHEET

(Concept based)

1. The sum of the exponents of the prime factors in the prime factorization of 196 is

(A)1 (B) 2 (C) 4 (D) 6

2.If one root of the polynomial f(x) = $5x^2$ + 13x + k is reciprocal of the other, then value of k is

(A)0 (B)5 (C)1/6 (D)6

3. The area of the triangle formed by the line $\frac{x}{a} + \frac{y}{b} = 1$ with the coordinate axis is

(A) ab (B) 2ab (C)$\frac{1}{2}$ab (D) $\frac{1}{4}$ab

4. If D,E,F are mid points of sides BC, CA and AB respectively of triangle ABC, then the ratio of the areas of triangles DEF and ABC is

(A) 1 : 4 (B) 1 : 2 (C)2 : 3 (D) 4 : 1

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. A man goes 24m due west and then 7m due north, how far is he from the starting point?

(A) 31m (B) 17m (C) 25m (D) 26m

7. The value of tan 1° tan 2° tan 3°……tan 89° is

(A) 1 (B) -1 (C) 0 (D) cannot find

8.If Cos A + Cos^2A = 1, then Sin^2A + Sin^4A =

(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. The height of cone is 60cm. A small cone is cut off at the top by a plane parallel to the base and its volume if $\frac{1}{64}$ the volume of original cone. The height from the base at which the section is made is

(A) 15cm (B) 30cm (C) 45cm (D) 20cm

11. If four times the sum of the areas of two circular faces of cylinder of height 8cm is equal to the twice the curved surface area, then diameter of the cylinder is

(A) 4cm (B) 8cm (C) 2cm (D) 6cm

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 non leap year has 53 Sundays?

(A) $\frac{6}{7}$ (B) $\frac{1}{7}$ (C) $\frac{5}{7}$ (D) none of these

(Value based)

14. One year ago a man was 8 times as old as his son. Now his age is equal to the square of his son's age. Their present ages are:

(A)6 years, 48 years (B) 7 years, 56 years (C) 7 years, 49 years (D) 6 years, 49 years

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)√$\frac{a}{b}$

(Logical Reasoning)

16. Some of the letters are missing, which are given in that order as one of the options below it. Select the correct option:

_ _ aba _ _ ba _ ab

(A) abbba (B) abbab (C) baabb (D) bbaba

17. '+' stands for division, '÷' stands for multiplication, 'x' stands for subtraction and '-' stands for addition. Which one of the following equation is correct?

(A)18 ÷ 6 – 7 + 5 x 2 = 20 (B) 18 + 6 ÷ 7 x 5 – 2 = 18 (C) 18 x 6 + 7 ÷ 5 - 2 = 16 (D) 18 ÷ 6 x 7 + 5 – 2 = 22

18.Pointing to a photograph, a lady tells Pramod, "I am the only daughter of this lady and her son is your maternal uncle". How is the speaker related to Pramod's father?

(A) Sister-in-law (B) Wife (C) Either (a) or (b) (D) Neither (a) nor (b)

19. This question is based on the 6 numbers given below:

271 361 912 714 459 187

If the first and second digits of each number are interchanged and if the third digit of each number is placed between these two digits, then which number will be the third number will be the third number from the top, if the new numbers are arranged in the descending order?

(A) 187 (B) 271 (C) 459 (D) 361

20. If the first half of the English alphabet series is written in reserve order, then which letter should be 8^{th} letter to the left of 14^{th} letter from the right end?

(A) E (B) G (C) F (D) I