



RAMAGYA SCHOOL, NOIDA

X/MATHS/2018-19

OLYMPIAD PRACTICE WORKSHEET

(Concept based)

1. If $\sin x + \cos x = a$ and $\sec x + \operatorname{cosec} x = b$, then the value of $b(a^2 - 1)$ is _____
(A) $2a$ (B) $3a$ (C) 0 (D) $2ab$
2. If $\sin A : \cos A = 4 : 7$, then the value of $\frac{7 \sin A - 3 \cos A}{7 \sin A + 2 \cos A}$ is _____
(A) $\frac{3}{14}$ (B) $\frac{3}{2}$ (C) $\frac{1}{3}$ (D) $\frac{1}{6}$
3. If $\sin x = \cos x$ then $2 \tan^2 x + \sin^2 x - 1 =$ _____
(A) $-\frac{3}{2}$ (B) $\frac{3}{2}$ (C) $\frac{2}{3}$ (D) $-\frac{2}{3}$
4. If $\sin x + \sin^2 x = 1$, then $\cos^8 x + 2 \cos^6 x + \cos^4 x =$ _____
(A) 0 (B) -1 (C) 1 (D) 2
5. If $x \sin^3 x + y \cos^3 x = \sin x \cos x$ and $x \sin x = y \cos x$ then _____
(A) $x^3 + y^3 = 1$ (B) $x^2 - y^2 = 1$ (C) $x^2 + y^2 = 1$ (D) $x^4 + y^4 = 1$

(Application based)

6. In an AP, if the p^{th} term is q and q^{th} term is p then its n^{th} term is _____
(A) $p + q - n$ (B) $p + q + n$ (C) $p - q + n$ (D) $p - q - n$
7. An AP consists of 21 terms. The sum of 3 terms in the middle is 129 and of the last three is 237, find the AP
(A) 4, 8, 12, 16 (B) 3, 6, 9, 12 (C) 4, 7, 10, 13 (D) 3, 7, 11, 15
8. The ratio of the sum of m and n terms of an AP is $m^2 : n^2$, then find the ratio of m^{th} and n^{th} terms
(A) $2m + 1 : 2n + 1$ (B) $2m - 1 : 2n - 1$ (C) $2m : n$ (D) $m : n$
9. If the m^{th} term of AP is $1/n$ and n^{th} term is $1/m$, then the sum of the first mn terms is _____
(A) $mn + 1$ (B) $\frac{mn + 1}{2}$
(C) $\frac{mn - 1}{2}$ (D) $\frac{mn - 1}{3}$
10. Which term of the AP 5, 2, -1, is -22?
(A) 9 (B) 11 (C) 10 (D) 7

(Value based)

11. The sum of all terms of the arithmetic progression having 10 terms except for the first term, is 99, and except for the 6th term, is 89. Find the 8th term of the progression if the sum of the first and the fifth term is equal to 10
(A) 15 (B) 25 (C) 18 (D) 10
12. Four members are inserted between the numbers 4 and 39 such that an AP results. Find the biggest of these four numbers
(A) 33 (B) 31 (C) 32 (D) 30
13. The production of a TV in a factory increases uniformly by a fixed number every year. It produced 800 sets in 6th year and 11300 in 9th year. Find the production in 6 years.
(A) 40500 (B) 20000 (C) 20500 (D) 31500
14. Deepak repays his total loan of 1,18,000 by paying every month starting with the first installment of 1000. If he increases the installment by Rs. 100 every month, what amount will be paid as the last installment of loan?
(A) Rs 4900 (B) Rs 5400 (C) Rs 3500 (D) Rs 4500
15. A manufacturer of laptop produces 6000 units in 3rd year and 7000 units in 7th year. Assuming that production increases uniformly by a fixed number every year, find the production in the 5th year
(A) 6500 units (B) 5000 units (C) 6000 units (D) 8000 units

(Logical Reasoning)

16. Ravi is not wearing white and Ajay is not wearing blue. Ravi and Sohan wear different color. Sachin alone wears red. What is Sohan colored, if all four them are wearing different color.
(A) red (B) blue (C) white (D) can't say
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. BEGK is related to ADFJ in the same way as PSVY is related to _____
(A) LOQT (B) ROUX (C) OTUZ (D) ORUX
19. If the first half of the English alphabet series is written in reverse order, then which letter should be 8th letter to the left of 14th letter from the right end?
(A) E (B) G (C) F (D) I
20. '+' stands for division, '÷' stands for multiplication, 'x' stands for subtraction and '-' stands for addition. Which one of the following equation is correct?
(A) $18 \div 6 - 7 + 5 \times 2 = 20$ (B) $18 + 6 \div 7 \times 5 - 2 = 18$ (C) $18 \times 6 + 7 \div 5 - 2 = 16$ (D) $18 \div 6 \times 7 + 5 - 2 = 22$