RAMAGYA SCHOOL, NOIDA

XI / MATHEMATICS / 2017-18

OLYMPIAD PRACTICE WORKSHEET

(Concept based)

1. $\lim_{x\to\pi} \frac{\sin x}{x-\pi}$ is

(A) 1 (B) 2 (C) –1 (D) –2

2. $\lim_{x\to 0} \frac{x^2 \cos x}{1-\cos x}$ is

(A) 2 (B) 3/2 (C) -3/ 2 (D) 1

3. $\lim_{x\to 0} \frac{\tan 2x - x}{3x - \sin x}$ is

(A) 2 (B) 1/ 2 (C) -1/ 2 (D) 1/ 4

4. $\lim_{x\to 0} \frac{\operatorname{cosec} x - \cot x}{x}$ is

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

5. $\lim_{x\to 0} \frac{|x|}{x}$ is equal to

(A) 1 (B) –1 (C) 0 (D) does not exists

6. $\lim_{x\to 0} \frac{\sin x}{x\,(1+\cos x)}$ is equal to

(A) 0 (B) 1 /2 (C) 1 (D) –1

(Application based)

7. If y = $\frac{\sin(x+9)}{\cos x}$ then dy/dx at x = 0 is

(A) cos 9 (B) sin 9 (C) 0 (D) 1

8. If y = $\frac{\sin x + \cos x}{\sin x - \cos x}$, then dy/dx at x = 0 is

(A) –2 (B) 0 (C) 1/2 (D) does not exist

9. If y = $\sqrt{x} + \frac{1}{\sqrt{x}}$ then dy/dx at x = 1 is

(A) 1 (B) ½ (C) 1 /$\sqrt{2}$ (D) 0

10. If f(x) = x sinx, then $f'(\pi/2)$ is equal to

(A) 0 (B) 1 (C) –1 (D) 1/ 2

11. $\lim_{n\to\infty} \frac{1+2+3+\cdots+n}{n^2}$, n ∈ N, is equal to

(A) 0 (B) 1 (C) 1/ 2 (D) 1/ 4

12. For all n ∈ N, $3.5^{2n+1} + 2^{3n+1}$ is divisible by

(A) 19 (B) 17 (C) 23 (D) 25

(HOTS)

13.$\lim_{x\to \pi/4} \frac{\sec^2 x-2}{\tan x-1}$is

(A) 3 (B) 1 (C) 0 (D) $\sqrt{2}$

14.$\lim_{x\to 0} \frac{(1-\cos 2x)(3+\cos x)}{x \tan 4x}$=

(A) -1/4 (B) ½ (C) 1 (D) 2

15.$\lim_{x\to 1}[x-1]$, where [.] is greatest integer function, is equal to

(A) 1 (B) 2 (C) 0 (D) does not exists

16.$\lim_{x\to 0} \frac{\sqrt{4+x} - \sqrt[3]{8+3x}}{x}$is

(A) -1/2 (B) ½ (C) -3 (D) 0

17.$\lim_{x\to 0} \frac{e^{2x}-1}{3x} =$

(A) 2/3 (B) 6 (C) 3/2 (D) 1/6

18.$\lim_{x\to 0} \frac{\tan^3 x-\sin^3 x}{x^5}$ =

(A) 5/2 (B) 3/2 (C) 3/5 (D) 2/5

(Value based)

19. If $x^n - 1$is divisible by x – k, then the least positive integral value of k is

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

20. If $10^n + 3.4^{n+2} + k$ is divisible by 9 for all n ∈ N, then the least positive integral value of k is

(A) 5 (B) 3 (C) 7 (D) 1