



MAHAVIR SENIOR MODEL SCHOOL
WINTER HOLIDAY HOME-WORK
XI- MATHS
SESSION-2025-26

PRACTICE WORKSHEET

1. Evaluate $\lim_{x \rightarrow 0} \frac{(1+x)^{n-1}}{(1+x)^{n-1}}$
2. Evaluate $\lim_{x \rightarrow 0} \frac{(\sin 2x)+3x}{2x+(\tan 3x)}$
3. Evaluate $\lim_{x \rightarrow 0} \frac{1-\cos 2x}{1-\cos 4x}$
4. If $y = \sin^2 x, \cos^3 x$, then $\frac{dy}{dx}$.
5. If $y = \sin 2x \cdot \cos 3x$, then $\frac{dy}{dx}$.
6. Differentiate $\frac{\sin x}{x}$ with respect to x .
7. Differentiate $x^3 + 3^3 + 3^x$ with respect to x .
8. Differentiate $\sin^2(x^3 + x - 1) + \frac{1}{\sec^2(x^3+x-1)}$ with respect to x .
9. Differentiate $\left(\frac{x^a}{x^b}\right)^{a+b} \cdot \left(\frac{x^b}{x^c}\right)^{b+c} \cdot \left(\frac{x^c}{x^a}\right)^{c+a}$ with respect to x .
10. Differentiate $\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{\infty-b}+x^{c-b}} + \frac{1}{1+x^{\infty-c}+x^{b-c}}$ w.r.t to x .



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ASSERTION-REASON BASED WORKSHEET

Directions: Each of these questions contains two statements, Assertion and Reason, Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

- (a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion.
(c) Assertion is correct, reason is incorrect.
(d) Assertion is incorrect, reason is correct.

1. Assertion: $\lim_{x \rightarrow 0} \frac{\sin ax}{bx} = \frac{a}{b}$

Reason: $\lim_{x \rightarrow 0} \frac{\sin ax}{\sin bx} = \frac{b}{a} (a, b \neq 0)$

2. Assertion: $\lim_{x \rightarrow 0} (\operatorname{cosec} x - \cot x) = 0$

Reason: $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan 2x}{x - \frac{\pi}{2}} = -1$

3. Assertion: If a and b are non-zero constants, then the derivative of $f(x) = ax + b$ is a.

Reason: If a, b and c are non-zero constants, then the derivative of $f(x) = ax^2 + bx + c$ is $ax + b$.

4. Let $a_1, a_2, a_3, \dots, a_n$ be fixed real numbers and define a function

$$f(x) = (x - a_1)(x - a_2) \dots \left(\frac{x}{a_n} \right), \text{ then}$$

Assertion: $\lim_{x \rightarrow a} f(x) = 0$

Reason: $\lim_{x \rightarrow a} (x) = (a - a_1)(a - a_2) \dots (a - a_n)$, for some $a = a_1, a_2, \dots, a_n$.

5. Assertion: Suppose f is real valued function, the derivative of f at x is given by

$$f'(x) \text{ is given by } f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

Reason: If $y = f(x)$ is the function, then derivative of 'f' at any x is denoted by $f'(x)$.



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COMPETENCY BASED WORKSHEET

1. If $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$, then find the value of k ,
2. Find the derivative of $(x - 1)(x + 1)(x^2 + 1)(x^4 + 1)$ with respect to X ,
3. Differentiate $\frac{x^8 - 1}{x^4 - 1}$ with respect to x ,
4. Find the values of a and b if $\lim_{x \rightarrow 2} f(x)$ and $\lim_{x \rightarrow 4} f(x)$ exists where

$$f(x) = \begin{cases} x^2 + ax + b, & 0 \leq x < 2 \\ 3x + 2, & 2 \leq x \leq 4 \\ 2ax + 5b, & 4 < x < 8 \end{cases}$$

CASE STUDY BASED

5. Mr. Pradeep has a rectangular plot, which is used for growing vegetables. Perimeter of plot is 50m . Length and width of plot are x m and y m respectively.



Based on the above information, answer the following questions:-

i. Relation between x and y is

- (a) $x + y = 50$ (b) $x + y = 100$ (c) $x + y = 25$ (d) $x = y$

ii. Area function, $A(x) =$

- (a) $x^2 - 5$ (b) $25x - x^2$ (c) $x^2 - 25x$ (d) $25 - x$

iii, Derivative of $A(x)$ w, r, t, $x[A'(x)] =$

- (a) $2x$ (b) $-2x$ (c) $25 - 2x$ (d) $2x - 25$

iv. Value of x for which $A'(x) = 0$ is

- (a) 25 (b) 12.5 (c) 5 (d) 0

v. Value of $A(x)$ at $x = 12.5$ is

- (a) 625 (b) 250 (c) 156.25 (d) 144.25