

GIRLS' HIGH SCHOOL AND COLLEGE, PRAYAGRAJ

2020 – 2021

CLASS - 12 B & C

SUBJECT: MATHEMATICS

E-LEARN ASSIGNMENT NO. 2

Ls : DIFFERENTIATION

INSTRUCTIONS: Parents please ensure that your ward watches the video instructions for the assignment by clicking on the link . <https://youtu.be/bdDfRURNrRk> .

<https://youtu.be/8RqozpX1Am4> .

She should revise the lesson given in the book and then work on the assignment. Completed assignment is to be downloaded and filed /pasted in the subject file/copy and kept ready for submission. The date and procedure of submission shall be notified later.

Exercise

1. Differentiate with respect to x.

i. $x^4 - 3x + \frac{1}{19x^2}$

ii. $\sqrt{8 - 7x}$

iii. $\frac{x^4+1}{\sqrt{1-2x}}$

iv. $\tan^4 5x$

v. $\sin 3x \cos 7x$

2. Given that $y = \frac{\sin x - \cos x}{\sin x + \cos x}$, show that $\frac{dy}{dx} = 1 + y^2$

3. Find the gradient of the following curve

$$Y = (x + 1)(2x + 3) \text{ at } (2, 21)$$

4. Differentiate from the first principle $\sqrt{x} + \frac{1}{\sqrt{x}}$

5. Find $\frac{dy}{dx}$ if $y = u^4$, $u = \frac{1}{v}$ and $v = 5x^2 + 2x + 6$

6. If $y = (1 + x)(1 + x^2)(1 + x^4)(1 + x^8) \dots (1 + x^{2^n})$, find $\frac{dy}{dx}$

7. Differentiate w.r.t. x :

i. $\log\left(\sec \frac{x}{2} + \tan \frac{x}{2}\right)$

ii. $\log[\sin(\log x)]$

iii. $e^{-x/2}$

iv. $e^{\tan x} \times \log \tan x$

v. e^e

vi. $\log_{10} x + \log_x 10 + \log_x x + \log_{10} 10$

vii. $\sqrt{\log \left\{ \sin \left(\frac{x^2}{3} - 1 \right) \right\}}$

viii. $\sin(m \sin^{-1} x)$

ix. $e^{\cos^{-1} \sqrt{1-x^2}}$

x. $\tan^{-1} \frac{a+x}{1-ax}$

8. If $y = \sin^{-1} \frac{2x}{1+x^2} + \sec^{-1} \frac{1+x^2}{1-x^2}$, $0 < x < 1$ prove that $\frac{dy}{dx} = \frac{4}{1+x^2}$

9. If the derivative of $\tan^{-1}(a + bx)$ takes the value 1 at $x = 0$, prove that $1 + a^2 = b$.

10. Differentiate $\sin^{-1} \frac{2^{x+1} \cdot 3^x}{1 + (36)^x}$ with respect to x .