

DO-AND-LEARN MATHEMATICS:

EXPERIMENT- DIFFERENTIATION

AIM OF THE EXPT. – to show results of differentiation of some functions by graphical method

MATERIALS REQUIRED- geometry box, graph sheets, calculator, Clarke's tables

METHOD - 1. Take a function $y = f[x]$. Choose your own. Suggestions are given at the end

2. Plot the points $[x_1, f[x_1]]$ etc on a graph sheet.. [to do this make a table of some chosen values of x. Calculate $f[x]$ thus tabulate $x_1, f[x_1]$ $x_2, f[x_2]$ you may need a calculator or clarke's tables to do this . Plot the values of on the x axis and the corresponding $f[x]$ on the y axis.]

3. Draw the graph of the function. Make a straight line or a smooth curve as the case may be .

4. Differentiation means slope of the curve at the chosen point. Find the slopes at points x_1, x_2, x_3 etc..Call these values $f'[x]$.

5. Plot these points and draw a new graph with x_1, x_2 etc on the x axis and $f'[x_1], f'[x_2]$... on the y axis

6. Find the nature of this new curve .i.e. find equation of this new line/curve. This gives the result of differentiation of $f[x]$

RESULT---- experimental results of $f'[x]$ are compared with theoretical results - they agree within an error of %

HELP

functions to be chosen -just some examples

$f[x]$ can be $x, 2x, 5x, x+3, x-5, 3x+4, 5x-3, \dots$

a [squared], i.e a^2

$2 \cdot a$ [squared] i.e $2 \cdot a^2$

$\frac{1}{2} \times a$ [squared] i.e $\frac{1}{2} \cdot a^2$

$\sin A, \cos A, \sin 2A, \cos 2A$

$\exp[x], \exp[-x], \exp[3x], \exp[-2x]$