

Al-Saudia Virtual Academy
Pakistan Online Tuition – Online Tutor Pakistan

FIRST PRINCIPLE

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x}$$

Or

$$\lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} = \frac{dy}{dx}$$

Find $\frac{dy}{dx}$ using first principle

1. $f(x) = 3x^2$;
2. x^3 ;
3. $x^2 - x$;
4. $2x^3 - 1$;
5. $\sqrt{x + 1}$;
6. x^4 ;
7. $1/x$;
8. $1/x^2$;
9. $ax^2 + b$;
10. $f(x) = 1/\sqrt{x}$;
11. $x^{1/3}$;
12. $x^{2/3}$;
13. x^n ;
14. $(\sqrt{a})^n$;
15. $n\sqrt{x}$
16. $f(x) = \sin x$;
17. $\cos x$;
18. $\tan x$;

19. $\sec x$;

20. $\operatorname{cosec} x$;

21. \cot ;

22. $f(a) = e^x$;

23. $\ln x$

24. $Y = uv$;

25. $Y = u/v$

26. $Y = \sin^2 x$;

27. $\cos^2 x$;

28. $\sin x^2$;

29. $\cos x^2$;

30. $\cot^2 x$;

31. $\tan^2 x$

32. $Y = \sin \sqrt{x}$;

33. $\cos \sqrt{x}$;

34. $\sin 2x$;

35. $\cos 2x$