NCERT Solutions Class 11 Maths
Chapter 12: Limits and Derivatives
Miscellaneous Exercise on Chapter 12

Document Information:

Class: 11 | **Subject:** Mathematics | **Chapter:** 12 | **Exercise:** misc
Total Questions: 30 | **Academic Year:** 2025-26
Source: www.ncertbooks.net | **Generated:** February 21, 2026

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Question 1

QUESTION

Find the derivative of the following functions from first principle:

(i) -x

(ii) $(-x)^{-1}$

(iii) $\sin(x+1)$

(iv) $\cos\left(x-\tfrac{\pi}{8}\right)$

ANSWER

(i) -1

(ii) $\dfrac{1}{x^2}$

(iii) $\cos(x+1)$

(iv) $-\sin\left(x-\tfrac{\pi}{8}\right)$

Question 2

QUESTION

Find the derivative of x+a.

ANSWER

1

Question 3

QUESTION

Find the derivative of (px+q)\left((r)/(x)+s\right), where p,q,r,s are fixed non-zero constants.

ANSWER

-(qr)/(x^2)+ps

Question 4

QUESTION

Find the derivative of (ax+b)(cx+d)^2.

ANSWER

2c(ax+b)(cx+d)+a(cx+d)^2

Question 5

QUESTION

Find the derivative of (ax+b)/(cx+d).

ANSWER

(ad-bc)/((cx+d)^2)

Question 6

QUESTION

Find the derivative of $\left(1+\tfrac{1}{x}\right)\left(1-\tfrac{1}{x}\right)$.

ANSWER

$-\dfrac{2}{(x-1)^2},\ x\neq 0,1$

Question 7

QUESTION

Find the derivative of $\dfrac{1}{ax^2+bx+c}$.

ANSWER

$-\dfrac{2ax+b}{(ax^2+bx+c)^2}$

Question 8

QUESTION

Find the derivative of $\dfrac{ax+b}{px^2+qx+r}$.

ANSWER

$\dfrac{-apx^2+2bpx+ar-bq}{(px^2+qx+r)^2}$

Question 9

QUESTION

Find the derivative of $\dfrac{px^2+qx+r}{ax+b}$.

ANSWER

$\dfrac{apx^2+2bpx+bq-ar}{(ax+b)^2}$

Question 10

QUESTION

Find the derivative of $\frac{a}{x^4} - \frac{b}{x^2} + \cos x$.

ANSWER

$-\frac{4a}{x^5} + \frac{2b}{x^3} - \sin x$

Question 11

QUESTION

Find the derivative of $4\sqrt{x} - 2$.

ANSWER

$\frac{2}{\sqrt{x}}$

Question 12

QUESTION

Find the derivative of $(ax+b)^n$.

ANSWER

$na(ax+b)^{n-1}$

Question 13

QUESTION

Find the derivative of $(ax+b)^n(cx+d)^m$.

ANSWER

$(ax+b)^{n-1}(cx+d)^{m-1}\big[mc(ax+b)+na(cx+d)\big]$

Question 14

QUESTION

Find the derivative of $\sin(x+a)$.

ANSWER

$\cos(x+a)$

Question 15

QUESTION

Find the derivative of $\csc x \cot x$.

ANSWER

$-\csc^3 x - \csc x \cot^2 x$

Question 16

QUESTION

Find the derivative of $(\cos x)/(1+\sin x)$.

ANSWER

$-(1)/(1+\sin x)$

Question 17

QUESTION

Find the derivative of $(\sin x+\cos x)/(\sin x-\cos x)$.

ANSWER

$-(2)/((\sin x-\cos x)^2)$

Question 18

QUESTION

Find the derivative of $(\sec x - 1)/(\sec x + 1)$.

ANSWER

$(2\sec x \tan x)/((\sec x + 1)^2)$

Question 19

QUESTION

Find the derivative of $\sin^n x$.

ANSWER

$n \sin^{n-1} x \cos x$

Question 20

QUESTION

Find the derivative of $(a + b\sin x)/(c + d\cos x)$.

ANSWER

$(bc\cos x + ad\sin x + bd)/((c + d\cos x)^2)$

Question 21

QUESTION

Find the derivative of $(\sin(x+a))/(\cos x)$.

ANSWER

$(\cos a)/(\cos^2 x)$

Question 22

QUESTION

Find the derivative of $x^4(5\sin x - 3\cos x)$.

ANSWER

$x^3\big(5x\cos x + 3x\sin x + 20\sin x - 12\cos x\big)$

Question 23

QUESTION

Find the derivative of $(x^2+1)\cos x$.

ANSWER

$-x^2\sin x - \sin x + 2x\cos x$

Question 24

QUESTION

Find the derivative of $(ax^2+\sin x)(p+q\cos x)$.

ANSWER

$-q\sin x(ax^2+\sin x) + (p+q\cos x)(2ax+\cos x)$

Question 25

QUESTION

Find the derivative of $(x+\cos x)(x-\tan x)$.

ANSWER

$-\tan^2 x(x+\cos x) + (x-\tan x)(1-\sin x)$

Question 26

QUESTION

Find the derivative of $(4x+5\sin x)/(3x+7\cos x)$.

ANSWER

$(35+15x\cos x+28\cos x+28x\sin x-15\sin x)/((3x+7\cos x)^2)$

Question 27

QUESTION

Find the derivative of $x^2\cos\left(\tfrac{\pi}{4}\right)\sin x$.

ANSWER

$(x\cos\left(\tfrac{\pi}{4}\right)(2\sin x-x\cos x)\sin^2 x$

Question 28

QUESTION

Find the derivative of $(x)/(1+\tan x)$.

ANSWER

$1+\tan x-x\sec^2 x(1+\tan x)^2$

Question 29

QUESTION

Find the derivative of $(x+\sec x)(x-\tan x)$.

ANSWER

$(x+\sec x)(1-\sec^2 x)+(x-\tan x)(1+\sec x\tan x)$

Question 30

QUESTION

Find the derivative of $\frac{x}{\sin^n x}$.

ANSWER

$\frac{\sin x - nx\cos x}{\sin^{n+1} x}$

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