

Table of derivatives

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Introduction

This leaflet provides a table of common functions and their derivatives and the opportunity to practice using it.

The table of derivatives

$y = f(x)$	$\frac{dy}{dx} = f'(x)$
k , any constant	0
x	1
x^2	$2x$
x^3	$3x^2$
x^n , any constant n	nx^{n-1}
e^x	e^x
e^{kx}	ke^{kx}
$\ln x = \log_e x$	$\frac{1}{x}$

Exercises

1. In each case, use the table of derivatives to write down $\frac{dy}{dx}$.

a) $y = 8$

b) $y = -2$

c) $y = 0$

d) $y = x$

e) $y = x^5$

f) $y = x^7$

g) $y = x^{-3}$

h) $y = x^{1/2}$

i) $y = x^{-1/2}$

j) $y = e^{4x}$

k) $y = e^x$

l) $y = e^{-2x}$

m) $y = e^{-x}$

n) $y = \ln x$

o) $y = \log_e x$

p) $y = \sqrt{x}$

q) $y = \sqrt[3]{x}$

r) $y = \frac{1}{\sqrt{x}}$

s) $y = e^{x/2}$

2. You should be able to use the table when other variables are used. Find $\frac{dy}{dt}$ if

a) $y = e^{7t}$, b) $y = t^4$, c) $y = t^{-1}$, d) $y = \ln t$, e) $y = t^{2/3}$.

Answers

1. a) 0, b) 0, c) 0, d) 1, e) $5x^4$, f) $7x^6$, g) $-3x^{-4}$, h) $\frac{1}{2}x^{-1/2}$, i) $-\frac{1}{2}x^{-3/2}$, j) $4e^{4x}$,
k) e^x , l) $-2e^{-2x}$, m) $-e^{-x}$, n) $\frac{1}{x}$, o) $\frac{1}{x}$

p) $\frac{1}{2}x^{-1/2} = \frac{1}{2x^{1/2}} = \frac{1}{2\sqrt{x}}$, q) $\frac{1}{3}x^{-2/3} = \frac{1}{3x^{2/3}} = \frac{1}{3\sqrt[3]{x^2}}$, r) $-\frac{1}{2}x^{-3/2}$, s) $\frac{1}{2}e^{x/2}$.

2. a) $7e^{7t}$, b) $4t^3$, c) $-\frac{1}{t^2}$, d) $\frac{1}{t}$, e) $\frac{2}{3}t^{-1/3}$.