

## Derivatives of logarithmic Functions

Q Find  $\frac{dy}{dx}$  if:

1)  $y = \log_e x$

$y' =$

2)  $y = 4 \ln x$

$y' =$

3)  $y = \ln(4x)$

$y' =$

4)  $y = \ln(3x-1)$

$y' =$

5)  $y = \ln(x^2-1)$

$y' =$

6)  $y = \ln(x^2+x)$

$y' =$

7)  $y = 3 \ln(x^3-4x)$

$y' =$

8)  $y = x \cdot \ln x$

$y' =$

9)  $y = \frac{\ln x}{x}$

$y' =$

10)  $y = (x + \ln x)^4$

$y' =$

\* 11)  $y = \ln(2x+1)^5$

$y' =$

\* 12)  $y = 6 \ln \sqrt{3x-7}$

$y' =$

### ANSWERS

①  $y' = \frac{1}{x}$     ②  $y' = \frac{1}{x}$     ③  $y' = \frac{1}{x}$     ④  $y' = \frac{1}{x}$     ⑤  $y' = \frac{1}{x}$     ⑥  $y' = \frac{1}{x}$     ⑦  $y' = \frac{1}{x}$     ⑧  $y' = \frac{1}{x}$     ⑨  $y' = \frac{1}{x}$     ⑩  $y' = \frac{1}{x}$     ⑪  $y' = \frac{1}{x}$     ⑫  $y' = \frac{1}{x}$

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LESSON 64 - HW

Quest 1: Differentiate the following: -

(1)  $e^x$

(2)  $e^{6x}$

(3)  $e^{-3x}$

(4)  $\frac{1}{e^{2x}}$

(5)  $e^{x^2}$

(6)  $e^{2x-x^2}$

(7)  $6e^{4x}$

(8)  $\frac{5}{e^{5x}}$

(9)  $x \cdot e^x$

(10)  $x^2 \cdot e^{3x}$

(11)  $(e^x + 4)^3$

(12)  $\frac{e^x + 1}{e^x}$

(13)  $\frac{x^2 + 1}{e^{3x}}$

Quest 2: Find: -

(1)  $\int e^x dx$

(2)  $\int e^{5x} dx$

(3)  $\int 4e^{-2x} dx$

Quest 3: Evaluate: -

(1)  $\int_0^1 e^{2x} dx$

(2)  $\int_0^2 (3e^x + 1) dx$

**ANSWERS**

- (1)  $e^x$  (2)  $6e^{6x}$  (3)  $-3e^{-3x}$  (4)  $-2e^{-2x}$  (5)  $2x \cdot e^{x^2}$  (6)  $(2-2x) \cdot e^{2x-x^2}$  (7)  $24e^{4x}$  (8)  $-25e^{-5x}$  (9)  $(x+1)e^x$   
 (10)  $(x+3)e^{3x}$  (11)  $3(e^x+4)^2 \cdot x$  (12)  $\frac{e^{3x} + e^x}{2}$  (13)  $\frac{e^{3x}}{3} + \frac{x^2 + 1}{e^{3x}}$   
 (14)  $\frac{1}{2} e^2 - 1 \div 3.19$  (15)  $3e^2 - 1 \div 2.17$