

# Calculus BC

## Section 5.4 - Exponential Functions - Differentiation and Integration

Obj: - To find the derivative and integral of  $y = e^x$ .

$$y = \ln x \quad \text{or} \quad y = \log_e x \quad \text{or} \quad e^y = x$$

the inverse of the above is:

$$\ln(e^x) =$$

$$e^{\ln x} =$$

$$1. \ln e^3 =$$

$$2. \ln \sqrt{e} =$$

$$3. e^{4+\ln e} =$$

4.  $e^{-\ln x} =$

5. Solve for y:  $\ln y = -t + 5$

6. Solve for k:  $e^{3k} = 4$

The Derivative and Integral of  $e^x$

$\frac{d}{dx} e^x = e$	$\frac{d}{dx} e^u =$
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Deriving the derivative of  $e^x$ :

Let  $y = e^x$

-take the ln of both sides

-simplify

-implicit differentiation

-solve for  $\frac{dy}{dx}$

7.  $y = e^{-2x}$  find  $\frac{dy}{dx}$

8.  $y = e^{x^2} \cdot \ln x^3$  find  $\frac{dy}{dx}$

9.  $\int e^{\sin x} \cos x dx$

10.  $\int \frac{e^{\ln x}}{x} dx$