

# Lecture Handout #12: Oct 11

Online mid-semester course assessment: <https://tlt.stonybrook.edu/evaluate>

## Derivatives of Exponential Functions

Slope of the tangent line to  $f(x) = e^x$  at different values of  $x$ :

$x$	$f(x)$	$f'(x)$		$x$	$f(x)$	$f'(x)$
0	_____	_____		_____	_____	_____
1	_____	_____		_____	_____	_____
_____	_____	_____		_____	_____	_____

Derivative of  $f(x) = e^x$ :  $f'(x) =$  \_\_\_\_\_

Derivative of  $f(x) = e^{2x}$ :  $f'(x) =$  \_\_\_\_\_

Derivative of  $f(x) = e^{kx}$ :  $f'(x) =$  \_\_\_\_\_

## Derivatives of Logarithm Functions

Slope of the tangent line to  $f(x) = \ln x$  at different values of  $x$ :

$x$	$f'(x)$		$x$	$f'(x)$		$x$	$f'(x)$
1	_____		_____	_____		_____	_____
2	_____		_____	_____		_____	_____

Formula for the derivative of  $f(x) = \ln x$ :  $f'(x) =$  \_\_\_\_\_

## Applications

Mouse population:  $P(t) =$  \_\_\_\_\_ ( $t$  in months)

$P(12) =$  \_\_\_\_\_  $P'(t) =$  \_\_\_\_\_  $P'(12) =$  \_\_\_\_\_

Tangent line to  $h(x) =$  \_\_\_\_\_ at  $a =$  \_\_\_\_\_

$h(a) =$  \_\_\_\_\_  $h'(a) =$  \_\_\_\_\_  $y =$  \_\_\_\_\_