

## AP Calculus – 2.3b Notes Derivatives of $e^x$ , $\ln(x)$ , $\sin x$ , and $\cos x$ functions

### Recall:

$\ln 1 =$

$\ln 0 =$

$e^0 =$

$e^{\ln a} =$

$\ln e^a =$

### Derivatives of Exponential Functions

$$\frac{d}{dx} e^x =$$

### Derivatives of Logarithmic Functions

$$\frac{d}{dx} \ln x =$$

**Find the value of the derivative at the given point.**

4. If  $f(x) = 3 \ln x + e^x$ , find  $f'(5)$

5) What is the slope of the line tangent to the graph of  $y = 2 \ln(x)$  at the point  $x = 8$ ?

(A)  $\frac{1}{16}$

(B)  $\frac{1}{8}$

(C)  $\frac{1}{4}$

(D) 16

(E) 4

6) If  $f(x) = 4 \ln x - 3e^x + e$ , find  $f'(1)$

### Derivatives of $\cos x$ and $\sin x$

$$\frac{d}{dx} \cos x =$$

$$\frac{d}{dx} \sin x =$$

Example: Find  $f'(x)$  if  $f(x) = 2 \sin x - 5 \cos x$

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13. If  $f(x) = 4e^x + 5 \sin x$ , find  $f'(0)$

14. If  $f(x) = 2 \cos x + e^x$ , find  $f'(\pi)$

**Find the equation of the tangent line at the given  $x$ -value.**

15.  $f(x) = 3 \cos x + x$  at  $x = \frac{\pi}{2}$

16.  $f(x) = 4e^x - 3 \sin x + x^2$  at  $x = 0$