

DERIVATIVES OF EXPONENTIAL FUNCTIONS
AP CALCULUS

Answers
NAME _____

Find the derivative.

1. $f(x) = e^{2x}$

$$f'(x) = 2e^{2x} dx$$

2. $y = e^{\sqrt{x}}$

$$y' = \frac{e^{\sqrt{x}}}{2\sqrt{x}} dx$$

3. $g(t) = (e^{-t} + e^t)^3$

$$g'(t) = 3(e^{-t} + e^t)^2 (-e^{-t} + e^t)$$

4. $y = \ln(1 + e^{2x})$

$$y' = \frac{2e^{2x}}{1 + e^{2x}}$$

5. $y = \frac{2}{e^x + e^{-x}}$

$$y' = \frac{-2(e^x - e^{-x})}{(e^x + e^{-x})^2}$$

6. $y = e^x (\sin x + \cos x)$

$$y' = 2e^x \cos x dx$$

7. $f(x) = \int_x^{\ln x} \cos e^t dt$

$$f'(x) = \frac{\cos x}{x}$$

8. $xe^y - 10x + 3y = 0$

$$\frac{dy}{dx} = \frac{10 - e^y}{(xe^y + 3)}$$

Find the equation of the tangent line at the given point.

9. $f(x) = e^{1-x}; (1, 1)$

$$y = -x + 2$$

10. $y = \ln(e^{x^2}); (-2, 4)$

$$y = -4x - 4$$

11. $y = x^2 e^x - 2x e^x + 2e^x; (1, e)$ (Hint: Factor first)

$$y = ex$$

12. $f(x) = e^{-x} \ln x; (1, 0)$

$$y = \frac{1}{e}x - \frac{1}{e}$$

13. $xe^y + ye^x = 1; (0, 1)$

$$y = (-e-1)x + 1$$

Find any relative extrema and points of inflection.

14. $f(x) = \frac{e^x + e^{-x}}{2}$

Rel min $(0, 1)$

15. $f(x) = x^2 e^{-x}$

Rel min $(0, 0)$

Rel max $(2, \frac{4}{e^2})$

There is a p.o.i but don't find it!