

Exponentials

1. $y = e^{2x^2+2x}$

2. $y = 6^{2x}$

3. $y = \sin^2 x + 2^{\sin x}$

4. $y = xe^2 - e^{x^2}$

9. Find the equation of the indicated line to the graph of the given equation at the indicated point.

$y = xe^x - e^x$ at $x = 1$, tangent line

14. Determine $f'(x)$ when $f(x) = e^{\sqrt{3x+4}}$

(A) $f'(x) = \frac{3e^{\sqrt{3x+4}}}{\sqrt{3x+4}}$

(B) $f'(x) = \frac{3}{2}e^{\sqrt{3x+4}}\sqrt{3x+4}$

(C) $f'(x) = \frac{3e^{\sqrt{3x+4}}}{2\sqrt{3x+4}}$

(D) $f'(x) = 3e^{\sqrt{3x+4}}$

(E) $f'(x) = \frac{e^{\sqrt{3x+4}}}{2\sqrt{3x+4}}$

17. If f is the function defined by $f(x) = e^{2x} + 6e^{-2x}$, find the value of $f'(\ln 2)$.

(A) 6

(B) $\frac{9}{2}$

(C) $\frac{11}{2}$

(D) 5

(E) $\frac{13}{2}$

Logarithms

1. Find the derivative of each function with respect to x , given that a is a constant

(a) $y = x^a$

(b) $y = a^x$

(c) $y = x^x$

(d) $y = a^a$

4. Use implicit differentiation to find $\frac{dy}{dx}$.

(a) $x^2 - 3 \ln y + y^2 = 10$

(b) $\ln xy + 5x = 30$

13. Which of the following is the domain of $f'(x)$ if $f(x) = \log_2(x+3)$?
(A) $x < -3$ (B) $x \leq 3$ (C) $x \neq -3$ (D) $x > -3$ (E) $x \geq -3$

16. Find the derivative of $f(t) = \frac{2 \ln t}{3 + \ln t}$

(A) $f'(t) = \frac{2}{t(3 + \ln t)^2}$

(B) $f'(t) = \frac{6 \ln t}{(3 + \ln t)^2}$

(C) $f'(t) = \frac{6}{(3 + \ln t)^2}$

(D) $f'(t) = \frac{2}{t(3 + \ln t)}$

(E) $f'(t) = \frac{6}{t(3 + \ln t)^2}$

Inverse Trig Derivatives

1. Find the derivative with respect to the appropriate variable. **Simplify your expression.**

(a) $y = \sec^{-1}(x^2)$

(b) $y = s\sqrt{1-s^2} + \arccos s$

(c) $y = \frac{1}{\arcsin(2x)}$

(d) $y = \cot^{-1}\sqrt{t-1}$

(e) $y = \csc^{-1}\frac{x}{2}$

(f) $y = \sin(\arccost)$

11. The expression $f(x) = \sin(\tan^{-1} x)$ is equivalent to which algebraic identity?

(A) $f(x) = \frac{1}{\sqrt{1+x^2}}$

(B) $f(x) = \sqrt{1+x^2}$

(C) $f(x) = \frac{x}{\sqrt{1-x^2}}$

(D) $f(x) = \frac{x}{\sqrt{1+x^2}}$

(E) $f(x) = \frac{1}{\sqrt{1-x^2}}$