

IB CALCULUS TEST 2 REVIEW

Find the derivative of the following:

1. $y = e^{\tan x}$

2. $y = \sqrt[3]{2x+1}$

3. Completely simplify $\frac{dy}{dx}$ for $y = \frac{x^2 + 5x + 5}{x + 2}$.

4. What is the equation of the vertical asymptote of $y = \frac{x^2 + 5x + 5}{x + 2}$?

5. Let $f(x) = 3x^2$:

a. find the value of $\frac{f(-3+h) - f(-3)}{h}$ if $h = 0.1$

b. if h approaches 0, then to what value does $\frac{f(-3+h) - f(-3)}{h}$ converge to?

6. Consider the function $f(x) = 4x + k \cos x$, where k is a constant.

a. find the derivative of the function with respect to x .

b. When $x = \frac{5\pi}{6}$, the value of the slope is equal to -6 . Find the value of the constant k .

7. If $y = \ln(x^3) + 5 \sin^2 x$, what is $\frac{dy}{dx}$?

8. Let $f(x) = 2 \sin(2x) - 3$ where $0 \leq x \leq 2\pi$:

a. find $f'(x)$

b. find all values between $0 \leq x \leq 2\pi$ such that $f'(x) = 0$.

9. If $y = \ln(x^2 + 2x - 1)$, find $\frac{d^2y}{dx^2}$ (the second derivative).

10. If $f(x) = (x^2 + 10x + 5)^{\frac{3}{4}}$, then find $f'(1)$.

11. The value V of an item t years after it is purchased is $V = 15000e^{-0.6286t}$. Find the rate of change of V with respect to t when $t = 1$ and $t = 5$.

Find the equation of the tangent and normal line of each equation at the given points.

12. $(x^3 + 4x - 1)(x - 2)$ at the point $(1, -4)$

13. $f(x) = \frac{x}{x+4}$ at the point $(-5, 5)$