

Mastery Exam Practice 2

- (1) Compute the derivative of $f(x) = \frac{2}{x}$ using the definition of the derivative.
- (2) Find an equation of the tangent line to the curve $y = 3x + \sin(x)$ at the point where $x = 0$.
- (3) (a) If $10^{1.69} = 49$, what is an approximate value of $\log_{10}(7)$?
(b) Find $\tan(\frac{\pi}{6})$.
- (4) Let $f(x) = 2 \ln(x + 1) - 3$.
(a) Find a formula for f^{-1} .
(b) What is the domain of f^{-1} ? Explain.
- (5) Find the derivative of $f(x) = e^\pi + \cos(2x) \ln(x)$.
- (6) Find the derivative of $f(x) = 5^{(x^4 + \cos(x))} + x^6$.
- (7) Find the derivative of $f(x) = \frac{e^{15x} + 12x}{\sin(x)}$.
- (8) Sketch a graph of $g(x) = 1 + 3 \cos(3x)$. Indicate the scale on both the x and y axes.
- (9) Suppose that f is a function with derivative $f'(x) = (x^2 - 1)e^x$.
(a) Determine the set of points x on which f is increasing.
(b) Find all the stationary points of the function f .
(c) Which of the stationary points are maximum, minimum, or neither? Explain.
- (10) Find the equation of the tangent line to $\sin(xy) = x + y$ at the point $(0, 0)$.
- (11) If a culture of mold doubles in size every 8 hours and there is 5 grams of mold at noon, find an equation for the grams of mold in terms of hours past noon.