

Supplement: Practice/review problems

The collection of problems listed below contains questions taken from previous MA123 exams.

- [1]. Suppose that $f(x) = \ln(g(x))$. Assume that $g(5) = 3$ and $g'(5) = 4$. Find $f'(5)$.
- (a) $5/3$ (b) $3/5$ (c) $4/3$ (d) $3/4$ (e) Does not exist
- [2]. Suppose that $f(x) = e^{g(x)}$. Assume that $g(5) = 3$ and $g'(5) = 5$. Find $f'(5)$.
- (a) $5e^4$ (b) $5e^3$ (c) $3e^5$ (d) $4e^3$ (e) $3e^4$
- [3]. Find $f'(-1)$ where $f(x) = \frac{x}{e^x}$.
- (a) e^{-2} (b) $-e^{-2}$ (c) $2e$ (d) $-2e$ (e) $-e^{-1}$
- [4]. Find the equation of the tangent line to the graph of $f(x) = x^2e^x$ at $x = 1$.
- (a) $y = 3ex + 2e$ (b) $y = 2ex + 3e$ (c) $y = 3ex - 2e$
(d) $y = 2ex - 3e$ (e) $y = 2ex - e$
- [5]. Suppose that $Q(t) = Q_0e^{rt}$. Assume that $(0, 5)$ lies on the graph of $Q(t)$. Assume also that the slope of the tangent line to the graph of $Q(t)$ at $t = 0$ is 10. Find r .
- (a) 1 (b) 2 (c) e (d) 5 (e) 10
- [6]. The number of bacteria in a sample t hours from now is given by $Q(t) = Q_0e^{kt}$. If $Q(0) = 10,000$ and $Q'(0) = 20,000$, how many bacteria are there in 4 hours?
- (a) $10,000e^6$ (b) $10,000e^8$ (c) $10,000e^{10}$ (d) $10,000e^{12}$ (e) $10,000e^{16}$
- [7]. How many years will it take an investment to triple in value if the interest rate is 4% compounded continuously?
- (a) $\frac{\ln(3)}{.04}$ (b) 75 (c) $\frac{\ln(.04)}{3}$ (d) $\frac{3}{\ln(4)}$ (e) $\frac{\ln(3)}{4}$