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 $f(x) = \dfrac{x}{e^x}$.

(**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 $f(x) = x^2 e^x$ 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 $Q(t) = Q_0 e^{rt}$. 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 $Q(t) = Q_0 e^{kt}$. 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**) $\dfrac{\ln(3)}{.04}$ (**b**) 75   (**c**) $\dfrac{\ln(.04)}{3}$ (**d**) $\dfrac{3}{\ln(4)}$ (**e**) $\dfrac{\ln(3)}{4}$