

Practice the following problems related to the derivatives of exponential and logarithmic functions with natural base e .

Find the derivative of the following functions

6. $f(x) = x^5 - 2e^{6x}$

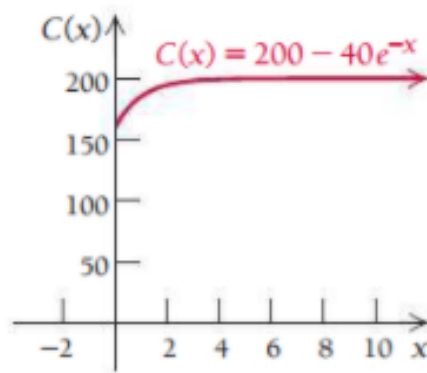
14. $f(x) = e^{-x^2+7x}$

18. $y = xe^{-2x} + e^{-x} + x^3$

48. **Marginal cost.** The total cost, in millions of dollars, for Marcotte Industries is given by

$$C(x) = 200 - 40e^{-x},$$

where x is the time in years since the start-up date.



Find each of the following.

- a) The marginal cost $C'(x)$
- b) $C'(1)$
- c) $C'(5)$ (Round to the nearest thousand.)
- d) Find $\lim_{x \rightarrow \infty} C(x)$ and $\lim_{x \rightarrow \infty} C'(x)$.

52. **Stock prices.** The value (price) of a share of stock in Barrington Gold was \$90 on June 15, 2018, and its value t weeks after that date is given by

$$V(t) = 90e^{0.0296t}.$$

- a) What was the rate of change in the value of a share of the stock on June 15, 2018?
- b) Use the model to estimate the value of a share of the stock 6 weeks prior to June 15, 2018.

Section 2.3

Find the derivative of the following functions

4. $f(x) = \ln(6x)$

8. $y = x^4 \ln x$

22. Find the equation of the line tangent to the graph of $y = \ln(4x^2 - 7)$ at $x = 2$.

28. **Marginal profit.** The profit, in thousands of dollars, from the sale of x thousand candles can be estimated by

$$P(x) = 2x - 0.3x \ln x.$$

- a) Find the marginal profit, $P'(x)$.
- b) Find $P'(150)$, and explain what this number represents.
- c) How many candles (in thousands) should be sold in order to achieve a marginal profit of \$750 per thousand candles?