

M119 – CHAPTER 4 REVIEW

- Write in logarithmic form: $20.0855 = e^3$
 - Write in exponential form: $\ln 8 = 2.079$
- Evaluate: (a) $e^{5 \ln 2 - 2 \ln 6}$, (b) $\ln \frac{e^2 \sqrt[3]{e^2}}{\sqrt{e}}$
- Use the calculator to sketch the graph of the function: $f(x) = 7x^4 e^{-x}$.
Indicate intercepts and asymptote(s), if any.
Use calculus to determine a) intervals of increase and decrease, b) relative extrema
- Use the calculator to sketch the graph of the function: $f(x) = \frac{4}{2 + e^{-x}}$.
Indicate intercepts and asymptote(s), if any.
Use calculus to determine intervals where the function is increasing and decreasing.
Justify answers.
- If $f(x) = 50 - Ae^{kx}$, $f(0) = 30$, and $f(4) = 5$, find $f(2)$.
- Solve for x : $-3 + 2 \ln x = 0$
- Solve for x : $3 = 2 + 5e^{-4x}$
- Solve for x : $\ln(x^2 - 8) = 0$
- Find the derivative: $f(x) = \ln(x)^5$
- Find the derivative: $f(x) = x \ln x$
- Find the derivative: $f(x) = e^{3x^2 + 4x + 1}$
- Find the derivative: $f(x) = \frac{3 \ln x}{x}$
- Find the derivative: $f(x) = 3x e^{-x^2}$
- Find the derivative: $f(x) = \frac{6x}{1 + e^{-x^2}}$
- Find the derivative: $f(x) = 3 - 2e^{-2x}$
- Find the derivative: $f(x) = \ln\left(\frac{x-4}{x+1}\right)$
- Find the derivative: $f(x) = \ln \sqrt{4x^2 - 5x}$

18. Determine where the given function is increasing and decreasing, Find the relative extrema and draw the graph:
 a) $f(x) = \frac{\ln x}{x^2}$ (b) $f(x) = 5x e^{-5x}$
19. If \$4,500 is invested at an annual interest rate of 12%, find the balance after 5 years if the interest is compounded:
 a) annually, b) quarterly, c) monthly, d) continuously
 e) Also find out how long will it take for money to triple if compounded continuously?
20. A home loan is made for \$200,000 at 6.75% annual interest, compounded monthly, for 15 years. What is the monthly mortgage payment on this loan?
 (use the program or formula on page 313)
21. Public health records indicate that t weeks after the outbreak of a certain form of influenza, approximately $Q(t) = \frac{15}{1+14e^{-1.4t}}$ thousand people had caught the disease.
 a) How many people had the disease when it broke out?
 b) When was the disease spreading most rapidly?
 c) Approximately how many people eventually contracted the disease?
22. Radium decays exponentially. Its half-life is 1,690 years. How long will it take for a 200-gram sample of radium to be reduced to 150 grams.
23. The daily output of a worker who has been on the job for t weeks is $Q(t) = 120 - Ae^{-kt}$ units. Initially the worker could produce 40 units per day, and after 8 weeks the worker could produce 80 units per day. How many units could the worker produce a day after 4 weeks?
24. A certain industrial machine depreciates so that its value after t years is $Q(t) = 20,000e^{-0.04t}$ dollars.
 a) At what rate is the value of the machine changing with respect to time after 5 years?
 b) At what percentage rate is the value of the machine changing with respect to time after t years.
25. The aerobic rating of a person x years old is $A(x) = \frac{110(\ln x) - 220}{x}$ for $x \geq 10$
 Use calculus to determine at what age aerobic capacity is maximized?

ALSO DO: Chapter 4 Checkup and Review

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