**I. True** or **False** problems testing concepts.

**II.** Given that $\log 5 = 0.699$ and $\log 4 = 0.602$, compute

- $\log 20$

- $\log 64$

- $\log \dfrac{1}{5}$

- $\log 0.2$

**III.** Write each expression as a sum and/or difference of logarithms. Express powers as factors.

- $\ln \left[ \dfrac{x^2 - x - 2}{(x+4)^2} \right]^{\frac{1}{3}}, \qquad x > 2$

- $\ln \dfrac{5x\sqrt{1+3x}}{(x-4)^3}, \qquad x > 4$

**IV.** Write each expression as a single logarithm.

- $2\log_2(x+1) - \log_2(x+3) - \log_2(x-1)$

- $\log \left( \dfrac{x^2 + 2x - 3}{x^2 - 4} \right) - \log \left( \dfrac{x^2 + 7x + 6}{x+2} \right)$

**V.** Solve the equations

- $2^{x+1} = 5^{1-2x}$

- $\ln(x+1) - \ln x = 3$

- $2^{2x} - 2^{x+2} - 12 = 0$

- $\log_{\frac{1}{3}}(x^2 + x) - \log_{\frac{1}{3}}(x^2 - x) = -1$

**VI.** Find the amount that results from each investment.

- $500 invested at 8% compounded quarterly after a period of $2\frac{1}{2}$ years.

- $100 invested at 12% compounded continuously after a period of $3\frac{3}{4}$ years

- $200 invested at 9% compounded weekly after a period of $2\frac{1}{4}$ years

**VII.** What rate of interest compounded annually is required to double an investment in 10 years?

**VIII.** Which is the better deal, 9% compounded quarterly or 9.24% compounded annually?

**IX.** How long will it take for an initial investment of $10,000 to grow to $25,000. Assume a rate of interest of 6% compounded continuously.