

**Term Test B version 2**

(1) [5 points] How long will it take the world population to double at an exponential growth rate of 1.93% per year?

(2) [5 points] Rewrite the expression as a single logarithm,

$$\frac{1}{3} \log(2x + 1) + \frac{1}{2} [\log(x - 4) - \log(x^4 - x^2 - 1)]$$

(3) [5 points] Solve the following equation,

$$\ln 2x - \ln 4 + \ln(x - 2) = 1$$

(4) [5 points] Suppose that you plan to need \$10,000 in thirty-six months' time when your child starts attending university. You want to invest in an instrument yielding 3.5% interest per year, compounded monthly. How much should you invest? Use the formula

$$A = P \left( 1 + \frac{r}{m} \right)^{mt}$$

(5) [5 points] Rewrite so that there is no logarithm of a product, quotient, root, or power,

$$\ln \frac{10^x}{x(x^2 + 1)(x^4 + 2)}$$

(6) [5 points] Suppose we are preparing a lovely *Canard à l'Orange* (roast duck with orange sauce). We first take our duck out of a 32°F refrigerator and place it in a 375°F oven to roast. After 12 minutes the internal temperature is 57°F. If we want to roast the duck until just under well-done (about 170°F internally), when will it be ready?

(7) [5 points] Evaluate without a calculator. Show all of your work.

$$\log_4 (2 \cdot \sqrt{32}) + \log_{27} \sqrt{3}$$

(8) [5 points] Solve the following equation,

$$3^{x^2} = 175^{x-1}$$