

**Term Test B version 1**

(1) [5 points] How long will it take the world population to double at an exponential growth rate of 1.37% per year?

(2) [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 36°F refrigerator and place it in a 350°F oven to roast. After 10 minutes the internal temperature is 53°F. If we want to roast the duck until just under well-done (about 170°F internally), when will it be ready?

(3) [5 points] Rewrite the expression as a single logarithm,

$$2(\log_5 x + 2\log_5 y - 3\log_5 z)$$

(4) [5 points] Solve the following equation,

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

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

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

(6) [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, compounded monthly. How much should you invest? Use the formula

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

(7) [5 points] Rewrite so that there is no logarithm of a product, quotient, root, or power,

$$\ln \frac{x^3 \sqrt{x-1}}{3x+4}$$

(8) [5 points] Evaluate without a calculator. Show all of your work.

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