1.5 if $k = 0.0193$

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?

36.26 yrs $\quad \frac{\ln 2}{\ln 1.0193}$

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

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

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

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

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

$x^2 - 2x - 2e = 0$ $\quad \delta = \{3.537\}$ not: -1.537

(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

$t = 36 \Rightarrow 2.5$

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

$9004.62 = \frac{10000}{\left(1 + \frac{0.035}{12}\right)^{36}}$

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

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

$x \ln 10 - \ln x - \ln(x^2+1) - \ln(x^4+2)$

(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.

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

$\frac{23}{12}$

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

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

$x^2 \ln 3 - x \ln 175 + \ln 75 = 0$

$k = \frac{1}{12} \ln \frac{57-375}{32-375} = -0.0063066$

$t = \frac{1}{k} \ln \frac{170-375}{32-375} = 81.616$