6 5
5 6
5 5
16 14

Term Test B

6

(1) [6 points] Solve the following three equations. Remember that the logarithm of a non-positive number is not defined.

$3^{2x-1} = 27$ $(2x-1)\ln 3 = 3\ln 3$ $2x-1=3$ $x=2$ $S=\{2\}$

$\log_2 x + \log_2(x-2) = 3$ $\log_2(x^2-2x) = \log_2 8$ $x^2-2x-8=0$ $(x-4)(x+2)=0$

$\ln(x+1)^2 = 2$ $2\ln(x+1)=2$ $x+1=e$ $x=e-1$ $S=\{e-1\}$ $S=\{4\}$

5

(2) [5 points] How long will it take the world population to double at an exponential growth rate of 1.64% per year?

$U_0 \leftrightarrow T$? (2)

5

(3) [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

(4) [5 points] Evaluate

$\log_4\left(2\cdot\sqrt{32}\right) + \log_{27}\sqrt{3}$ $\log_4\left(4^{\frac{1}{2}}\cdot 2^{\frac{5}{2}}\right) + \log_{27}\left(27^{\frac{1}{3}}\right)^{\frac{1}{2}} =$

$\log_4\left(4^{\frac{1}{2}}\cdot 4^{\frac{5}{4}}\right) + \log_{27} 27^{\frac{1}{6}} =$

$\frac{7}{4} + \frac{1}{6} = \frac{21}{12} + \frac{2}{12} = \frac{23}{12}$

1.91667

6

(5) [6 points] Solve the following three equations.

$7^{x-5} = 2$

$\ln(5-2x) = -2$

$6 - 5e^x = -e^{2x}$

5

(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

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

\$ 9004.62

$t=3$, not 36

$\rightarrow$ \$2841.74

3.