Pre calculus **REVIEW**
Test – Ch. 4 Part II

Name Key
Date_____ Hour_____

**Calculators may be used on this portion of the test.**

1. Evaluate the following. The the nearest hundredth.

A. $Log 834 =$

$\log 10^x = 834$ $\quad x = 2.92$

$x = \log 834$

B. $Ln 15 =$

$\ln e^x = \ln 15$

$x = \ln 15$

$x = 2.71$

2 – 4. Solve the following for $x$.

2. $4^{x+2} = 6$

$\ln 4^{x+2} = \ln 6$

$\frac{(x+2)\ln 4}{\ln 4} = \frac{\ln 6}{\ln 4}$

$x + 2 = \frac{\ln 6}{\ln 4} - 2$

$-2$

$x = -0.71$

3. $\frac{5e^{3x}}{5} = \frac{30}{5}$

$\ln e^{3x} = \ln 6$

$\frac{3x}{3} = \frac{\ln 6}{3}$

$x = 0.60$

4. $Log_2(x+2) + Log_2(x-2) = 5$

$\log_2[(x+2)(x-2)] = 5$

$2^5 = x^2 - 4$

$32 = x^2 - 4$

$+4 \quad +4$

$\sqrt{36} = \sqrt{x^2}$

$x = \pm 6$

$C = 20°C$ $t = 15$ min

5-6. A kettle full of water is brought to a boil in a room with temperature of 20 degrees Celsius. After 15 minutes the temperature of the water decreased from 100 degrees Celsius to 75 degrees Celsius. Find the temperature after another 10 minutes.

$T_0$ $T$

$$T = C + (T_0 - C)e^{Kt}$$

$$75 = 20 + (100 - 20)e^{K(15)}$$

$$-20 \quad -20$$

$$\frac{55}{80} = \frac{80e^{K(15)}}{80}$$

$$\ln 0.6875 = \ln e^{K(15)}$$

$$\frac{-0.375}{15} = \frac{15K}{15}$$

$$K = -0.025$$

$$T = 20 + (100 - 20)e^{-0.25(25)}$$

$$T = 20 + 80e^{-0.625}$$

$$T = 20 + 42.82$$

$$T = 62.82°C$$

7-8. A study showed that the population of the world at the end of the year 2003 was approximately 6.2 billion. Twenty-five years after the study was completed what would be the approximate population if it increases at the rate of 4 % per year?

$$A = 6.2e^{0.04(25)}$$

$$A = 16.85 \text{ billion}$$

9-10. Dr. Willard Libby, a nuclear chemist, developed radiocarbon dating in the 1940's. In 1951 he dated the Dead Sea scrolls using this technique. If he found 79.3 % of the original carbon-14 still present and Carbon-14 has a half-life of 5730 years, then in about what year were the scrolls made?

$$\ln \frac{1}{2} = \ln e^{K(5730)}$$

$$\frac{-0.693}{5730} = \frac{5730K}{5730}$$

$$K = -1.2094 E-4$$

$$-0.0001 2094$$

$$K = -0.000121$$

$$\ln 0.793 = \ln e^{-0.000121t}$$

$$\frac{-0.232}{-0.000121} = \frac{-0.000121t}{-0.000121}$$

$$t = 1917.36 \text{ years}$$

$$1951 - 1917.36$$

year 34