Date: ______________________

Today's Learning Goal(s):

By the end of the class, I will be able to:

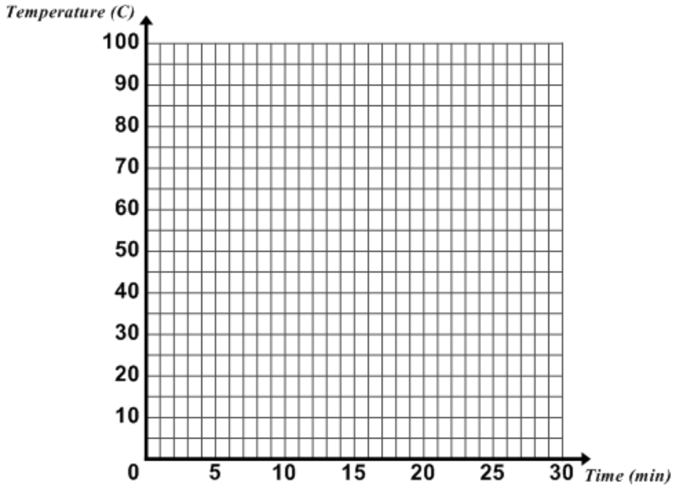
a) graph exponential functions using transformations.

Last day's work: pp. 261-262 # 1 – 8

Order Change Spring 2017

pp. 251-253 #1 – 5, 9, 10 [12 – 14]
(text quesons on following screens)

Cooling Curve



7. A cup of hot liquid was left to cool in a room whose temperature was 20 °C.
C The temperature changes with time according to the function $T(t) = 80\left(\frac{1}{2}\right)^{\frac{t}{30}} + 20$. Use your knowledge of transformations to sketch this function. Explain the meaning of the y-intercept and the asymptote in the context of this problem.

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 261-262 # 1 – 8

3d, 4d, 5, 8

Today's Homework Practice includes:

pp. 251-253 #(1,2)cd, 4c, 5cd, 10 [12 – 14]
(*Oponal Wkst 4.6 Extra Pracce*)

Tomorrow's Review: pp. 267-269 #(1 – 17)ace

Hwk p. 261 #3d

3. The growth in population of a small town since 1996 is given by the function $P(n) = 1250(1.03)^n$.

a) What is the initial population? Explain how you know.

b) What is the growth rate? Explain how you know.

c) Determine the population in the year 2007.

d) In which year does the population reach 2000 people?

3d) Let $P(n) = 2000$

$$2000 = 1250(1.03)^n$$

$$\frac{2000}{1250} = 1.03^n$$

$$1.6 = 1.03^n$$

$$n \doteq 15.9$$

*Extra Laws of Logarithms

$$1.6 = 1.03^n$$

$$\log 1.6 = \log 1.03^n$$

$$\log 1.6 = n \log 1.03$$

$$\frac{\log 1.6}{\log 1.03} = n$$

$$n \doteq 15.9$$

Hwk p. 261 #4d

4. A computer loses its value each month after it is purchased. Its value as a function of time, in months, is modelled by $V(m) = 1500(0.95)^m$.

a) What is the initial value of the computer? Explain how you know.

b) What is the rate of depreciation? Explain how you know.

c) Determine the value of the computer after 2 years.

d) In which month after it is purchased does the computer's worth fall below $900?

Let $V(m) = 900$

$\therefore 900 = 1500(0.95)^m$

$\frac{900}{1500} = 0.95^m$

$0.6 = 0.95^m$

$\log 0.6 = \log 0.95^m$

$\log 0.6 = m \log 0.95$

$\frac{\log 0.6}{\log 0.95} = m$

$m \doteq 9.9589$

Check $\doteq 9.96$

$V(9.96) = 1500(0.95)^{9.96}$

Hwk p. 261 #5

5. In 1990, a sum of $1000 is invested at a rate of 6% per year for 15 years.

a) What is the growth rate?

b) What is the initial amount?

c) How many growth periods are there?

d) Write an equation that models the growth of the investment, and use it to determine the value of the investment after 15 years.

a) 0.06

$r = 1 + 0.06$

$= 1.06$

b) 1000

c) 15 periods

d) $A = 1000(1.06)^{15}$

$\doteq 2396.558$

$\doteq \$2396.56$

$A = P + I$

$I = A - P$

Hwk p. 262 #8

8. A town with a population of 12 000 has been growing at an average rate of 2.5% for the last 10 years. Suppose this growth rate will be maintained in the future. The function that models the town's growth is

$$P(n) = 12(1.025^n)$$

where $P(n)$ represents the population (in thousands) and n is the number of years from now.

a) Determine the population of the town in 10 years.

b) Determine the number of years until the population doubles.

c) Use this equation (or another method) to determine the number of years ago that the population was 8000. Answer to the nearest year.

d) What are the domain and range of the function?

a) $n = 10$

$p(10) = 12(1.025^{10})$

b) Let $P(n) = 24$

$24 = 12(1.025^n)$

$\frac{24}{12} = 1.025^n$

$2 = 1.025^n$ ← logs

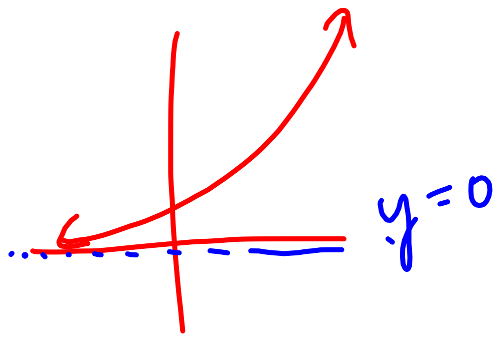
c) Let $p(n) = 8$

$8 = 12(1.025)^n$

$\frac{8}{12} = 1.025^n$

$\log\left(\frac{8}{12}\right) = n \log 1.025$

d) $p(n) = 12(1.025^n)$



d) $D: \{n \in \mathbb{R}\}$

$R: \{P \in \mathbb{R} \mid P > 0\}$