Exponential Functions - What did you learn from reading section 1.2?

1. Definition:

P is an exponential function of t with base a if $P = P_0\, a^t$, where P_0 is the initial quantity (when t=0) and a is the factor by which P changes when t increases by 1.

2. How to recognize exponential growth or decay from a table

If data come from an exponential function $P = P_0\, a^t$, the ratios of P values are constant for equally spaced t values.

Are these tables generated by an exponential function?

t	P
10	2
13	8
16	32

t	P
6	4
9	6
15	9

3. Shapes of graphs

Concave up = Concave down =

(why are they telling me this here?, something to do with exponential functions?)

4. Growth? Decay? From the Mexico population and the drug elimination example:

Population growth in Mexico is modeled by:	*Drug elimination is modeled by:*
$P = 67.38(1{,}026)^t$	$Q = 250(0.6)^t$
Growth factor =	*Decay factor=*

What does the factor do?

How do we know growth from decay?

5. Natural exponential base "e"

Growth $P = P_0\, a^t = P_0\, e^{kt}$, $a > 1, k > 0$.

Decay $P = P_0\, a^t = P_0\, e^{-kt}$, $0 < a < 1, k > 0$.

k – continuous rate.

6. Half-life and doubling time (they didn't do anything with this, we'll probably use it later…)

Half-life = Time required for an exponentially decaying quantity to be reduced by a factor of one half.

Doubling time = Time required for an exponentially increasing quantity to double.

7. What where the examples about?

- Find exponential function given initial quantity, P_0 , and exponential growth/decay factor a. (Mexico and drug examples)
- Graphically, what happens if we change initial amount and/or growth factor. (Example 2)
- Find exponential function given two points. (Example 1)
- Convert $P = P_0\, a^t$ to $Y = P_0\, e^{kt}$ or $Y = P_0\, e^{-kt}$ (Example 3)
- Model that involves an exponential function (Example 4)

8. From quiz

When the Olympic Games were held outside Mexico City in 1968, there was much discussion about the effect the high altitude (7340 feet) would have on the athletes. Assuming air pressure decays exponentially by 0.4% every 100 feet, by what percentage is air pressure reduced by moving from sea level to Mexico City?