# REVIEW OF LOGS

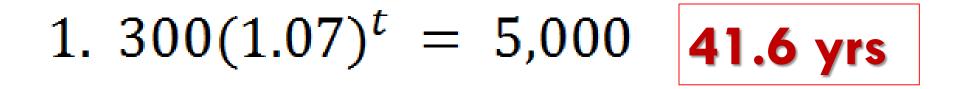
Please get into groups for the day.

Solve for t.

1.  $300(1.07)^t = 5,000$ 

2. 
$$6000 = 200\left(1 + \frac{.15}{4}\right)^{4t}$$

3.  $500 = 150e^{0.12t}$ 



2.  $6000 = 200 \left(1 + \frac{.15}{4}\right)^{4\iota}$  **23.1 yrs** 

### 3. $500 = 150e^{0.12t}$



## SOLVING WORD PROBLEMS

#### Sequences & Series Word Problems

- Determine if it is a Sequence or a Series are you being asked for a specific event/amount or the sum of events/amounts?
- Determine if it's Arithmetic or Geometric is there a common difference or ratio between the given pieces of data?
- Determine which formula to use

A mine worker discovers an ore sample containing 500 **Ex1.** mg of radioactive material. It is discovered that the radioactive material has a **half life** of 1 day. Find the amount of radioactive material in the sample at the beginning of the 7<sup>th</sup> day.

 Geometric Sequence
  $a_n = a_1 \cdot r^{(n-1)}$ 
 $a_1 = 500$   $a_7 = 500 \cdot .5^{(7-1)}$  

 r = .5  $a_7 = 500 \cdot .5^{(6)}$  

 n = 7  $a_7 = 500 \cdot .0156$ 
 $a_7 = 7.8125$ 

The sum of the interior angles of a triangle is 180°, of **Ex2.** a quadrilateral is 360° and of a pentagon is 540°. Assuming this pattern continues, find the sum of the interior angles of a dodecagon (12 sides) then find the sum of all the shapes interior angles.

Arithmetic Series

- a1 = 180
- n = 10
- d = 180
- Find 12<sup>th</sup> term
- Find the sum

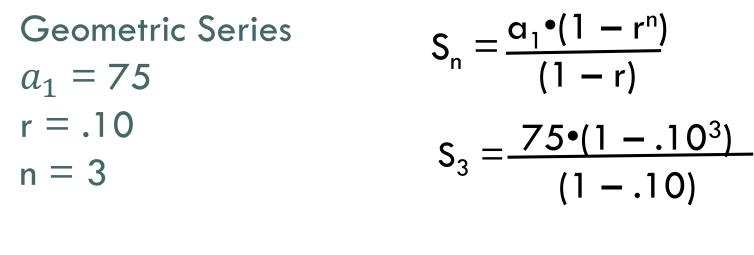
 $a_n = a_1 + (n - 1) \cdot d$  $a_{12} = 180 + (10 - 1) \cdot 180$  $a_{12} = 2160$ 

$$S_n = \frac{n}{2} (a_1 + a_n)$$

 $S_{12} = \frac{12}{2} (180 + 2160)$ 

 $S_{12} = 14,040$ 

The hotel tells you that they will increase the Ex3. temperature by 10% each hour. If the current temperature of the hot tub is 75° F, what will be the temperature of the hot tub after 3 hours, to the nearest tenth of a degree?



$$S_3 = 83.25^{\circ}$$

#### **Investment Formulas:**

- $\square$  P<sub>o</sub>= principal or initial amount (can use either)
- $\square$  A = investment amount accumulated after a period of time
- r = rate at which an investment amount can grow (as a decimal)
- $\Box$  t = number of years
- $\Box$  n = number of times an investment is compounded per year
  - Annually once a year
  - Semiannually twice a year
  - Quarterly every four months
  - Monthly 12 times a year
  - Continuously every day, 365 times

#### Types of Compounding Interest:

- Not Continuous
  - Annually
  - Semiannually
  - Quarterly
  - Monthly

- Continuously
  - Accruing interest every day

$$A = P_o \left( 1 \pm r \right)^t$$

How long will it take \$30,000 to accumulate to \$110,000 in a trust that earns a 10% annual interest compounded monthly?

$$A = P_o \mathop{\rm e}\limits^{\mathfrak{A}} 1 \pm \frac{r \, \overset{\, \circ}{\mathbf{0}}^{nt}}{n \, \overset{\, \circ}{\mathbf{0}}}$$

How long will it take \$30,000 to accumulate to
 DOUBLE in a trust that earns a 10% annual interest compounded continuously?

$$A = P_o \left(1 \pm r\right)^t$$

#### **Group Activity**

- Select an interest rate (r)
- □ Select an initial investment amount (P<sub>o</sub>)
- Calculate how long it would take your investment to be worth \$100,000 compounded....
  - 1. Annually
  - **2**. Monthly
  - **3.** Continuously

Solve each equation for "r"

1. 
$$4000 = 2500(1+r)^5$$
 **0.1 or 10%**

2. 7000 = 200 
$$\left(1 + \frac{r}{4}\right)^{24}$$
 **0.64 or 64%**

3.  $800 = 120e^{3r}$ 



Solve each equation for " $P_0$ "

1. 8,500 = 
$$P_0(1.09)^8$$



2. 
$$P_0 \left( 1 + \frac{0.10}{12} \right)^{36} = 15,000$$
 **11,126.10**

3. 
$$P_0 e^{(0.14 \cdot 6)} = 12,000$$
 **5,180.53**

#### Ticket Out:

1. At what rate of interest would a person need to invest in order to turn \$200.00 into \$5,000 in 6 years if compounded monthly?

2. A student wants to save \$8000 for college in 5 years. How much should be put into an account that pays 5.2% annual interest compounded continuously?