

Ch. 1 Review

Note Title

2/10/2014

1. 8, 3, -2, -7, ... which term is -5002 *arithmetic*

$$t_n = -5002$$

$$n = ?$$

$$-5002 = 8 + (n-1)(-5)$$

$$t_1 = 8$$

$$-8 \quad -8$$

$$d = -5$$

$$\begin{array}{r} -5010 = -5n + 5 \\ -5 \quad -5 \end{array}$$

$$\begin{array}{r} -5015 = -5n \\ -5 \quad -5 \end{array}$$

$$\rightarrow \boxed{n = 1003}$$

2. Determine the sum of S_n *geometric*

$$-700 + 350 - 175 + \dots + 5.46875$$

$$t_1 = -700$$

$$r = \frac{350}{-700} = -\frac{1}{2}$$

$$t_n = 5.46875$$

$$n = ?$$

$$t_n = t_1 \cdot r^{n-1}$$

$$\frac{5.46875}{-700} = \frac{(-700)(-\frac{1}{2})^{n-1}}{-700}$$

$$-0.0078125 = (-0.5)^{n-1}$$

$$\therefore n = 8$$

$$S_8 = \frac{-700(1 - (-\frac{1}{2})^8)}{1 - (-\frac{1}{2})}$$

$$= \boxed{-464.8}$$

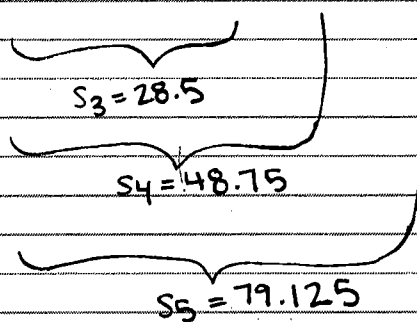
$$-0.0078125 = (-0.5)^{n-1} \quad \text{*guess*}$$

3. $S_3 = 28.5$, $S_4 = 48.75$, and $S_5 = 79.125$

What is the first term of this geometric series?

$$t_1 \quad t_2 \quad t_3 \quad t_4 \quad t_5$$

$$+ \quad + \quad + 20.25 + 30.375$$



$$t_5 = S_5 - S_4$$

$$= 79.125 - 48.75$$

$$= 30.375$$

$$t_4 = S_4 - S_3$$

$$= 48.75 - 28.5$$

$$= 20.25$$

$$r = \frac{30.375}{20.25} = 1.5$$

$$\begin{array}{cccc} 6 & 9 & 13.5 & 20.25 \\ \uparrow & \uparrow & \uparrow & \\ \div 1.5 & \div 1.5 & \div 1.5 & \end{array}$$

$$\boxed{t_1 = 6}$$

4. A ball is dropped from a height of 20 feet. Each time it bounces, it rebounds to 80% of its previous height. Determine the total vertical distance the ball has travelled after it hits the ground for
- the third time?
 - the ninth time?

5. In an arithmetic sequence:

$t_2 = 4.5$ and $t_{20} = 58.5$, what is S_{15} ?

$$\begin{array}{ccccccc} 4.5 & & & & & & 58.5 \\ \hline t_2 & t_3 & t_4 & \dots & t_{19} & t_{20} & \\ \hline \end{array}$$

$$S_n = \frac{n(2t_1 + (n-1)d)}{2}$$

$$\begin{array}{r} 4.5 + 18d = 58.5 \\ -4.5 \qquad -4.5 \\ \hline \end{array}$$

$$S_{15} = \frac{15(2(1.5) + (15-1)(3))}{2}$$

$$18d = 54$$

$$= \frac{15(3 + 14(3))}{2}$$

$$\boxed{d = 3}$$

$$\begin{array}{cc} 1.5 & 4.5 \\ \hline t_1 & t_2 \end{array}$$

$$\boxed{= 337.5}$$

$$\begin{array}{c} \curvearrowright \\ = 3 \end{array}$$

6. Determine the value of x in the following arithmetic sequence:

$$3x-6, 4+2x, 19$$

$$t_1 \quad t_2 \quad t_3$$

Arithmetic means: $t_2 - t_1 = t_3 - t_2$

$$(4+2x) - (3x-6) = 19 - (4+2x)$$

$$4+2x - 3x + 6 = 19 - 4 - 2x$$

$$-x + 10 = 15 - 2x$$

$$+2x \quad +10 \quad -10 \quad +2x$$

$$\boxed{x = 5}$$

7. Determine the number of terms of the following sigma notations, then determine the sum.

a) $\sum_{k=1}^5 k$ # of terms:
 $5 - 1 + 1 = 5$

$$(1) + (2) + (3) + (4) + (5) \\ = 15$$

b) $\sum_{k=1}^7 (2k-1)$ # of terms:
 $7 - 1 + 1 = 7$

$$(2(1)-1) + (2(2)-1) + (2(3)-1) + (2(4)-1) \\ + (2(5)-1) + (2(6)-1) + (2(7)-1)$$

$$= 49$$

c) $\sum_{k=1}^8 2 \cdot 3^{k-1}$

