Consider the sequence -6, -13, -20, ... -27, -34, ...

a) Is the sequence arithmetic? How do you know?

Yes, going down by 7 each term.

b) Determine an explicit formula for the sequence

$t_n = -7n + 1$

c) Determine the value of the 17th term.

$t_{17} = -7(17) + 1$

$= -119 + 1$

$= -118$

d) Write a recursive formula for the sequence.

$t_1 = -6$

$t_n = t_{n-1} - 7$

Arithmetic Sequences

goes up/down by the same amount

list of numbers.

Add/Subtract to get the next term.

$$t_n = a + (n-1)d$$

$a \rightarrow$ first term

$d \rightarrow$ common difference

Determine the number of terms in the sequence

5, 10, 15, 20, ..., 200

$a = 5$

$d = 5$

$t_n = 5 + (n-1)5$

$t_n = 5 + 5n - 5$

$\underline{t_n} = 5\underline{n}$

$\frac{200}{5} = \frac{5n}{5}$

$40 = n$

-15, -12, -9, ..., 66

$a = -15$

$d = 3$

$t_n = -15 + (n-1)3$

$= -15 + 3n - 3$

$t_n = -18 + 3n$

$66 = -18 + 3n$

$\frac{84}{3} = \frac{3n}{3}$

$\boxed{28 = n}$

If term 8 is 33 and term 14 is 57 and the sequence is arithmetic. Determine "a" and "d" as well as a formula for the general term.

$t_8 = 33$

$t_{14} = 57$

$t_{14} \to t_8 = 6$ terms

$57 - 33 = 24$

$\frac{24}{6} = 4 \quad \therefore d = 4$

$t_n = a + (n-1)d$

$33 = a + (8-1)4$

$33 = a + 28$

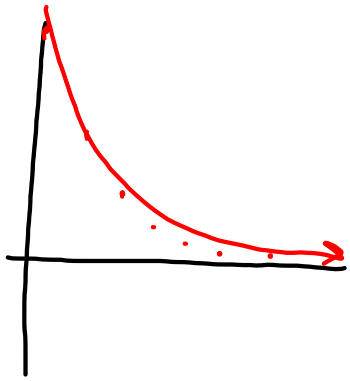
$5 = a$

$\therefore a = 5, \; d = 4$

and $\boxed{t_n = 4n + 1}$

Geometric Sequence

Time	Amount
0	50
1	25
2	12.5
3	6.25
4	3.125
5	1.5625



$$t_1 = 50$$

$$t_2 = 50\left(\tfrac{1}{2}\right)$$

$$t_3 = 50\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right)$$

$$t_4 = 50\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right)$$

$$t_5 = 50\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right)$$

$$t_n = 50\left(\tfrac{1}{2}\right)^{n-1}$$

$$\boxed{t_n = a(r)^{n-1}}$$

$a \rightarrow$ first term

$r \rightarrow$ common ratio

Investigate

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1, 2, 5, 6, 9