Questions from Quiz

② Find "a", "r", and the general term

$t_3 = \frac{1}{3}$ $\quad$ $t_8 = 81$

$t_3 = ar^{3-1}$ $\quad$ $t_8 = ar^{8-1}$

$t_3 = ar^2$ $\quad$ $t_8 = ar^7$

$ar^2 = \frac{1}{3}$ $\quad$ $ar^7 = 81$

$$\frac{ar^7 = 81}{ar^2 = \frac{1}{3}}$$

$r^5 = 243$

$r = 3$

$ar^2 = \frac{1}{3}$

$a(3)^2 = \frac{1}{3}$

$9a = \frac{1}{3}$

$a = \frac{1}{27}$

$t_n = ar^{n-1}$

$t_n = \left(\frac{1}{27}\right)(3)^{n-1}$

$t_n = (3)^{-3}(3)^{n-1}$

$t_n = 3^{n-4}$

Questions from Homework

② $a = 25$

$t_n = 750$

$d = 5$

$n =$

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

$750 = 25 + (n-1)5$

$725 = 5n - 5$

$730 = 5n$

$146 = n$

There are 146 multiples of 5 between 25 & 750 inclusive

⑦ $a = 52$

$n = 5$

$r = 0.8$ (20% decrease)

$S_5 =$

$S_n = \frac{a(r^n - 1)}{r - 1}$

$S_5 = \frac{52(0.8^5 - 1)}{0.8 - 1}$

$= \frac{52(0.32768 - 1)}{-0.2}$

$= \frac{52(-0.67232)}{-0.2}$

$= \frac{34.9606}{-0.2}$

$= 174.8$

$= 175$

There were 175 deaths in the past 5 years.

Sigma Notation

For the ***sequence*** 1, 2, 4, 8, 16, 32, 64 there is an associated sum called a ***series.***

The Greek symbol ∑ (sigma) is used to write the series in compact form.

$$1+2+4+\ldots+64 = \sum_{n=1}^{7} 2^{n-1}$$

the terms form a geometric sequence with a = 1, r = 2, $t_n = 1(2)^{n-1}$

This symbol is read as "the sum of the terms of the sequence given by $t_n=2^{n-1}$ from n = 1 to n = 7"

We can also say:

$$S_7 = \sum_{n=1}^{7} 2^{n-1}$$

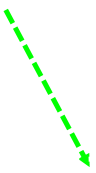
Find each sum:

$$\sum_{n=1}^{4} n^2$$

$$= (1)^2 + (2)^2 + (3)^2 + (4)^2$$
$$= 1 + 4 + 9 + 16$$
$$= 30$$

$$\sum_{n=1}^{5} 3n + 2$$

$$= 5 + 8 + 11 + 14 + 17$$
$$= 55$$



$$3n + 2$$
$$= 3(4) + 2$$
$$= 14$$

Write the following series in ***Sigma Notation***

$2+5+8+11+14.$

What type of series is it? arithmetic

Find t_n

$a = 2$

$d = 3$

$t_n = 2 + (n-1)(3)$

$= 2 + 3n - 3$

$= 3n - 1$

Sigma Notation

$$\sum_{n=1}^{5} 3n - 1$$

$$\sum_{n=3}^{6} n^2 + 1$$

$= (3)^2+1 + (4)^2+1 + (5)^2+1 + (6)^2+1$

$= 10 + 17 + 26 + 37$

$= 90$

Homework