# Review:

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2:46 PM

Give a formula for the $n^{th}$ term of the following sequences. Also, state whether the sequence is arithmetic, geometric, or neither

a) $\frac{1}{9}, -\frac{1}{3}, 1, -3, \ldots$

b) $5, 9, 13, 17, \ldots$

c) $1, 8, 27, 64, \ldots$

a) geometric $r = -3$

general:

$$a_n = a_1 r^{n-1}$$
$$= \frac{1}{9}(-3)^{n-1}$$

recursive:

$$\begin{cases} a_1 = \frac{1}{9} \\ a_n = a_{n-1}(-3) \end{cases}$$

but <u>not</u> $a_n = a_{n-1} - 3$

b) arithmetic $d = 4$

general:

$$a_n = a_1 + (n-1)d$$
$$= 5 + (n-1)\cdot 4$$
$$= 5 + 4n - 4$$
$$= 4n + 1$$

recursive:

$$\begin{cases} a_1 = 5 \\ a_n = a_{n-1} + 4 \end{cases}$$

c) ① 1, ② 8, ③ 27, ④ 64

neither

$a_n = n^3$

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evaluate: $\sum_{k=0}^{\infty} (0.2)^k = (0.2)^0 + (0.2)^1 + (0.2)^2 + \ldots$ ($k=0$, $1$, $2$)

$= 1 + 0.2 + 0.04 + \ldots$

geometric $r = 0.2$ $\quad |r| < 1$ ? $\quad -1 < r < 1$ ? ✓

$S_\infty = \frac{a_1}{1-r}$

$= \frac{1}{1-0.2} = 1.25$

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solve $\log_2 \sqrt{x-1} = 3$ $\quad a = b^c$ $\quad \log_b a = c$

$\sqrt{x-1} = 2^3$

$\sqrt{x-1} = 8$

$x-1 = 64$

$x = 65$

Solve:

$$7^{x+5} = 8$$

$$\log 7^{x+5} = \log 8$$

$$\frac{(x+5)\log 7}{\log 7} = \frac{\log 8}{\log 7}$$

$$x+5 = \frac{\log 8}{\log 7}$$

$$x = \frac{\log 8}{\log 7} - 5$$