Name KEY

Precalculus Unit 12: 12.1-12.3 Review

Sequences and Series

1. For the sequence $a_n = -8n+3$, find a_1 and a_{15}.

$a_1 = -8(1)+3 = -5 \quad a_{15} = -8(15)+3 = -117$

$a_1 = -5$
$a_{15} = -117$

2. Write the first five terms of the sequence starting with $n=1$.

a. $a_n = \frac{(3n+4)!}{(3n)!}$

$a_1 = 840 \quad a_2 = 5040 \quad a_3 = 17160 \quad a_4 = 43{,}680 \quad a_5 = 93{,}024$

b. $a_n = 8\left(\frac{1}{4}\right)^{n-1}$

$a_1 = 8 \quad a_2 = 2 \quad a_3 = \frac{1}{2} \quad a_4 = \frac{1}{8} \quad a_5 = \frac{1}{32}$

c. The arithmetic sequence with $a_1 = -3$, $d = 7$

$a_1 = -3 \quad a_2 = 4 \quad a_3 = 11 \quad a_4 = 18 \quad a_5 = 25$

d. The geometric sequence with $a_1 = \frac{1}{3}$, $r = 4$

$a_1 = \frac{1}{3} \quad a_2 = \frac{4}{3} \quad a_3 = \frac{16}{3} \quad a_4 = \frac{64}{3} \quad a_5 = \frac{256}{3}$

3. Write the following sum in sigma notation: $6.6 + 17.1 + 27.6 + 38.1 + 48.6 + 59.1$

$$\sum_{n=1}^{6} (10.5n - 3.9)$$

4. Find a general formula for the following sequences:

a. 8, 6, 4, 2, ... arithmetic $d = -2$

$a_n = -2n + 10$

b. An arithmetic sequence where $a_1 = 3$ and $a_6 = 18$

$(1,3) \quad (6,18)$

$m = \frac{18-3}{6-1} = \frac{15}{5} = 3$

$3 = 3(1) + b$

$0 = b$

$a_n = 3n$

c. 3, -15, 75, -375, ... geometric $r=-5$

$a_n = 3\cdot(-5)^{n-1}$

d. A geometric sequence where $a_1 = 25$ and $a_4 = 675$

$a_n = 25(3)^{n-1}$

$a_4 = 25\cdot r^3$
$675 = 25\cdot r^3$
$27 = r^3$
$r = 3$

5. Evaluate the following series:

a. $\sum_{n=1}^{5}(3n-4)$ = $-1 + \ldots + 11$

$= (10)(2.5) = 25$

b. $\sum_{i=3}^{6}\left(\frac{(2i)!}{2}\right)$ (You can use your calculator/computer for this one.)

$= 870$

c. Find S_{12} for -47, -17, 13, 43,... ,

+30

$a_n = 30n - 77$
$a_{12} = 283$

$S_{12} = (-47+283)(6)$
$= (236)(6) = 1416$

d. Find S_5 for $2, \frac{8}{5}, \frac{32}{25}, \frac{128}{125}, \ldots$

$r = 4/5$

$S_5 = 2\left(\frac{1-(4/5)^5}{1-4/5}\right) = \frac{4202}{625} \approx 6.7232$

e. $\sum_{n=1}^{\infty}\left(-3\left(\frac{2}{5}\right)^{n-1}\right)$

$S_\infty = \frac{-3}{1-2/5} = \frac{-3}{3/5} = -5$