

Sequences/Sigma Notation QUIZ 2013

Online Version

SHOW ALL WORK FOR FULL CREDIT. Calculators may be used to do simple arithmetic, but all calculations must be written out in full.

1. Find the first four terms of the sequence AND tell whether the sequence is arithmetic, geometric, or neither.

a.
$$a_n = 2 + \frac{n^2 + 6n + 9}{n + 3}$$

b.
$$a_n = \frac{(n-1)!}{n!}$$

c.
$$a_n = 2 \cdot \frac{1}{2}^{n+2}$$

d.
$$a_1 = 4; \quad a_n = a_{n-1} \cdot \sqrt{2} \sin\left(\frac{(2n-1)\pi}{4}\right)$$

Name: _____

ID: A

2. Write both an explicit AND a recursive formula for each of the following sequences.

a. $72, -8, \frac{8}{9}, -\frac{8}{81}$

b. An arithmetic sequence whose 2nd term is -2 and whose 4th term is -40.

3. In a geometric sequence, $a_4 = 18$ and $a_9 = 4374$. Find a_2 .

4. Find the sum: $\sum_{n=1}^{100} \frac{1}{n} - \frac{1}{n+1}$

5. Expand fully (write out all terms in the series) and find the sum.

$$\sum_{n=2}^6 \frac{(n-3)^2}{n} \cos n\pi$$

6. The Bridgewater-Raritan school budget is \$139,515,108 for 2013-2014. By recent legislation, the school budget can increase by a maximum of 2% per year without submitting any proposals to the public.

Assuming a 2% increase per year, write a formula describing the school budget amount n years from 2013.

Calculate the school budget amount in 2026.

7. At sunrise at 6AM the temperature was 63 degrees. As the day went on, the temperature rose by 2.5 degrees per hour.

Give a formula for the temperature n hours after sunrise.

The thermometer read 88 degrees. What time was it?

Name: _____

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8. Write each of the following series in sigma notation. DO NOT find the sum.

a. $\frac{5}{6} + \frac{2}{3} + \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$

b. $\frac{11}{6} + \frac{2}{7} - \frac{7}{8} - \frac{16}{9}$

c. $\frac{1}{9} + \frac{1}{3} + 1 + \dots + 6561$

d. $0.3 - 0.003 + 0.00003 - 0.0000003 + 0.000000003$

e. $1 + \frac{\sqrt{3}}{2} + \frac{1}{2} + 0 - \frac{1}{2} - \frac{\sqrt{3}}{2}$

Sequences / Sigma Notation QUIZ 2013 Answer Key

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1. a) 6, 7, 8, 9 arithmetic
b) $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ neither
c) $\frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}$ geometric
d) 4, 4, -4, 4 neither

2. a) $a_n = 72(-\frac{1}{9})^{n-1}$

$$a_1 = 72$$

$$a_n = (-\frac{1}{9})a_{n-1}$$

b) $a_n = -19n + 36$

$$a_1 = 17$$

$$a_n = a_{n-1} - 19$$

3. $a_2 = 2$

4. $100/101$ (haven't done this yet)

5. $\frac{1}{2} + 0 + \frac{1}{4} - \frac{4}{5} + \frac{9}{6} = \frac{29}{20}$ (not yet)

6. $a_n = (142, 305, 410.2)(1.02)^{n-1}$

$$a_{13} = \$180,477,668.80$$

7. $a_n = 2.5n + 63$

4pm.

8. (haven't done this yet)

a) $\sum_{k=1}^5 -\frac{1}{6}k + 1$

c) $\sum_{k=1}^{11} (\frac{1}{9})(3)^{k-1}$

e) $\sum_{k=1}^6 \cos(30k - 30)^\circ$

b) $\sum_{k=1}^4 \frac{-9k + 20}{k + 5}$

d) $\sum_{k=1}^5 (.3)(-.01)^{k-1}$