

Name: _____

Date: _____

Math 10 Enriched: Section 3.5 Sigma Notations and Summation

1. Indicate the number of terms in each series. If the series is geometric, find the common ratio.

a) $\sum_{x=4}^{11} x + 3$	b) $\sum_{x=-2}^{13} 3(2)^{x-5}$	c) $\sum_{x=-1}^{99} 5^x + 3$	d) $\sum_{x=a}^9 2x = 78$
e) $\sum_{x=3}^a x^2 = 814$	f) $\sum_{x=n-2}^{n+6} x + 7$	g) $\sum_{x=2n-1}^{n+1} 3^x - 3x$	h) $\sum_{x=-4}^a 3(-2)^x = 8192.063$

2. Write the series corresponding to each expression and then find the sum:

a) $\sum_{x=5}^{10} x^2$	b) $\sum_{x=2}^8 x - 4$
c) $\sum_{x=-2}^4 3^x$	d) $\sum_{x=1}^6 5(2)^{x-1}$
e) $\sum_{x=-3}^3 x^x - 1$	f) $\sum_{x=1}^{1000} \left(\frac{9}{10^x} \right)$

3. Express each series using sigma notations in simplest form:

a) $2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$	b) $2 - 6 + 18 - 54 + 162 - 486 + \dots + 1062882$
c) $a + a + d + a + 2d + a + 3d + \dots + (n-1)d$	d) $a + ar + ar^2 + ar^3 + ar^4 + \dots + ar^{n-1}$
e) $\sqrt{2} + 2 + 2\sqrt{2} + 4 + 4\sqrt{2} + \dots + 128\sqrt{2}$	f) $2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$
g) $-\sqrt{5} - \sqrt{10} - 2\sqrt{5} - 2\sqrt{10} - \dots$	h) $2 + \frac{2}{1.01} + \frac{2}{1.01^2} + \frac{2}{1.01^3} + \dots$

4. Evaluate each of the following series:

a) $\sum_{n=1}^{2001} n$	b) $\sum_{i=1}^{\infty} \frac{1}{5^i}$
c) $\sum_{k=1}^3 \frac{1}{2k}$	d) $\sum_{i=1}^{10} \frac{10}{i}$

5. Solve for “x”

a) $\sum_{z=1}^x 5(2)^z = 1270$	b) $\sum_{z=1}^3 x^{z-1} = 7$
c) $\sum_{n=1}^{\infty} 15x(x^2)^{n-1} = 4$	d) $\sum_{z=1}^{\infty} 4(x)^{z-1} = 3$
e) $\sum_{\theta=0}^{180^\circ} \cos \theta = x$	f) $\sum_{n=1}^{\infty} 3(x)^{n-1} + \sum_{n=1}^{\infty} 5(x^2)^{n-1} = 18$

6. Find the sum of this series $\sum_{m=1}^n (-1)^m$ if “n” is odd? OR if “n” is even.

7. Find the sum of the following series: $\sum_{x=1}^{10} (2^x - 5)$

8. Which expression represents the sum of the series given by: $\sum_{x=3}^{12} 6(3)^{x-1}$

- a) $27(3^9 - 1)$ b) $27(3^{10} - 1)$ c) $108(3^9 - 1)$ d) $108(3^{10} - 1)$ e) $729(3^{11} - 1)$

9. Compute the following and provide your answer in the form of “a/b”

$$\sum_{n=1}^{\infty} \frac{n+1}{n^2(n+2)^2}$$

10. Evaluate: $\sum_{a=1}^5 \sum_{b=0}^3 (a+b)^2$