

Sigma Notation

1. Find a) the number of terms, b) the first term, c) the common ratio, and d) the exact value of the sum for each of the following series.

a) $\sum_{k=1}^7 3(2)^{k-1}$

b) $\sum_{x=-2}^5 \frac{1}{4} \left(-\frac{1}{2}\right)^x$

c) $\sum_{k=2}^5 4(2)^{1-k}$

d) $\sum_{i=2}^{\infty} 3\left(\frac{2}{3}\right)^i$

e) $\sum_{x=-3}^{\infty} -5(3)^{-2x}$

2. Write each series using sigma notation.

a) $8 + 4 + 2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{64}$

b) $\frac{3}{16} + \frac{3}{8} + \frac{3}{4} \dots 1536$

c) $-12 - 6 - 3 \dots -\frac{3}{16}$

3. Solve for the exact value of x . $\sum_{k=0}^2 x^k = \frac{8}{5}$

4. Simplify: $\sum_{x=3}^5 \log 2^x$

ANSWERS

1a) 7 terms $a=3$ $r=2$ $S_7=381$ 1b) 8 terms $a=1$ $r=-\frac{1}{2}$ $S_8=\frac{85}{128}$

1c) 4 terms $a=2$ $r=\frac{1}{2}$ $S_4=\frac{15}{4}$ 1d) infinite $a=\frac{4}{3}$ $r=\frac{2}{3}$ $S_{\infty}=4$

1e) infinite $a=-3645$ $r=\frac{1}{9}$ $S_{\infty}=-\frac{32805}{8}$

2. There are many answers that are correct, following is an example of one for each.

2a) $\sum_{k=1}^{10} (8)\left(\frac{1}{2}\right)^{k-1}$ 2b) $\sum_{k=1}^{14} \left(\frac{3}{16}\right)(2)^{k-1}$ 2c) $\sum_{k=1}^7 (-12)\left(\frac{1}{2}\right)^{k-1}$

3. $x = \frac{-5 \pm \sqrt{85}}{10}$ 4. $\log 4096$