

$$n = 1 \quad 2 \quad 3 \quad \dots \quad 8$$

5. Following series is geometric: $30 + 20 + 40/3 + \dots + 1280/729$.

a. Express the series in summation notation.



$$a_n = 30 \left(\frac{2}{3}\right)^{n-1}$$

$$\sum_{n=1}^8 30 \left(\frac{2}{3}\right)^{n-1} = \frac{63050}{729}$$

b. Find the sum.

6. Express $4/9$ in summation notation.

$$\frac{4}{9} = .\bar{4} = .4 + .04 + .004 + \dots$$

$$\sum_{n=1}^{\infty} .4 \left(\frac{1}{10}\right)^{n-1}$$

7. Consider yourself, your parents, your grandparents, your great-grandparents, and so on all the way back to your grandparents with the word "great" used 40 times. What is the total number of people you are considering?

"Great" n	You	Parent	Grand Parent	Great x 1	Great x 2	Great x 40
a_n	1	2	4	8	16	2^{40}
	2^0	2^1	2^2	2^3	2^4	2^{40}

$$\sum_{n=1}^{43} (2)^{n-1} \cdot 1 = 8,796,093,022,207$$

8. Write the first 5 terms of the recursive sequence given $a_1 = 6$, $a_2 = 10$ and $a_{n+2} = 2(a_n) - a_{n+1}$.

$$a_1 = 6$$

$$a_2 = 10$$

$$a_3 = 2 \cdot 6 - 10 = 2$$

$$a_4 = 2 \cdot 10 - 2 = 18$$

$$a_5 = 2 \cdot 2 - 18 = -14$$

9. Given two terms in an arithmetic sequence are $a_{21} = -17$ and $a_{37} = -9$, find:

a. Find the n th term formula.

$$a_{21} + d(16) = a_{37}$$

$$d(16) = -9 - (-17)$$

$$16d = 8$$

$$d = \frac{1}{2}$$

$$a_{21} = -17 = a_1 + \frac{1}{2}(21-1)$$

$$a_1 = -27$$

$$a_n = -27 + \frac{1}{2}(n-1)$$

$$a_n = -27.5 + \frac{1}{2}n$$

b. Express the 50th partial sum in summation notation and find the sum.

$$\sum_{n=1}^{50} -27.5 + \frac{1}{2}n = -737.5$$