

There are n numbers in arithmetic progression with First term a and common difference d . What are the mean & median of this collection?

We have

$$\text{mean} = \frac{a + (a+d) + \dots + (a + (n-1)d)}{n}$$

$$= \frac{na + d \sum_{k=1}^{n-1} k}{n}$$

$$= a + \left(\frac{d \cdot \frac{(n-1)n}{2}}{n} \right)$$

$$= a + d \frac{(n-1)}{2}$$

For the median: Suppose n is odd.

Then the middle term is $a + \frac{(n-1)}{2} d$

There are n numbers in geometric progression with First term a and Common ratio r ($|r| \neq 1$). Find the mean of this collection.

We have

$$\text{mean} = \frac{1}{n} \sum_{k=1}^{k=n} ar^{k-1}$$

$$= \frac{1}{n} \cdot a \cdot \frac{1-r^n}{1-r}$$

$$= \frac{a}{n} \cdot \frac{1-r^n}{1-r}$$