3000 ~~a year~~ a year 5%.

$$A_1 = 3000$$

$$A_2 = 3000 + 3000(1.05)$$

$$A_3 = 3000 + 3000(1.05) + 3000(1.05)^2$$

$$A_n = 3000(1.05)^{n-1}$$

$$\sum_{i=1}^{15} 3000(1.05)^{n-1} = \frac{3000(1-1.05^{15})}{1-1.05}$$

$$\sum_{i=1}^{15} 3000\left(e^{0.05}\right)^{n-1}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \cdots$$

$$\sum_{n=1}^{K} \frac{1}{2}\left(\frac{1}{2}\right)^{n-1} = \frac{\frac{1}{2}\left(1 - \frac{1}{2}^{K}\right)}{1 - \frac{1}{2}}$$

no, yes.

$$= \left(1 - \frac{1}{2}^{K}\right)$$

if we let $K \to \infty$ sum goes to 1

ex. $0.9\bar{9} = 1$

$$0.9\bar{9} = \frac{9}{10} + \frac{9}{100} + \frac{9}{1000} + \frac{9}{10{,}000} + \dots$$

$$\sum_{i=1}^{K} \frac{9}{10}\left(\frac{1}{10}\right)^{i-1} = \frac{\frac{9}{10}\left(1 - \frac{1}{10}^{K}\right)}{1 - \frac{1}{10}}$$

$$= 1 - \frac{1}{10}^{K}$$

as $K \to \infty$ the sum goes to 1.

if $|r| < 1$

$$\sum_{i=1}^{\infty} a_1 r^{i-1} = \frac{a_1(1 - r^{\infty})}{1 - r} = \frac{a_1}{1-r}$$

$$= \frac{a_1}{1-r}$$

$$S = 1 + r + r^2 + r^3 + r^4 + r$$

$$(1-r)(1+r) = 1 - r^2$$

$$(1-r)(1+r+r^2) = 1 - r^3$$

$$(1-r)(1+r+r^2+r^3) = 1 - r^4$$

$$(1-r)S = 1 - r^{n+1}$$