

$$0 < |r| < 1$$



$$a_n = a_1 r^{n-1}$$

Sigma  $\rightarrow$  "Sum"

$$1 + \frac{2}{3}$$

$$\frac{3}{3} + \frac{2}{3} = \frac{5}{3}$$

$$r = \frac{6}{9} = \frac{4}{6} = \frac{2}{3}$$

Find the sum of the infinite series using the formula  $S = \frac{a_1}{1-r}$ .

41)  $8, -4, 2, -1, \frac{1}{2}, \frac{-1}{4}, \frac{1}{8}, \frac{-1}{16}, \frac{1}{32}, \frac{-1}{64}$

$$\begin{aligned} S &= \frac{a_1}{1-r} \\ &= \frac{8}{1 - (-\frac{1}{2})} \\ &= \frac{8}{\frac{3}{2}} = \frac{16}{3} \end{aligned}$$

62.  $\sum_{n=0}^{\infty} 2\left(\frac{-2}{3}\right)^n$

$$a_0 = 2\left(\frac{-2}{3}\right)^0 = 2$$

$$r = \frac{-2}{3}$$

$$\begin{aligned} S &= \frac{2}{1 - (-\frac{2}{3})} \\ &= \frac{2}{\frac{5}{3}} = \frac{6}{5} \end{aligned}$$

64B.  $\sum_{n=1}^{\infty} \frac{1}{2}(-4)^n$

DNE

70)  $9 + 6 + 4 + \frac{8}{3} + \dots$

$$\begin{aligned} S &= \frac{9}{1 - \frac{2}{3}} \\ &= \frac{9}{\frac{1}{3}} = 27 \end{aligned}$$

41A)  $8, 4, 2, 1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}$   
 $a_1 = 8 \quad r = \frac{1}{2}$

$$\begin{aligned} S &= \frac{8}{1 - \frac{1}{2}} \\ &= \frac{8}{\frac{1}{2}} = 16 \end{aligned}$$

64.  $\sum_{n=1}^{\infty} \frac{1}{2}(4^n)$

DNE



64C.  $\sum_{n=1}^{\infty} \frac{-1}{2}(4)^n$

DNE

Find the rational number(Fraction) for the given decimal.

74)  $\overline{.297}$

76)  $1.\overline{38}$

$$\sum_{n=1}^9$$

$$256 = 2^{n-1}$$

$$\frac{\ln 256}{\ln 2} = \frac{(n-1) \ln 2}{\ln 2}$$

$$8 = n-1$$

$$n = 9$$

$$S_n = a_1 \left( \frac{1-r^n}{1-r} \right)$$

Use summation Notation to write the sum

A)  $2 + 4 + 8 + \dots + 512$

$$a_n = a_1 r^{n-1}$$

$$a_n = 2(2)^{n-1}$$

$$\frac{512}{2} = \frac{2(2)^{n-1}}{2}$$

$$256 = 2^{n-1}$$

$$\sum_{n=1}^9 2(2)^{n-1}$$

(B)  $5 - 15 + 45 - \dots + 32805$

$$a_n = a_1 r^{n-1}$$

$$a_n = 5(-3)^{n-1}$$

$$\frac{32805}{5} = \frac{5(-3)^{n-1}}{5}$$

$$6561 = (-3)^{n-1}$$

$$\frac{\ln 6561}{\ln 3} = \frac{(\ln 3)(n-1)}{\ln 3}$$

$$8 = n-1$$

$$n = 9$$

$$\sum_{n=1}^9 5(-3)^{n-1}$$

C)  $1000 + 500 + 250 + \dots + 125/64$

Find the finite sum

46.  $\sum_{n=1}^9 (-2)^{n-1}$

$$a_1 = 1$$

$$r = -2$$

$$n = 9$$

$$S = 1 \left( \frac{1 - (-2)^9}{1 - (-2)} \right)$$

$$171$$

52.  $\sum_{n=1}^{10} 5 \left( -\frac{1}{3} \right)^{n-1}$

$$a_1 = 5$$

$$r = -\frac{1}{3}$$

$$n = 10$$

$$S = 5 \left( \frac{1 - (-\frac{1}{3})^{10}}{1 - (-\frac{1}{3})} \right)$$

$$3.75$$

$$24605$$

$$6561$$

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