$\frac{5}{1}, \frac{15}{2}, \frac{45}{4}, \frac{135}{8}$

$a_{100} = 81(3)^{n-4}$

Find the missing term of the geometric sequence

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

26. $a_1 = 5$ $r = \frac{3}{2}$ $n = 8$

a_8

$a_8 = 5\left(\frac{3}{2}\right)^{8-1}$

$= 5\left(\frac{3}{2}\right)^7$

$= 5\left(\frac{3^7}{2^7}\right)$

$= \frac{5}{1}\left(\frac{2187}{128}\right)$

$= \frac{10935}{128}$

A) $a_4 = 81$ $a_7 = 2187$ $n = 10$

$\boxed{a_4 = 81 \quad a_7 = 2187}$ a_{10}

$\underset{a_4}{81}, \_, \_, \underset{a_7}{2187}, \_, \_, \_$

xr xr xr

$\frac{81r^3}{81} = \frac{2187}{81}$ $r = 3$

$\sqrt[3]{r^3} = \sqrt[3]{27}$

$r = \sqrt[x]{\text{Divide 2 given terms}}$

x is the difference in term #'s

32) $a_3 = \frac{16}{3}$ $a_5 = \frac{64}{27}$ $n = 7$

34) 3, 36, 432,. . . n = 7

NOTES

Find the sum of the first 5 terms. Then find r.

42) 8, 12, 18, 27, 81/2

$r = \frac{12}{8} = 1.5$

$r = \frac{18}{12} = 1.5$

$r = \frac{27}{18} = 1.5$

$S_1 = 8$
$S_2 = 20$
$S_3 = 38$
$S_4 = 65$
$\boxed{S_5 = 105.5}$

$\boxed{S_\infty = \text{Diverges}}$

Find the sum of the first 10 terms. Then find r.

$r = -\frac{1}{2}$

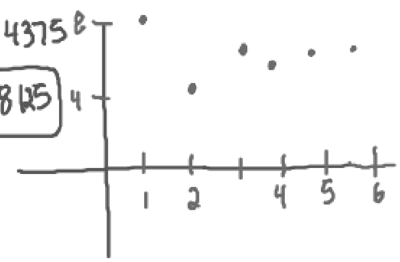
41) $8, -4, 2, -1, \frac{1}{2}, \frac{-1}{4}, \frac{1}{8}, \frac{-1}{16}, \frac{1}{32}, \frac{-1}{64}$

$S_1 = 8$
$S_2 = 4$
$S_3 = 6$
$S_4 = 5$
$S_5 = 5.5$

$S_6 = 5.25$
$S_7 = 5.375$
$S_8 = 5.3125$
$S_9 = 5.34375$
$\boxed{S_{10} = 5.328125}$

$\boxed{S_\infty = 5.333\overline{3}}$

converges



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

41A) $8, 4, 2, 1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}, \frac{1}{128}$

$S_\infty = 16$?

$S_1 = 8$
$S_2 = 12$
$S_3 = 14$
$S_4 = 15$
$S_5 = 15.5$

$S_6 = 15.75$
$S_7 = 15.875$
$S_8 = 15.9375$
$S_9 = 15.96875$
$S_{10} = 15.98437$

Sum of Infinite Series

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

If $-1 < r < 1$ $\leftarrow$ $S = \frac{a}{1-r}$

a: 1st term of series
r: common ratio

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

$S = \frac{8}{1-(-\frac{1}{2})}$

$S = \frac{8}{(\frac{3}{2})} = \frac{16}{3}$

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

$S = \frac{8}{1-\frac{1}{2}} = \frac{8}{(\frac{1}{2})} = 16$

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

$n=0 \quad n=1 \quad n=2$

$\frac{2}{1} + \frac{-4}{3} + \frac{8}{9}$

$S = \frac{a}{1-r} = \frac{2}{1-(-\frac{2}{3})} = \frac{2}{(\frac{5}{3})} = \frac{6}{5}$

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

$r = 4$

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

$r = -4$

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

$a_1 = -\frac{1}{8}$

$r = \frac{1}{4}$

$S = \frac{-\frac{1}{8}}{1-\frac{1}{4}} = \frac{(-\frac{1}{8})}{(\frac{3}{4})} = \frac{-4}{24}$

$\frac{-1}{8} \div \frac{3}{4} = \frac{-1}{8} \cdot \frac{4}{3} =$

70) $9 + 6 + 4 + 8/3 + \ldots$

a

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

$S = \frac{9}{1-\frac{2}{3}} = 27$