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

$\cancel{a_n = 81(r)^{4-1}}$

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

Find the missing term of the geometric sequence

26. $a_1 = 5$ $r = \frac{3}{2}$ $n = 8$ $\frac{10935}{128}$

Find the 8th term

5, _, _, _, _, _, _, _

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

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

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

_, _, _, 81, _, _, 2187

xr xr xr

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

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

$r = 3$

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

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

$\cancel{(3)} \cdot \frac{16}{\cancel{3}} r^2 = \frac{64}{\cancel{27}} \cancel{(3)}$

$\frac{16r^2}{16} = \frac{\left(\frac{64}{9}\right)}{16}$

$\boxed{a_7 = \frac{64}{27} \cdot \frac{2}{3} \cdot \frac{2}{3} = \frac{256}{243}}$

$r^2 = \frac{\cancel{64}}{9} \cdot \frac{1}{\cancel{16}}$

$\sqrt{r^2} = \sqrt{\frac{4}{9}}$ $r = \frac{2}{3}$

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

$a_n = 3(12)^{n-1}$

$a_7 = 3(12)^{7-1}$

Partial Sum of a Geometric Series

a: 1st term n: # of terms r: common ratio $\boxed{S_n: \text{Partial Sum}}$

$$S_n = a + \cancel{ar} + \cancel{ar^2} + \cancel{ar^3} + \cdots + \cancel{ar^{n-2}} + \cancel{ar^{n-1}}$$

$$-rS_n = \cancel{ar} + \cancel{ar^2} + \cancel{ar^3} + \cdots + \cancel{ar^{n-1}} + ar^n$$

$$S_n - rS_n = a - ar^n$$

$$\frac{S_n(1-r)}{(1-r)} = \frac{a(1-r^n)}{(1-r)}$$

$$\boxed{S_n = \frac{a(1-r^n)}{1-r}}$$

1, 2, 4, 8, 16 → sequence

1 + 2 + 4 + 8 + 16 → Series

Partial Sum $S_5 = 31$

$$\boxed{S_n = \frac{a(1-r^n)}{1-r}}$$

$$S_5 = \frac{1(1-2^5)}{1-2}$$

$$= \frac{-31}{-1} = 31$$