Trig Assignment
P. 635
(40-46e, 56-76e)

9.3 Part 2

39. Find the term. $6, 18, 54, \ldots$

8th term $= a_8 = ?$

$a_1 = 6$

$r = \frac{18}{6} = 3$

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

$$a_n = 6(3)^{n-1}$$

$$a_8 = 6(3)^{8-1}$$

$$= 6(3)^7 = \boxed{13{,}122}$$

43. $a_3 = ?$

$a_1 = 16$

$a_4 = \frac{27}{4}$

To find r:

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

$$\frac{27}{4} = 16(r)^{4-1}$$

$$\frac{1}{16} \cdot \frac{27}{4} = \cancel{\frac{1}{16} \cdot 16}(r)^3$$

$$\sqrt[3]{\frac{27}{64}} = \sqrt[3]{r^3}$$

if even you will get a $\pm r$ which means 2 solutions

$$\frac{3}{4} = r$$

$$a_3 = 16\left(\frac{3}{4}\right)^{3-1}$$

$$a_3 = 16\left(\frac{3}{4}\right)^2$$

$$= \cancel{16}\left(\frac{9}{\cancel{16}}\right) = \boxed{9}$$

Sum of Geom. Finite Seq.

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

58 $$\sum_{n=1}^{8} 5\left(-\frac{5}{2}\right)^{n-1} = 5\left(\frac{1-\left(-\frac{5}{2}\right)^8}{1-(-5/2)}\right)$$

$$= 5\left(\frac{1-\frac{390625}{256}}{1+\frac{5}{2}}\right)\begin{matrix}\cdot 256\\ \cdot 256\end{matrix}$$ mult top and bottom by LCD

$$= 5\left(\frac{256-390625}{256+640}\right)$$

$$= 5\left(-\frac{390369}{896}\right) = \boxed{-\frac{278835}{128}}$$

65 $10 + 30 + 90 + \cdots + 7290$

Summation Notation $\boxed{\sum_{n=1}^{n} a_1(r)^{n-1}}$

$a_1 = 10 \qquad a_n = 7290$

$r = \frac{30}{10} = 3$

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

$a_n = 10(3)^{n-1}$

$$\boxed{\sum_{n=1}^{7} 10(3)^{n-1}}$$

What term is $a_n = 7290$?
What is n?

$$\frac{\cancel{10}(3)^{n-1}}{\cancel{10}} = \frac{7290}{10}$$

$$3^{n-1} = 729$$

$$\ln 3^{n-1} = \ln 729$$

$$\frac{(n-1)\ln 3}{\ln 3} = \frac{\ln 729}{\ln 3}$$

$$n-1 = 6$$

$$n = 7$$

put 7 on top of Σ

Sum of Infinite Geom Seq

$$S = \sum_{i=0}^{\infty} a_1 r^i = \boxed{\frac{a_1}{1-r}}$$

← I have seen on an ACT problem

(70) $$\sum_{n=0}^{\infty} 2\left(\frac{3}{4}\right)^n = \left(\frac{2}{1-\frac{3}{4}}\right)\frac{\cdot 4}{\cdot 4}$$

a_1 r

mult top + bottom by LCD

$$= \frac{8}{4-3} = \frac{8}{1} = \boxed{8}$$