

8.1 (cont)

Ex 2 Classify sequence as arithmetic or geometric, or neither.

Find first 3 terms.

(a) $S_n = 7 - 3n$

looks like linear
 $f_n \Rightarrow$ it's arithmetic

4, 1, -3, -5, ...

(b) $S_n = \frac{10}{2^{n-1}}$

$$S_n = 10 \left(\frac{1}{2}\right)^{n-1}$$

$\{S_n\}$ is geometric
with common
ratio of $\frac{1}{2}$

10, 5, $\frac{5}{2}$, $\frac{5}{4}$, ...

(c) $\{(-1)^n(n+1)\}$

(start with $n=1$)

-2, 3, -4, 5, -6, ...

neither arithmetic
nor geometric

(d) $\left\{\frac{2}{3}\right\}$

$\frac{2}{3}, \frac{2}{3}, \frac{2}{3}, \frac{2}{3}, \dots$

this is a
constant sequence,
neither geometric
nor
arithmetic

8.1 (cont)

Ex 3 Find 6th term of

$$S_n = \frac{(-1)^{n+1} 5^{n+1}}{2}$$

$$S_6 = \frac{(-1)^{6+1} 5^{6+1}}{2} = \frac{(-1)^7 5^7}{2} = \frac{-5^7}{2} = \boxed{\frac{-78125}{2}}$$

Ex 4 Find first five terms of
 $S_1 = 3, S_n = \frac{1}{3} S_{n-1}, n \geq 2.$

n	S_n
1	$S_1 = 3$
2	$S_2 = \frac{1}{3} S_1 = \frac{1}{3}(3) = 1$
3	$S_3 = \frac{1}{3} S_2 = \frac{1}{3}(1) = \frac{1}{3}$
4	$S_4 = \frac{1}{3} S_3 = \frac{1}{3}\left(\frac{1}{3}\right) = \frac{1}{9}$
5	$S_5 = \frac{1}{3} S_4 = \frac{1}{3}\left(\frac{1}{9}\right) = \frac{1}{27}$

$3, 1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots$