

- ✓ 1. For each sequence, identify the type (arithmetic, geometric, or neither), write an expression for the n th term, and find t_{20} .

(a) $-19, -14, -9, \dots$

arithmetic

$$t_{20} = 76$$

$$t_n = 5n - 24$$

(b) $\frac{2}{1}, \frac{3}{2}, \frac{4}{3}, \dots$

neither

$$t_n = \frac{n+1}{n}$$

$$t_{20} = \frac{21}{20}$$

(c) $3, -12, 48, \dots$

geometric

$$t_n = 3(-4)^{n-1}$$

$$t_{20} = 3(-4)^{19}$$

$$\approx -8,246 \times 10^{11}$$

- ✓ 2. Given an arithmetic sequence with $t_5 = 2$ and $t_{20} = 47$ find t_n .

$$m = \frac{47 - 2}{20 - 5} = 3$$

$$t_n = 3n - 13$$

$$= -824633720832$$

- ✓ 3. Find each sum:

(a) $\sum_{j=1}^{25} (2j+1)$

$$a_1 = 3$$

$$a_{25} = 51$$

$$S_{25} = \frac{25}{2}(3 + 51)$$

$$= \boxed{675}$$

✓ (b) $1 - \frac{1}{3} + \frac{1}{9} - \frac{1}{27} + \dots$

$$S_{\infty} = \frac{a}{1-r}$$

$$= \frac{1}{1 - (-\frac{1}{3})}$$

$$= 1 \div \frac{4}{3}$$

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

✓ (c) $\sum_{n=1}^{10} [3(-2)^{n-1}]$

$$S_{10} = \frac{3(1 - (-2)^{10})}{1 - (-2)}$$

$$= \frac{3(1 - 1024)}{3}$$

$$= \boxed{-1023}$$

4. Write and use a series for the following two problems.

- ✓ (a) There are 19 chairs in the first row of the auditorium. If each row has two more chairs than the row in front of it, how many chairs are there in the auditorium if there are twenty-five rows of seats.

$$t_n = 2n + 17$$

$$t_1 = 19$$

$$t_{25} = 67$$

$$S_{25} = \frac{25}{2} (19 + 67)$$

$$= 25(43)$$

$$= \boxed{1075}$$

- ✓ (b) A pile driver pounds a steel column into the earth. On its first drive, the column penetrates 1.5 meters into the earth and on each succeeding drive it moves 92% as far as it did on the previous drive. How far is the column driven on just the 60th drive? What is the total distance that the column moves if the pile driver continues indefinitely?

$$t_n = 1.5 (.92)^{n-1}$$

$$t_{60} = 1.5 (.92)^{59} \approx \boxed{.0110 \text{ m}}$$

$$S_{\infty} = \frac{1.5}{1 - .92}$$

$$S_{\infty} = \boxed{18.75 \text{ m}}$$

- ✓ 5. An arithmetic sequence is a linear function with a domain of the natural numbers.

- ✓ 6. An geometric sequence is a exponential function with a domain of the natural numbers.

Arithmetic	Geometric
$t_n = t_1 + d(n-1)$	$t_n = t_1 (r)^{n-1}$
$S_n = \frac{n}{2} (t_1 + t_n)$	$S_n = \frac{t_1 (1 - r^n)}{1 - r}$
	$S_{\infty} = \frac{t_1}{1 - r}, r < 1$