

For each sequence, find the following:

- Determine if the sequence is arithmetic, geometric, or neither.
- If the sequence is arithmetic or geometric, find an explicit function for the sequence.
- If the sequence is arithmetic or geometric, find its 10th term (a_{10}).
- If the sequence is arithmetic or geometric, find its 10th partial sum (S_{10}).

1. $a_n = 32, -24, 18, \dots$

2. $a_n = -12, -5, 2, \dots$

3. $a_n = 4, -6, 8, \dots$

4. $a_n = a_{n-1} - 5, a_1 = 47$

5. $a_n = 6a_{n-1} + 1, a_1 = 12$

6. $a_n = -3a_{n-1}, a_1 = 1/4$

Evaluate the following.

7. $\sum_{k=3}^8 0.2(-4)^{k-1}$

8. $\sum_{j=0}^4 (3j!)$

9. $\sum_{i=4}^{35} (5 - 7i)$

10. $\sum_{k=1}^6 (k^2 - 3)$

11. $\sum_{i=2}^{\infty} 64 \left(\frac{3}{4}\right)^i$

12. $\sum_{m=0}^{\infty} 0.75(1.25)^{m+1}$

Answer the following.

13. If a_n is arithmetic where $a_1 = 22$ and $a_3 = 28$, find a_{45} .

14. If a_n is geometric where $a_1 = 180$ and $a_2 = -80$, find a_7 .

15. Find the sum $59 + 62 + 65 + \dots + 143 + 146$.

1. $a_n = 32, -24, 18, \dots$
 geometric, $r = -3/4$
 $a_n = 32(-3/4)^{n-1}$
 $a_{10} = 32(-3/4)^9 = -2.403$
 $S_{10} = \frac{32(1 - (-3/4)^{10})}{1 - (-3/4)} = 17.256$

2. $a_n = -12, -5, 2, \dots$
 arithmetic, $d = 7$
 $a_n = 7n - 19$
 $a_{10} = 7(10) - 19 = 51$
 $S_{10} = \frac{10}{2}(-12 + 51) = 195$

3. $a_n = 4, -6, 8, \dots$
 neither

4. $a_n = a_{n-1} - 5, a_1 = 47$
 arithmetic, $d = -5$
 $a_n = 52 - 5n$
 $a_{10} = 52 - 5(10) = 2$
 $S_{10} = \frac{10}{2}(47 + 2) = 245$

5. $a_n = 6a_{n-1} + 1, a_1 = 12$
 neither

6. $a_n = -3a_{n-1}, a_1 = 1/4$
 geometric, $r = -3$
 $a_n = 1/4(-3)^{n-1}$
 $a_{10} = 1/4(-3)^9 = -4920.75$
 $S_{10} = \frac{1/4(1 - (-3)^{10})}{1 - (-3)} = -3690.5$

7. $\sum_{k=3}^8 0.2(-4)^{k-1} = -2620.8$

8. $\sum_{j=0}^4 (3j!) = 102$

9. $\sum_{i=4}^{35} (5 - 7i) = -4208$

10. $\sum_{k=1}^6 (k^2 - 3) = 73$

11. $\sum_{i=2}^{\infty} 64 \left(\frac{3}{4}\right)^i = 144$

12. $\sum_{m=0}^{\infty} 0.75(1.25)^{m+1}$ diverges ($r \geq 1$)

13. If a_n is arithmetic where $a_1 = 22$ and $a_3 = 28$, find a_{45} . $a_{45} = 22 + (45 - 1)(3) = 154$

14. If a_n is geometric where $a_1 = 180$ and $a_2 = -80$, find a_7 . $a_7 = 180(-4/9)^{7-1} = 1.387$

15. Find the sum $59 + 62 + 65 + \dots + 143 + 146$. $146 = 59 + (n - 1)(3) \Rightarrow n = 30$
 $S_{30} = \frac{30}{2}(59 + 146) = 3075$