

- Identify which of the following sequences are arithmetic. For each arithmetic sequence, state the values of t_1 and d , and the next three terms.
 - 4, 7, 10, 13, ...
 - 12, 7, 2, -3, ...
 - 5, 15, 45, 135, ...
 - x, x^2, x^3, x^4, \dots
 - $x, x + 2, x + 4, x + 6, \dots$
- Write the first four terms of each arithmetic sequence for the given values of t_1 and d .
 - $t_1 = -5, d = -2$
 - $t_1 = 10, d = -0.5$
 - $t_1 = 3, d = x$
 - $t_1 = \frac{7}{3}, d = \frac{1}{3}$
- Determine the general term and the 50th term for each arithmetic sequence.
 - 6, 10, 14, ...
 - $3, 2\frac{1}{2}, 2, \dots$
- Determine the number of terms in each finite arithmetic sequence.
 - 6, -3, 0, ..., 222
 - $3\frac{1}{4}, 3\frac{3}{4}, 4\frac{1}{4}, \dots, 15\frac{3}{4}$
- Determine the unknown terms in each arithmetic sequence.
 - 4, \square , \square , 16
 - \square , 8, \square , \square , 2
 - 20, \square , \square , \square , \square , -10
- The 20th term of an arithmetic sequence is 107, and the common difference is 5. Determine the first term, the general term, and the 40th term of this sequence.
- Use the two given terms to find t_1 , d , and t_n for each arithmetic sequence.
 - $t_{11} = 25, t_{30} = 101$
 - $t_2 = 90, t_{51} = -57$
- The terms $5 + x$, 8, and $1 + 2x$ are consecutive terms in an arithmetic sequence. Determine the value of x and state the three terms.

- The triangular shapes are made from asterisks.



Figure 1 Figure 2 Figure 3

- How many asterisks will be in the fourth triangle? the fifth triangle?
 - Write the general term for the sequence involving the number of asterisks in the triangles.
 - How many asterisks will be in the 20th diagram?
 - Which diagram will contain 126 asterisks?
- Determine the sum of each arithmetic series.
 - $14 + 10 + 6 + \square + (-86)$
 - $5 + 6.5 + 8 + \square + 26$
 - $\frac{3}{4} + 2 + \frac{13}{4} + \square + \frac{49}{2}$
 - For each arithmetic series, determine the indicated sum.
 - $4 + 9 + 14 + \dots$; first 12 terms
 - $(-16) + (-14) + (-12) + \dots$; first 17 terms
 - $x + 3x + 5x + \dots$; first 20 terms
 - For each arithmetic series, determine the number of terms.
 - $t_1 = 3, t_n = 59, S_n = 465$
 - $t_1 = -2, t_n = -74, S_n = -950$
 - $t_1 = 20, t_n = -40, S_n = -210$
 - For each arithmetic series, determine the 12th term and the 12th partial sum.
 - $3 - 1 - 5 - \dots$
 - $\frac{3}{5} + \frac{7}{5} + \frac{11}{5} + \dots$
 - Determine the sum of all multiples of 7 between 1 and 1000.
 - In an arithmetic series, the third term is 24 and the sixth term is 51. What is the sum of the first 25 terms of the series?
 - The sum of the first eight terms of an arithmetic series is 176. The sum of the first nine terms is 216. Determine the first and ninth terms of the series.

17. The sum of the first n terms of an arithmetic series is $S_n = 3n^2 + 4n$.
- Determine the first five partial sums.
 - Determine the first five terms of the series.
 - Use the formula to verify that the sum of the first five terms is equal to S_5 .

18. A student is offered the opportunity to earn \$6.00 for the first day, \$11.00 for the second day, \$16.00 for the third day, and so on, for 20 working days. Or, the student can accept \$1000 for the whole job. Which offer pays more?

KEY

1. **a)** arithmetic; $t_1 = 4$, $d = 3$; 16, 19, 22
b) arithmetic; $t_1 = 12$, $d = -5$; -8, -13, -18
c) not arithmetic **d)** not arithmetic
e) arithmetic; $t_1 = x$, $d = 2$; $x + 8$, $x + 10$, $x + 12$
2. **a)** -5, -7, -9, -11 **b)** 10, 9.5, 9, 8.5
c) 3 , $3 + x$, $3 + 2x$, $3 + 3x$ **d)** $\frac{7}{3}$, $\frac{8}{3}$, $\frac{9}{3}$, $\frac{10}{3}$
3. **a)** $t_n = 4n + 2$; $t_{50} = 202$ **b)** $t_n = \frac{7}{2} - \frac{1}{2}n$;

$$t_{50} = -21\frac{1}{2}$$

4. **a)** 77 **b)** 26

5. **a)** 4, $\boxed{8}$, $\boxed{12}$, 16 **b)** $\boxed{10}$, 8, $\boxed{6}$, $\boxed{4}$, 2

- c)** 20, $\boxed{14}$, $\boxed{8}$, $\boxed{2}$, $\boxed{-4}$, -10

6. $t_1 = 12$, $t_n = 5n + 7$, $t_{40} = 207$

7. **a)** $t_1 = -15$, $d = 4$, $t_n = 4n - 19$

b) $t_1 = 93$, $d = -3$, $t_n = 96 - 3n$

8. $x = \frac{10}{3}$; $\frac{25}{3}$, 8, $\frac{23}{3}$

9. **a)** 15, 18 **b)** $t_n = 3n + 3$

- c)** 63 asterisks **d)** 41st diagram

10. **a)** -936 **b)** 232.5 **c)** 252.5 or $252\frac{1}{2}$

11. **a)** 378 **b)** 0 **c)** $400x$

12. **a)** 15 **b)** 25 **c)** 21

13. **a)** $t_{12} = -41$, $S_{12} = -228$ **b)** $t_{12} = \frac{47}{5}$, $S_{12} = 60$

14. 71 071 **15.** 2850 **16.** $t_1 = 8$, $t_9 = 40$

17. **a)** $S_1 = 7$, $S_2 = 20$, $S_3 = 39$, $S_4 = 64$, $S_5 = 95$

b) $t_1 = 7$, $t_2 = 13$, $t_3 = 19$, $t_4 = 25$, $t_5 = 31$

c) $S_5 = 3(5)^2 + 4(5) = 95$

18. $6 + 11 + 16 + \dots + t_{20} = \1070 . Therefore, the arithmetic series method pays more money.