Sequences and Series

Short Answer

For each arithmetic sequence, determine
a) the value of t_1 and d
b) an explicit formula for the general term
c) t_{20}

1. $-8, -5, -2, 1, \ldots$

ANSWER:

2. $3a, 3a - 2b, 3a - 4b, 3a - 6b, \ldots$

ANSWER:

3. The starting wage at a bookstore is $8.50 per hour with a yearly increase of $0.75 per hour.
    a) Write the general term of the sequence representing the hourly rate earned in each year.

ANSWER:

b) Use your expression from part a) to determine the hourly rate after 6 years.

ANSWER:

c) How many years will someone need to work at the store to earn $15.25 per hour?

ANSWER:

Determine whether each sequence is geometric, arithmetic, or neither. Justify your answer. If possible find the common difference or common ratio.

4. $5, -10, 20, -40, \ldots$

ANSWER:

5. $\dfrac{1}{5}, \dfrac{1}{4}, \dfrac{1}{3}, \dfrac{1}{2}, 1, \ldots$

ANSWER:

6. $\dfrac{1}{3}, \dfrac{2}{3}, 1, \dfrac{4}{3}, \ldots$

ANSWER:

For each geometric sequence, determine
a) an explicit formula for the general term
b) t_{11}

7. $t_1 = 3, r = 2$

ANSWER:

8. $3, 2, \dfrac{4}{3}, \dfrac{8}{9}, \dfrac{16}{27}, \ldots$

ANSWER:

9. $3, 3\sqrt{3}, 9, 9\sqrt{3}, 27, \ldots$

ANSWER:

For each arithmetic series, determine
a) an explicit formula for the general term
b) a formula for the general sum
c) t_{12}

10. $t_1 = 2, d = 3, n = 4$

ANSWER:

11. $-12 - 9 - 6 - \cdots + 12$

ANSWER:

Determine the sum of each arithmetic series.

12. $t_1 = 3\sqrt{3}, d = -2\sqrt{3}, n = 11$

ANSWER:

13. $(4a - 3b) + (4a + b) + (4a + 5b) + \cdots + (4a + 29b)$

ANSWER:

14. Find the value of t_1 given $S_8 = -3280$ and $r = -3$. Be sure to show all of your work.

ANSWER:

15. If $S_1 = 0.7$ and $S_2 = 2.1$ in a geometric series, determine the sum of the first 12 terms in the series. Be sure to show all of your work.

ANSWER:

16. A bouncy ball bounces to $\frac{2}{3}$ its height when it is dropped on a hard surface. Suppose the ball is dropped from 20 m.
    a) What height will the ball bounce back up to after the sixth bounce?

ANSWER:

    b) What is the total distance the ball travels if it bounces indefinitely?

ANSWER: