Exercise Arithmetic Sequences

1.) For this arithmetic sequence: $4, 7, 10, \ldots$
   a.) determine t_{15}. 46
   b.) determine which term in the sequence has the value 439. 146
2.) For this arithmetic sequence: $-3, 1, 5, \ldots$
   a.) determine t_{17}. 61
   b.) determine which term in the sequence has the value 97. 26
3.) Two terms in an arithmetic sequence are $t_{13} = -3$, and $t_{20} = -17$. Determine t_1. 21
4.) Two terms in an arithmetic sequence are $t_6 = 10$, and $t_{18} = 46$. Determine t_{32}. 88
5.) Write the first 5 terms of an arithmetic sequence with $a = 4$ and $d = 2$. 4, 6, 8, 10, 12
6.) Write the first 5 terms of an arithmetic sequence with $a = -5$ and d =-3/4. $-5, -\frac{23}{4}, -\frac{26}{4}, (-\frac{13}{2}$
7.) Determine x so that $x + 3$, $2x + 1$, and $5x + 2$ are consecutive terms of an arithmetic sequence. $-\frac{3}{2}$

$-\frac{29}{4}, -\frac{3}{2}$

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Exercise Arithmetic Series

1.) Determine the sum of the first 6 terms of this arithmetic series:
   $15 + 11 + 7 + 3 - 1 - 5 \ldots$ 30
2.) If an arithmetic series has $t_1 = 5$ and $d = 4$, determine S_{20}. 860
3.) If an arithmetic series has $t_1 = 7$, $t_n = 79$ and $n = 8$, determine S_n. 344
4.) An arithmetic series has $S_{40} = 4940, d = -3$, and $t_{40} = 65$. Determine the first 3 terms of the series. 182, 179, 176
5.) An auditorium has 8 seats in the first row. Each subsequent row has four more seats than the previous row. Determine how many seats are in the 50th row of the auditorium. 204
6.) Determine how many terms of the arithmetic series $1491 + 1484 + 1477 + \ldots$ are needed to give a sum of 0. 427
7.) Determine the value of n for an arithmetic series where $t_1 = 8$, $t_n = 68$ and $S_n = 608$. 16
8.) The sum of the first five terms of an arithmetic series is 85. The sum of the first six terms is 123. Determine the first four terms of the series.
   3, 10, 17, 24

Exercise Geometric Sequences

1.) Determine the 8th term of the geometric sequence: 3, 12, 48, 192 …
2.) In a finite geometric sequence, $t_4 = 5$, and $t_6 = 20$. Determine t_1 and t_9.
3.) Determine a formula for the nth term of the geometric sequence $192, -48, 12, -3$ ...
4.) Given $r = 3, t_1 = 5$, and $t_n = 135$, determine n.
5.) Given $r = 1/2, t_1 = 1/3$, and $t_n = 1/48$, determine n.
6.) Given the geometric sequence $3, 12, 48, 5x + 7$, ... determine the value of x.
7.) Determine the value of x that would make $x, 2x + 2, 3x + 3$ a geometric sequence.
8.) A car costs a company \$40 000. Each year, the car depreciates 16% of its value. Determine the value of the car after 5 years.
9.) Two terms in an arithmetic sequence are $t_7 = 78$, and $t_{18} = 45$. Determine t_1.
10.) If an arithmetic series has $t_1 = 10$ and $d = 3$, determine S_{62}.

1) 49 152
2) $t_1 = 6$ $t_9 = 39\,366$
3) $t_n = 192\left(-\frac{1}{4}\right)^{n-1}$
4) 4
5) 5
6) 37
7) -4
8) \$ 16 728.48
9) 96
10) 6293

Exercise Geometric Sequences…again

1.) Insert two geometric means between 4 and -13.5.
2.) Insert two geometric means between -160 and 1280.
3.) In a geometric sequence the fourth term is 162 and the eighth term is 13 122. Determine the values of t_1 and r.
4.) In a geometric sequence the second term is 7 and the fifth term is $-\frac{7}{8}$. Determine the values of t_1 and r.
5.) Two terms in an arithmetic sequence are $t_{11} = 37$, and $t_{26} = 32$. Determine t_1.
6.) If an arithmetic series has $t_1 = 5$ and $d = -2$, determine S_{21}.
7.) Factor: $2x^2 + 7x - 4$.
8.) Solve: $12x^2 - 5x - 2 = 0$.
9.) Solve: $3x^2 + 2x - 4 = 0$.

1) $-6, 9$
2) $320, -640$
3) $t_1 = 6$ $r = \pm 3$
4) $t_1 = -14$ $r = -\frac{1}{2}$
5) $\frac{121}{3}$
6) -315
7) $(2x-1)(x+4)$
8) $x = \frac{1}{4}$ $x = \frac{2}{3}$
9) $x = \frac{-1 \pm \sqrt{13}}{3}$

Exercise Geometric Series

1.) Determine the sum of the first 10 terms of the geometric series:
$4 + 12 + 36 + \cdots$ 118 096

2.) The sum of the first 5 terms of a geometric series is 93. The common ratio is 2. Determine the 1st term. 3

3.) If 64 students enter a singles tennis tournament, where the winner of each match advances to the next round, determine the number of matches that must be played before a winner is determined. 63

4.) Determine the sum of the geometric series: $27 + 9 + 3 + \ldots + \frac{1}{243}$.
$\frac{9841}{243}$

Exercise Infinite Geometric Series

1.) Determine the sum of each geometric series, if it exists.
a.) $8 + 4 + 2 + 1 + \ldots$ 16
b.) $8 + 12 + +18 + 27 + 40.5 + \ldots$ ϕ

2.) The sum of an infinite geometric series is 81. If the common ratio is $\frac{2}{3}$, determine the value of t_1. 27

3.) The sum of an infinite geometric series is $-\frac{40}{3}$. If the first term is -8, determine the value of the common ratio. 0.4

4.) The infinite series given by $1 + 3x + 9x^2 + 27x^3 + \cdots$ has a sum of 4. Determine the value of x. $\frac{1}{4}$

5.) A weather balloon rises 100m the first minute, and each minute after the first it rises 4% less than the previous minute. Determine the maximum height reached by the balloon. 2500m

6.) If $-64, a, b, 27$ are four consecutive terms in a geometric sequence, determine the value of b.
-36