Foundations and Pre-Calculus 10

Name: KBY

Learning Target 2 – 3: Arithmetic Sequence and Series

Learning Target $(L-T)$	Procedural Context
$2-3$ **Arithmetic Sequence and Series**	• Identify the Common Difference • Understand the Sequence Equation: $t_n = t_1 + (n-1)d$ $\quad t_1 = a$, they are interchangeable • Solving for various missing information • Arithmetic Series ○ Use the provided equation when necessary ○ Solve for n first with sequence equation

Self-Reflection

For this Learning Target I am feeling:

Discuss your work habits leading up to this Check-In:

Your Level of Understanding of this Learning Target is:

My Feedback:

$t_n = a + (n-1)d$ $S_n = \frac{n}{2}(a + l)$ *or* $S_n = \frac{n}{2}(2a + (n-1)d)$

EMERGING LEVEL QUESTIONS

Find the indicated information.

1. Given the following Sequence, what is the 34^{th} term?

$3, 7, 11, 15, \ldots$

$t_{34} = 3 + (34-1)(4)$

$3 + 33(4)$

$t_{34} = 135$

2. Find the value of n.

$-4, -1, 2, \ldots, 47$

$t_n = -4 + (n-1)(3)$

$47 = -4 + 3(n-1)$

$51 = 3(n-1)$

$17 = n-1$

$n = 18$

3. Find the 23rd term of the following sequence.

$-12, -7, -2, \ldots$

$t_{23} = -12 + (23-1)(5)$

$-12 + 22(5)$

$-12 + 110$

$t_{23} = 98$

4. Find the value of n.

$1, -3, -7, \ldots, -79$

$-79 = 1 + (n-1)(-4)$

$-80 = -4(n-1)$

$20 = n-1$

$n = 21$

5. Find the sum of the sequence with the following information.

$a = 5, n = 17, l = 53$

$S_{17} = \frac{17}{2}(5 + 53)$

$8.5(58)$

$S_{17} = 493$

6. Determine the number of terms in the arithmetic sequence:

$5, 1, -3, \ldots, -111$

$-111 = 5 + (n-1)(-4)$

$-116 = -4(n-1)$

$29 = n-1$

$n = 30$

PROFICIENT LEVEL QUESTIONS

7. Find the first term (a), in the arithmetic sequence with the following:

   6th term is 10 18th term is 46

$\frac{46-10}{18-6} = \frac{36}{12}$ $d=3$

$10 = a+(6-1)(3)$

$10 = a+15$

$a=-5$

8. Find the first term (a), in the arithmetic sequence with the following:

   7th term is 78 18th term is 45

$\frac{45-78}{18-7} = \frac{-33}{11} \Rightarrow d=-3$

$78 = a+(7-1)(-3)$

$78 = a+(-18)$

$a=96$

9. Find the first term (a), in the arithmetic sequence with the following:

   5th term is 3 25th term is -57

$\frac{-57-3}{25-5} = \frac{-60}{20}$ $d=-3$

$3 = a+(5-1)(-3)$

$3 = a+(-12)$

$a=15$

10. Find the sum of the following series in the abstract.

$$-3+2+7+\cdots+(2n-1)$$

$S_n = \frac{n}{2}(2n-1+(-3))$

$\frac{n}{2}(2n-4)$

n^2-2n

11. Find the sum of the following series:

$$39+33+27+\cdots+(-15)$$

$-15 = 39+(n-1)(-6)$

$-54 = -6(n-1)$

$9 = n-1$

$n=10$

$S_{10} = \frac{10}{2}(39+(-15))$

$5(24)$

$S_{10} = 120$

12. Find the sum of the following series:

$$5+9+13+\cdots+137$$

$137 = 5+(n-1)(4)$

$132 = 4(n-1)$

$33 = n-1$

$n=34$

$S_{34} = \frac{34}{2}(5+137)$

$17(142)$

$S_{34} = 2414$

EXTENDING LEVEL QUESTION

13. Find $S_{21}, if\ a_1 = 8, a_{16} = 83$

$\frac{83-8}{16-1} = \frac{75}{15} \rightarrow d = 5$

$t_{21} = 8 + (21-1)(5)$

$t_{21} = 8 + (20)(5)$

$t_{21} = 108$

$S_{21} = \frac{21}{2}(8+108)$

$S_{21} = 1218$

14. Find x so that the values given are consecutive terms in an arithmetic sequence. Identify the common difference and the first three terms.

$2x, 3x + 2, 5x + 3$

$3x+2-2x = d$

$5x+3-(3x+2) = d$

$x+2 = 2x+1$

$1 = x$

2, 5, 8

$d = 3$