Name: Key

10.1&10.2 Homework

$a_n = a_1 + (n-1)d$

$S_n = \frac{n}{2}(a_1 + a_n)$

1) True or False; The following sequence is arithmetic: -10,-3,4,11,18,25,32.

(if it is true, identify the *d* value) $d = 7$

2) True or False; The following sequence is arithmetic: -14,-12,-10,-8,-6,…

(if it is true, identify the *d* value) $d = 2$

3) True or False; The following series is arithmetic infinite: -10 +(-15)+(-20)+(-25) +(-30).

(if it is true, identify the *d* value) otherwise d would have been -5

4) True or False; The following sequence is arithmetic: $\frac{11}{6}, \frac{19}{6}, \frac{9}{2}, \frac{35}{6}, \frac{43}{6}, \ldots$

(if it is true, identify the *d* value) $d = \frac{4}{3}$

5) Write an explicit formula for the sequence. Then find a_{13}. 12,22,32,42..

$a_n = 12 + (n-1)(10)$ $a_{13} = 132$

$a_n = 10n + 2$

6) Find the first 19th partial sum of the series -8+(-13)+(-18)…

$S_{19} = \frac{19}{2}(-8 + -98)$ $d = -5$ $a_{19} = -8 + (19-1)(-5)$

-1007 $a_{19} = -98$

7) One term of an arithmetic sequence is $a_{18} = 22$. The common difference is 6. Find a_1.

$22 = a_1 + (18-1)(6)$

$a_1 = -80$

8) One term of an arithmetic sequence is $a_{14} = -11$ and *d* is 4. Write an explicit formula.

$-11 = a_1 + (14-1)(4)$ $a_n = -63 + (n-1)(4)$

$a_1 = -63$ $a_n = 4n - 67$

9) Determine a rule for the nth term of the sequence. Then find a_{13}. 72, 60, 48, 36, 24, ..

$a_n = 72 + (n-1)(-12)$ $a_{13} = -12(13) + 84$ $d = -12$

$a_n = -12n + 84$ $a_{13} = -72$ $a_1 = 72$

10) One term of an arithmetic sequence is $a_{19} = 34$. The common difference is $d = \frac{7}{2}$ Write an explicit formula.

$34 = a_1 + (19-1)\frac{7}{2}$ $a_n = -29 + (n-1)\frac{7}{2}$

$34 = a_1 + 63$ $a_n = \frac{7}{2}n - 32.5$

$a_1 = -29$

11) Write an explicit formula. Then find a_{12}. $0, \frac{2}{3}, \frac{4}{3}, 2, \ldots$

$a_n = (n-1)\frac{2}{3}$ $a_{12} = \frac{2}{3}(12) - \frac{2}{3} = \frac{22}{3}$

$a_n = \frac{2}{3}n - \frac{2}{3}$

12) Write an explicit formula. Then find a_{13}. $0, \frac{3}{2}, 3, \frac{9}{2}, \ldots$

$a_n = \frac{3}{2} - \frac{3}{2}$

$a_{13} = 18$

$a_n = a_1 + (n-1)d$

$S_n = \frac{n}{2}(a_1 + a_n)$

13) Two terms of an arithmetic sequence are $a_8 = 74$ and $a_{21} = 191$. Write an explicit formula.

a) a_n =-2 +9n b) a_n = -2 +10n c) a_n =10n +2 d) a_n =9n + 2

$74 = a_1 + (8-1)d$ $191 = a_1 + (21-1)d$

$74 = a_1 + 7d$ $191 = a_1 + 20d$

$-191 = -a_1 - 20d$

$a_1 = 11$ $d = 9$

$a_n = 11 + (n-1)9$ $a_n = 9n + 2$

14) Two terms of an arithmetic sequence are $a_7 = 42$ and $a_{23} = 170$. Write an explicit formula.

a) $a_n = -14 + 8n$ b) a_n =14 + 8n c) a_n =14 + 10n d) a_n = −14 + 10n

$-42 = a_1 + (6)d$

$+170 = a_1 + 22d$

$128 = 16d$ $d = 8$ $a_1 = -6$

$a_n = -6 + (n-1)8$

$a_n = 8n - 14$

15) Two terms of an arithmetic sequence are $a_9 = 40$ and $a_{23} = 96$. Write an explicit formula.

a) a_n =4 +6n b) a_n = 4n +4 c) a_n = -4 +4n d) a_n =-4 + 6n

$-40 = a_1 + 8d$

$96 = a_1 + 22d$

$56 = 14d$ $d = 4$ $a_1 = 8$

$a_n = 8 + (n-1)4$

$a_n = 4n + 4$

16) Find the sum of the arithmetic series $\sum_{i=4}^{21} (9 + 8i)$

a) -1960 b) -1962 c) 1960 d) 1962

$S_{18} = \frac{18}{2}(41 + 177)$

$= 1962$

sum(seq(9+8x, x, 4, 21))

17) Given the first 46th partial sum of an arithmetic series is -1265 and the d value is -1, find a_1 and a_{46}.

$-1265 = \frac{46}{2}(a_1 + a_{46})$

$a_{46} = a_1 + (46-1)(-1)$

$a_{46} = a_1 + -45$

$-55 = a_1 + (a_1 - 45)$

$-10 = 2a_1$

$a_1 = -5$

$a_{46} = -50$

18) Find S_{23} of the series -13+-5 +3 +…

$S_{23} = \frac{23}{2}(-13 + 163)$

1725

$a_{23} = -13 + (23-1)(8)$

$a_{23} = 163$

19) Considering if number 18 was a sequence, does it converge or diverge and why?