

Name: KEY

Unit 7 - Review

1. Indicate the sequences that are arithmetic. For each arithmetic sequence, determine the value of t_1 , d , and the next three terms.

a) 36, 40, 44, 48 ... 52, 56, 60

$+4 \quad +4 \quad +4$

$t_1 = 36$

$d = 4$

b) -35, -40, -45, -50 ... -55, -60, -65

$-5 \quad -5 \quad -5$

$t_1 = -35$

$d = -5$

c) 1, 2, 4, 8 ...

$+1 \quad +2 \quad +4$

not
arithmetic!

d) 8.3, 4.3, 0.3, -3, -3.7 ...

$-4 \quad -4 \quad -3.3 \quad -0.7$

not
arithmetic!

2. For the sequence: 7, 14, 21, 28 ... Determine whether each number is a term in this sequence. If the number is a term in the sequence, determine the value of n for that term.

a) 98 $t_1 = 7$ $d = 7$

$t_n = t_1 + (n-1)d$

$98 = 7 + (n-1)(7)$

$98 = 7 + 7n - 7$

$n = 14$ yes

b) 110

$110 = 7n$

$n = 15.71$

no! not a term

c) 378

$378 = 7n$

$n = 54$ yes

d) 575

$575 = 7n$

$n = 82.14$

no! not a term

3. Given the sequence: 2, 9, 16, 23 ... Determine each term.

a) t_{17} $n = 17$ $d = 7$

$t_1 = 2$

$t_{17} = 2 + (17-1)(7)$

$t_{17} = 114$

b) t_{26}

$t_{26} = 2 + (26-1)(7)$

$t_{26} = 177$

4. Given the sequence: $-10, -7, -4 \dots$ Determine each term.

a) t_{11}

$$t_1 = -10 \\ d = 3$$

$$t_{11} = -10 + (11-1)(3)$$

$$\boxed{t_{11} = 20}$$

b) t_{22}

$$t_{22} = -10 + (22-1)(3)$$

$$\boxed{t_{22} = 53}$$

5. Determines the rank of each term to complete the statement.

a) 250 is the n^{th} term of $10, 15, 20 \dots$

$$t_n \quad n=? \quad t_1 = 10 \quad d = 5$$

$$250 = 10 + (n-1)(5)$$

$$250 = 10 + 5n - 5$$

$$245 = 5n$$

$$\boxed{n = 49}$$

b) -30 is the n^{th} term of $40, 38, 36 \dots$

$$t_n \quad n=? \quad t_1 = 40 \quad d = -2$$

$$-30 = 40 + (n-1)(-2)$$

$$-30 = 40 - 2n + 2$$

$$-72 = -2n$$

$$\boxed{n = 36}$$

c) 121 is the n^{th} term of $1, 4, 7 \dots$

$$t_n \quad n=? \quad t_1 = 1 \quad d = 3$$

$$121 = 1 + (n-1)(3)$$

$$121 = 1 + 3n - 3$$

$$123 = 3n$$

$$\boxed{n = 41}$$

d) 153 is the n^{th} term of $-11, -7, -3 \dots$

$$t_n \quad n=? \quad t_1 = -11 \quad d = 4$$

$$153 = -11 + (n-1)(4)$$

$$153 = -11 + 4n - 4$$

$$168 = 4n$$

$$\boxed{n = 42}$$

6. Given the sequence defined by $t_n = 5n - 12$. Determine each term.

a) t_7 $n = 7$

$$t_7 = 5(7) - 12$$

$$\boxed{t_7 = 23}$$

b) t_{13} $n = 13$

$$t_{13} = 5(13) - 12$$

$$\boxed{t_{13} = 53}$$

7. Given the sequence defined by $t_n = -3n + 4$. Determine each term.

a) t_{31} $n = 31$

$$t_{31} = -3(31) + 4$$

$$\boxed{t_{31} = -89}$$

b) t_5 $n = 5$

$$t_5 = -3(5) + 4$$

$$\boxed{t_5 = -11}$$

8. Given the arithmetic sequence with values of $t_1 = 7$ and $d = 2$; determine the general term, t_n .

$$t_n = t_1 + (n-1)d$$

$$t_n = 7 + (n-1)(2)$$

$$t_n = 7 + 2n - 2$$

$$\boxed{t_n = 5 + 2n}$$

9. Given the arithmetic sequence with values of $t_1 = -4$ and $d = 6$; determine the general, t_n .

$$t_n = -4 + (n-1)(6)$$

$$\boxed{t_n = -10 + 6n}$$

10. Given the arithmetic sequence with values of $t_1 = -5$ and $d = -8$; determine the general term, t_n .

$$t_n = -5 + (n-1)(-8)$$

$$t_n = 3 + (-8n)$$

$$\boxed{t_n = 3 - 8n}$$

11. Determines the tenth term of the arithmetic sequence whose first term is 5 and the fourth term is 17.

$$t_1 = 5$$

$$n = 10$$

$$t_4 = 17$$

$$t_{10} = ?$$

$$d = ?$$

$$t_4 = t_1 + (n-1)d$$

$$17 = 5 + (4-1)d$$

$$\boxed{d = 4}$$

$$t_{10} = 5 + (10-1)(4)$$

$$t_{10} = 5 + 9(4)$$

$$\boxed{t_{10} = 41}$$

$$t_1 = ?$$

12. Determines the first term of the arithmetic sequence whose 18th term is 262 and the common difference is 15.

$$t_{18} = 262$$

$$d = 15$$

$$t_n = t_1 + (n-1)(d)$$

$$262 = t_1 + (18-1)(15)$$

$$262 = t_1 + 17(15)$$

$$\boxed{t_1 = 7}$$

$$t_1 = ?$$

13. Determines the first term of the arithmetic sequence whose 30th term is -215 and the common difference is -8.

$$t_{30} = -215$$

$$d = -8$$

$$t_n = t_1 + (n-1)(d)$$

$$-215 = t_1 + (30-1)(-8)$$

$$-215 = t_1 + (29)(-8)$$

$$\boxed{t_1 = 17}$$

14. The 3rd term of an arithmetic sequence is 14 and the 13th term is 74. Determine:

a) d

$$t_3 = 14$$

$$t_{13} = 74$$

$$14 = t_1 + (3-1)d$$

$$74 = t_1 + (13-1)d$$

$$14 = t_1 + 2d$$

$$74 = t_1 + 12d$$

$$14 = t_1 + 2d$$

$$- (74 = t_1 + 12d)$$

$$\frac{-60}{-10} = \frac{-10d}{-10}$$

$$\boxed{d = 6}$$

b) t_1

$$14 = t_1 + 2(6)$$

$$\boxed{t_1 = 2}$$

c) t_n

$$t_n = t_1 + (n-1)d$$

$$t_n = 2 + (n-1)(6)$$

$$\boxed{t_n = -4 + 6n}$$

5. The 5th term of the arithmetic sequence is -30 and the 20th term is -135. Determine:

a) d

$$t_5 = -30$$

$$t_{20} = -135$$

$$-30 = t_1 + (5-1)d$$

$$-135 = t_1 + (20-1)d$$

$$-30 = t_1 + 4d$$

$$-135 = t_1 + 19d$$

$$\begin{array}{r} -30 = t_1 + 4d \\ -(-135 = t_1 + 19d) \\ \hline 105 = -15d \\ \boxed{d = -7} \end{array}$$

b) t_1

$$-30 = t_1 + 4(-7)$$

$$\boxed{t_1 = -2}$$

c) t_n

$$t_n = -2 + (n-1)(-7)$$

$$t_n = 5 + (-7n)$$

$$\boxed{t_n = 5 - 7n}$$