

Nam3: KEY

### Exercise 7.1 (part 1)

1. Which sequences are arithmetic? For each arithmetic sequence, determine the value of  $t_1$ ,  $d$ , and the next three terms

a) 16, 32, 48, 64, 80, ... 96, 112, 128

$\xrightarrow{+16}$

$$t_1 = 16$$

$$d = 16$$

b) 2, 4, 8, 16, 32, ...

$\xrightarrow{\times 2}$   
 $\xrightarrow{\times 2}$

c) -4, -7, -10, -13, -16, ...

$\xrightarrow{-3}$

$$t_1 = -4$$

$$d = -3$$

d) 3, 0, -3, -6, -9, ...

$\xrightarrow{-3}$   
 $\xrightarrow{-3}$

$$t_1 = 3$$

$$d = -3$$

2. Write the first four terms of the arithmetic sequence that has the values shown.

a)  $t_1 = 5$  and  $d = 3$

$$5, 8, 11, 14$$

b)  $t_1 = -1$  and  $d = -4$

$$-1, -5, -9, -13$$

c)  $t_1 = 4$  and  $d = \frac{1}{5}$

$$4, 4\frac{1}{5}, 4\frac{2}{5}, 4\frac{3}{5}$$

d)  $t_1 = 1,25$  and  $d = -0,25$

$$1,25, 1, 0,75, 0,50$$

3. Given the sequence defined by  $t_n = 3n + 8$ . Determine each term

a)  $t_1$ ,  $n=1$

$$t_1 = 3(1) + 8$$

$$t_1 = 11$$

b)  $t_7$ ,  $n=7$

$$t_7 = 3(7) + 8$$

$$t_7 = 29$$

c)  $t_{14}$ ,  $n=14$

$$t_{14} = 3(14) + 8$$

$$t_{14} = 50$$

4. For each arithmetic sequence determine the values of  $t_1$ , and  $d$ , then find the indicated terms:

a)  $\square, \square, \square, 19, 23$

$$d = 4$$

$$t_3 = 19 - 4 = 15$$

$$t_2 = 15 - 4 = 11$$

$$t_1 = 11 - 4 = \boxed{7}$$

b)  $\square, \square, 3, \frac{3}{2}$

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

$$t_2 = 3 + \frac{3}{2} = \frac{9}{2}$$

$$t_1 = \frac{9}{2} + \frac{3}{2} = \frac{12}{2} = \boxed{6}$$

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

a) 170 is the  $\square^{th}$  term of  $-4, 2, 8, \dots$

$$t_n = 170 \quad t_1 = -4 \quad d = 6$$

$$170 = -4 + (n-1)(6)$$

$$170 = -4 + 6n - 6$$

$$180 = 6n$$

$$\boxed{n = 30}$$

b)  $-14$  is the  $\square^{th}$  term of  $\frac{11}{5}, 2, \frac{9}{5}, \dots$

$$t_n = -14 \quad t_1 = 2\frac{1}{5} \quad d = -\frac{1}{5}$$

$$-14 = \frac{11}{5} + (n-1)\left(-\frac{1}{5}\right)$$

$$-70 = 11 - n + 1$$

$$\boxed{n = 82}$$

c) 97 is the  $\square^{th}$  term of  $-3, 1, 5, \dots$

$$t_n = 97 \quad t_1 = -3 \quad d = 4$$

$$97 = -3 + (n-1)(4)$$

$$97 = -3 + 4n - 4$$

$$104 = 4n$$

$$\boxed{n = 26}$$

d)  $-10$  is the  $\square^{th}$  term of  $14, 12, 5, 11, \dots$

$$t_n = -10 \quad t_1 = 14 \quad d = -1.5$$

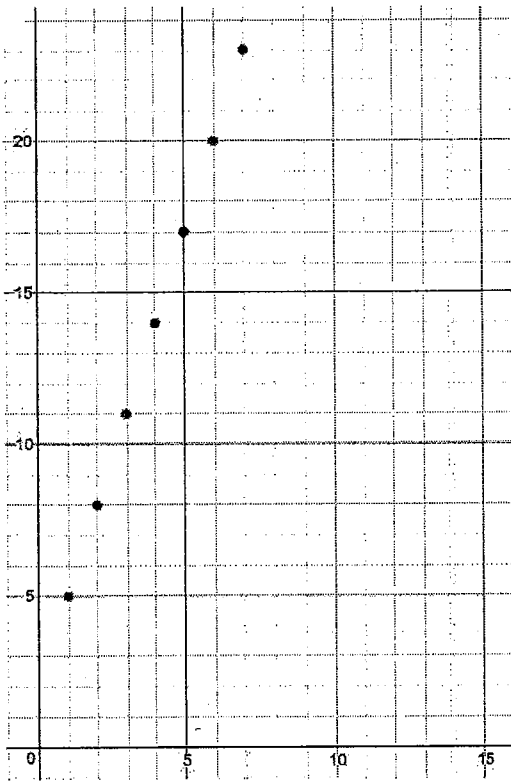
$$-10 = 14 + (n-1)(-1.5)$$

$$-10 = 14 - 1.5n + 1.5$$

$$25.5 = -1.5n$$

$$\boxed{n = 17}$$

6. Given the graph of the arithmetic sequence.



$$t_1 = 5$$

$$d = 3$$

a) What are the first 6 terms of the sequence?

$$5, 8, 11, 14, 17, 20$$

b) Determine the general term of the sequence.

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

$$t_n = 5 + (n-1)(3)$$

$$t_n = 5 + 3n - 3$$

$$\boxed{t_n = 3n + 2}$$

c) Determine the value of  $t_{50}$  and  $t_{100}$ .

$$t_{50} = 3(50) + 2$$

$$t_{100} = 3(100) + 2$$

$$\boxed{t_{50} = 152}$$

$$\boxed{t_{100} = 302}$$

7. Determine the first term of the arithmetic sequence given that the 16<sup>th</sup> term is 110 and the common difference is 7.

$$t_{16} = 110 \quad d = 7 \quad t_1 = ?$$

$$t_{16} = t_1 + (16-1)d$$

$$110 = t_1 + (15)(7)$$

$$\boxed{t_1 = 5}$$

8. The first term of the arithmetic sequence is  $5y$  and the common difference is  $-3y$ . Write the equation  $t_n$  and find  $t_{15}$ .

$$t_1 = 5y \quad d = -3y$$

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

$$t_n = 5y + (n-1)(-3y)$$

$$t_n = 5y - 3yn + 3y$$

$$\boxed{t_n = 8y - 3yn}$$

$$t_{15} = 8y - 3y(15)$$

$$t_{15} = 8y - 45y$$

$$\boxed{t_{15} = -37y}$$