

The Arithmetic Sequence

We know that to generate a sequence you need:

- A set pattern
- A starting value (a)

We will focus our study on the arithmetic sequence

It has a first term ' a ' and a common difference ' d '

To get to the 9th term you add 8 differences, to get to the 40th add 39 differences

Formula: the n^{th} term of an arithmetic sequence is given by:

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

1) Given 3, 7, 11, ...

a) create t_n

$$a = 3, d = 4$$

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

b) find t_{253}

we now know $n = 253$

$$t_{253} = 3 + (253 - 1)4 \quad t_{101} = 1011$$

2) Given 13, 28.6, 40.2 ...

a) find t_{356}

$$a = 13, d = 28.6 - 13$$

$$t_n = 13 + (n - 1)(15.6)$$

$$t_{356} = 13 + (356 - 1)(15.6) \quad t_{356} = 5551$$

b) Is 10262.2 in this sequence?

if it is $n = \text{whole \#}$

$$10262.2 = 13 + (n - 1)(15.6)$$

$$10249.2 = (n - 1)(15.6) \quad 657 = n - 1$$

$$n = 658 \text{ so YES in sequence}$$

3) Given 96, 82.6, 69.2....

a) find t_{306}

$$a = 96, d = 82.6 - 98$$

$$t_n = 96 + (n - 1)(-13.4)$$

$$t_{306} = 96 + (306 - 1)(-13.4) \quad t_{306} = -3991$$

b) Which term is -11649.1?

$$-11649.1 = 96 + (n - 1)(-13.4)$$

$$-11745.1 = (n - 1)(-13.4) \quad 876.5 = n - 1$$

$$n = 877.5 \text{ THIS TERM Does not exist}$$

4) Given 50.4, 41.7, 33, ...

a) Find t_{58}

$$a = 50.4, d = 41.7 - 50.4$$

$$t_n = 50.4 + (n - 1)(-8.7)$$

$$t_{58} = 50.4 + (58 - 1)(-8.7) \quad t_{58} = -445.5$$

b) Which term is -419.4?

$$-419.4 = 50.4 + (n - 1)(-8.7)$$

$$-469.8 = (n - 1)(-8.7) \quad 54 = n - 1$$

$$n = 55 \dots \text{the } 55^{\text{th}} \text{ term}$$

Assignment = worksheet

Math 10 Arithmetic Sequences (Day 2 Worksheet)

1) Create an arithmetic sequence formula and use it to find the indicated term

a) 6, 8, 10,

$t_n =$

Find $t_{40} =$

Find $t_{125} =$

b) 12, 16, 20,

$t_n =$

Find $t_{17} =$

Find $t_{112} =$

c) 9, 16, 23,

$t_n =$

Find $t_{15} =$

Find $t_{88} =$

d) -10, -7, -4,

$t_n =$

Find $t_{22} =$

Find $t_{99} =$

e) -4, -9, -14,

$t_n =$

Find $t_{33} =$

Find $t_{314} =$

f) 5, -1, -7,

$t_n =$

Find $t_{44} =$

Find $t_{745} =$

g) 7, 20, 33

$t_n =$

Find $t_{12} =$

Find $t_{67} =$

h) 100, 88, 76,

$t_n =$

Find $t_{17} =$

Find $t_{116} =$

i) 45, 52, 59 ...

$t_n =$

Find $t_{44} =$

Find $t_{745} =$

j) 5.6, 12, 18.4

$t_n =$

Find $t_{12} =$

Find $t_{67} =$

k) 94.7, 94, 93.3,

$t_n =$

Find $t_{31} =$

Find $t_{166} =$

l) $\pi + 5, \pi + 9, \pi + 13 \dots$

$t_n =$

Find $t_{44} =$

Find $t_{111} =$

2) Given 7, 23, 39

a) $t_n =$

b) $t_{64} =$

c) Is 1975 in this sequence?

3) Given 15, 21.5, 28

a) $t_n =$

b) $t_{42} =$

c) Is 577 in this sequence?

4) Given 99, 85, 71

a) $t_n =$

b) $t_{21} =$

c) Is -818 in this sequence?

5) Given 245, 239, 233

a) $t_n =$

b) $t_{121} =$

c) Is -949 in this sequence?

6) Given 94.5, 103.2, 111.9 ...

a) $t_n =$

b) $t_{88} =$

c) Is 4061.7 in this sequence?

7) If you graphed the terms of an arithmetic sequence on a graph of t_n vs n the graph would form a straight line. Would you connect the dots on this graph? Why or Why not?

8) In 1988 Calgary hosted the Olympic winter games – these games occur every 4 years. Will there be winter Olympics in

a) 2052?

b) 2070?

c) 2168?