

6.1 Arithmetic Sequences

Arithmetic Sequences - ordered list of terms that have a common difference between each term

ex.) 2, 4, 6, 8

General Term - formula that can be used to find terms in a sequence

t_n

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

t_1 = first term

n = number of terms

d = common difference

t_n = general term/last term



Ex.) The LCHS Fine Arts Department wants to hire a community events promoter. The person will be paid \$12 for the first hour of work, \$19 for two hours of work, and so on.

t_n 12, 19, ...

a) Write the general term that you could use to determine the pay for any number of hours worked?

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

$$t_n = 12 + (n-1)7$$

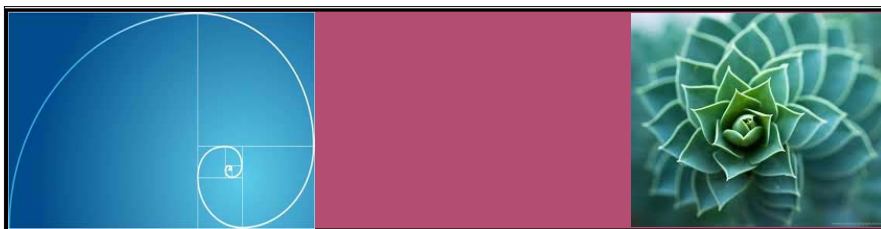
$$t_n = 12 + 7n - 7$$

$$t_n = 5 + 7n$$

b) What will the person get paid for 6 hours of work?

$$t_6 = 5 + 7(6)$$

$$t_6 = \$47$$



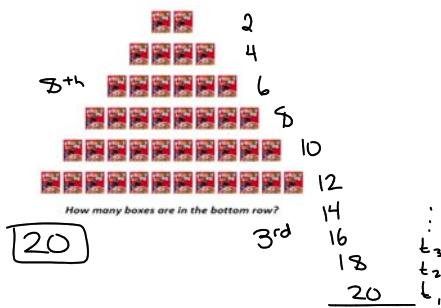
Ex.) In 1955, the Banks Island musk-ox population was approximately 9250 animals. Suppose in subsequent years, the growth of the musk-ox population generated an arithmetic sequence, in which the number of musk-ox increased by approximately 1650 per year.

a) How many years would it take for the musk-ox population to reach 100 000?

$$\begin{aligned}
 t_1 &= 9250 & t_n &= t_1 + (n-1)d \\
 d &= 1650 & 100\,000 &= 9250 + (n-1)1650 \\
 t_n &= 100\,000 & 100\,000 &= 9250 + 1650n - 1650 \\
 n &= ? & 100\,000 &= 7600 + 1650n \\
 & & 92400 &= \frac{1650n}{1650} \\
 & & \boxed{56 \text{ years} = n} &
 \end{aligned}$$



Ex.) Stephen has a job at No-Frills. He has been asked to create a display of cereal boxes. The top six rows of his display are shown. The numbers of boxes in the rows produce an arithmetic sequence. There are 16 boxes in the third row from the bottom, and 6 boxes in the eighth row from the bottom.



Determine the general term, t_n , for the sequence.

$$\begin{aligned}
 t_n &= t_1 + (n-1)d \\
 t_n &= 20 + (n-1)(-2) \\
 t_n &= 20 - 2n + 2 \\
 \boxed{t_n} &= \boxed{22 - 2n}
 \end{aligned}$$

What is the number of rows of boxes in his display?

10 rows



Ex.) Best Buy technicians charge \$65 for making a house call, plus \$42 per hour or portion of an hour.

a) Generate the possible charges (excluding parts) for the first 4 h of time.

$$\frac{107}{t_1}, \frac{149}{t_2}, 191, 233.$$

b) What is the charge for 10 h of time?

$$t_n = t_1 + (n-1)d$$
$$t_{10} = 107 + (10-1) \cdot 42$$
$$t_{10} = \$485$$

Pg. 16
1-10
(odd letters)