# Daily Quiz

Identify $a_1$ term and the common difference, then write the recursive and explicit rule for the following sequence.

7, 14, 21, 28, . . ..

## M4:L4.3 Modeling with Arithmetic Sequence

Objective: We will be able to solve real-world problems using arithmetic sequences.

**1 Example**

You can model real-world situations and solve problems using models of arithmetic sequences. For example, suppose watermelons cost $6.50 each at the local market. The total cost, in dollars, of n watermelons can be found using $\boxed{c(n) = 6.5n}$.

A) Complete the table of values for 1, 2, 3, and 4 watermelons.

| | $a_1$ | $a_2$ | $a_3$ | $a_4$ | |
|---|---|---|---|---|---|
| **Watermelons *n*** | 1 | 2 | 3 | 4 | Domain |
| **Total cost ($) *c*(*n*)** | $6.50 | $13.00 | $19.50 | $26 | Range |

B) What is the common difference?

$d = 2^{nd}\# - 1^{st}\#$

$= 13 - 6.5 = \boxed{6.5 = d}$

C) What does n represent in this context?

$n$ = # of watermelon

D) What are the dependent and independent variables in this context?

dep = Total cost ($)

Indep = # of watermelons

E) Find c(7). What does this value represent?

$c(7) = 6.50(7)$

$\boxed{c(7) = \$45.50}$

The $45.50 is the total cost of 7 watermelons.

**2 Example** Construct an explicit rule in function notation for the arithmetic sequence represented in the table. Then interpret the meaning of a specific term of the sequence in the given context.

The table shows the cumulative total interest paid, in dollars, on a loan after each month.

| **Number of months** | *n* | 1 $a_1$ | 2 $a_2$ | 3 $a_3$ | 4 $a_4$ | D |
|---|---|---|---|---|---|---|
| **Cumulative total ($)** | *a*(*n*) | 160 | 230 | 300 | 370 | R |

Determine the value of a(20) and tell what it represents in this situation.

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

$a_1 = 160$

$d = 2^{nd} - 1^{st}$

$= 230 - 160$

$d = 70$

$a_n = 160 + 70(n-1)$

$= 160 + 70n - 70$

$\boxed{a_n = 70n + 90}$ Exp. Rule

$n = 20$, $a_{20} = 70(20) + 90$

$a_{20} = 1400 + 90$

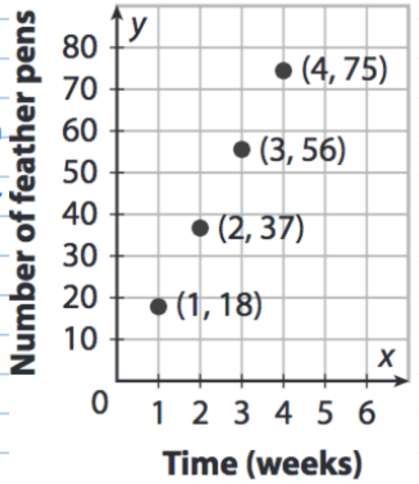
$\boxed{a_{20} = \$1490.00}$

After 20 months they will owe $1490 in interest.

**4 Example**

Construct an explicit rule in function notation for the arithmetic sequence represented in the graph, and use it to solve the problem.

D'Andre collects feather pens. The graph shows the number of feather pens D'Andre has collected over time, in weeks. According to this pattern, how many feather pens will D'Andre have collected in 12 weeks?




Represent the sequence in a table.

| n | 1 | 2 | 3 | 4 | Domain |
|---|---|---|---|---|---|
| a(n) | 18 | 37 | 56 | 75 | Range |

$a_1 = 18$

$d = 19$

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

$a_n = 18 + 19(n-1)$

$a_n = 18 + \underbrace{19n - 19}$

$a_n = 19n - 1$

$n = 12, \quad a_{12} = 19(12) - 1$

$= 228 - 1$

$\boxed{a_{12} = 227}$

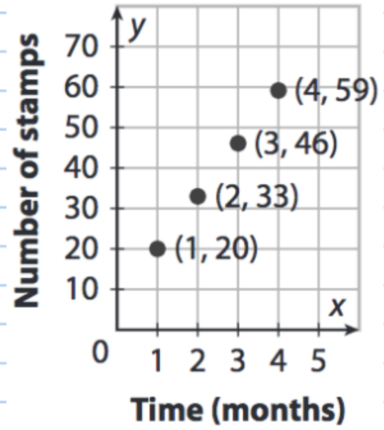
After 12 weeks D'Andre will have 227 feather pens.

**5 Example**

Construct an explicit rule in function notation for the arithmetic sequence represented in the graph, and use it to solve the problem.

Eric collects stamps. The graph shows the number of stamps that Eric has collected over time, in months. According to this pattern, how many stamps will Eric have collected in 10 months?

Represent the sequence in a table.




| n | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| a(n) | | | | |

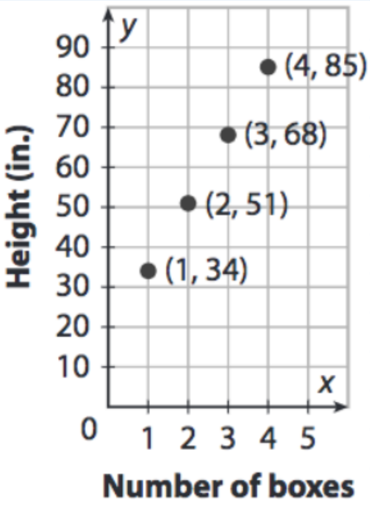
SKIP

**U TRY**

Construct an explicit rule in function notation for the arithmetic sequence represented in the graph, and use it to solve the problem.

The graph shows the height, in inches, of a stack of boxes on a table as the number of boxes in the stack increases. Find the height of the stack with 7 boxes.

Skip




**6 Example**

**Construct an explicit rule in function notation for the arithmetic sequence represented, and use it to solve the problem. Justify and evaluate your answer.**

Ruby signed up for a frequent-flier program. She receives 3400 frequent-flier miles for the first round-trip she takes and 1200 frequent-flier miles for all additional round-trips. How many frequent-flier miles will Ruby have after 5 round-trips?

$a_1$ $d$ $n$

Exp Rule : $a_n = a_1 + d(n-1)$

$a_1 = 3400$

$d = 1200$

$n = 5$

$a_n = 3400 + 1200(n-1)$

$a_n = 3400 + \underbrace{1200n - 1200}$

$a_n = 1200n + 2200$

$n = 5, \quad a_5 = \overset{6000}{1200(5)} + 2200$

$a_2 = 8{,}200$

After 5 trips Ruby will have 8,200 frequent-flier miles