

Arithmetic Sequences pt2

recursive formula

- way to tell the next term
- use u_n OR a_n
- includes 3 pieces

$$\begin{aligned} a_1 &= \text{1st term} \\ a_n &= a_{n-1} + \text{c.d.} \\ n &\geq 2 \end{aligned}$$

[ex] write a recursive formula for
-1, 2, 5, 8, ...

first term $a_1 = -1$

$$a_n = a_{n-1} + 3 \leftarrow \text{rule}$$

"to get the new term, take the previous & add 3"

explicit formula

- able to find any term # value

$$a_n = a_1 + d(n-1) \text{ OR } a_n = a_0 + dn$$

[ex1] write the explicit formula from

$$a_n = \begin{cases} -5, & n=1 \leftarrow \text{1st term} \\ a_{n-1} + 2, & n > 1 \leftarrow \text{rule} \end{cases}$$

$$a_n = -5 + 2(n-1)$$

[ex2] write the explicit formula for -8, -11, -14, ...

$$\begin{aligned} u_n &= -5 - 3n \\ \text{OR } u_n &= -8 - 3(n-1) \end{aligned}$$

$$\begin{aligned} u_1 & \uparrow \text{ c.d.: } -3 \\ u_0 &= -5 \end{aligned}$$

Word problems

ex1 Sam is training for a race. The distances of her training runs form an arithmetic sequence. She runs 1 mile the first day and 2mi the 7th day.

a) What's the explicit formula?

$$a_1 = 1$$

$$a_7 = 2$$

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

$$2 = 1 + d(7-1)$$

$$2 = 1 + 6d$$

$$1 = 6d$$

$$\frac{1}{6} = d$$

$$a_n = 1 + \frac{1}{6}(n-1)$$

Solve for the d

b) How far does she run on day 19?

$$a_{19} = 1 + \frac{1}{6}(19-1)$$

$$a_{19} = 1 + \frac{1}{6}(18)$$

$$a_{19} = 1 + 3 = \boxed{4 \text{ mi}}$$