

Sequences - card matching

Calculators may be used

Learners should have some knowledge of:

- Determining a recurrence relation in the form $u_{n+1} = au_n + b$ when given 3 consecutive terms of a sequence
- Using a recurrence relation to determine a given term in the sequence
- Finding the limit (where it exists) of a sequence

Give learners card set A and B

Ask them to find a recurrence relation in the form $u_{n+1} = au_n + b$ for each sequence and match the cards

Give learners card set C and D

Ask them to match them to the existing pairs of cards.

The extra limit cards in set D are “red herrings” designed to expose common misconceptions.

Ask learners how they can prove that the limits they have found are correct.

Learners could use the blank cards to make up more sequences of their own.

Card set A

16, 10, 7,...	8, 11, 17,...
40, 32, 24.8,...	40, 124, 216.4,...
40, 4, 11.2,...	

$u_{n+1} = 0.5u_n + 2$	$u_{n+1} = 2u_n - 5$
$u_{n+1} = 0.9u_n - 4$	$u_{n+1} = 1.1u_n + 80$
$u_{n+1} = 12 - 0.2u_n$	

Card Set C

$u_5 = 4.75$	$u_5 = 53$
$u_5 = 12.488$	$u_5 = 429.844$
$u_5 = 10.048$	

Limit as $n \rightarrow \infty = 4$	Limit as $n \rightarrow \infty = -40$
Limit as $n \rightarrow \infty = 15$	No limit exists
No limit exists	Limit as $n \rightarrow \infty = 5$
Limit as $n \rightarrow \infty = -800$	Limit as $n \rightarrow \infty = 10$