(2)(a) $u_1 = 20$

$u_2 = \frac{1}{5}u_1 + 12$

$= \frac{1}{5}(20) + 12$

$= 4 + 12$

$= 16$

(b) (i) $-1 < \frac{1}{5} < 1$

(ii) Limit $= \frac{12}{1-\frac{1}{5}} = \frac{12}{4/5} = 12 \times \frac{5}{4} = 5 \times 3 = 15$

Question			Generic scheme	Illustrative scheme	Max mark
2.	(a)		$\bullet^1$ calculate second term	$\bullet^1$ 16	**1**
Notes:					
1. Candidates who use $u_0 = 20$ and then calculate $u_1 = 16$ gain $\bullet^1$.					
Commonly Observed Responses:					
	(b)	(i)	$\bullet^2$ communicate condition for limit to exist	$\bullet^2$ a limit exists as $-1 < \frac{1}{5} < 1$	**1**
		(ii)	$\bullet^3$ know how to calculate a limit $\bullet^4$ calculate limit	$\bullet^3$ $\frac{12}{1-\frac{1}{5}}$ or $L = \frac{1}{5}L + 12$ $\bullet^4$ 15	**2**
Notes:					

2. For $\bullet^2$ accept:

   any of '$-1 < \frac{1}{5} < 1$' or '$\left|\frac{1}{5}\right| < 1$' or '$0 < \frac{1}{5} < 1$' with no further comment;

   or statements such as:

   '$\frac{1}{5}$ lies between -1 and 1' or '$\frac{1}{5}$ is a proper fraction'.

3. $\bullet^2$is not available for:

   '$-1 \le \frac{1}{5} \le 1$' or '$\frac{1}{5} < 1$'

   or statements such as:

   'It is between -1 and 1.' or '$\frac{1}{5}$ is a fraction'.

4. Candidates who state $-1 < a < 1$ can only gain $\bullet^2$ if it is explicitly stated that $a = \frac{1}{5}$.

5. Do not accept $L = \frac{b}{1-a}$ with no further working for $\bullet^3$.

6. $\bullet^3$ and $\bullet^4$ are not available to candidates who conjecture $L = 15$ following the calculation of further terms in the sequence.

7. For $L = 15$ with no working award 0/2.

8. $\bullet^4$ is only available where $\bullet^3$ has been awarded.

Commonly Observed Responses:

Candidate A

$a = \frac{1}{5}$

$-1 < a < 1$ so a limit exists $\bullet^2$ ✓

Candidate B - no explicit reference to a

$u_{n+1} = au_n + b$

$u_{n+1} = \frac{1}{5}u_n + 12$

$-1 < a < 1$ so a limit exists $\bullet^2$ ^