# **Lesson Review**

#### **Learning Objectives**

Please list the learning objectives of this module that you have achieved:

I certified that I am able to:

- Find the elements of a sequence given in closed form or in recurrence form.
- Evaluate partial sums of sequences.
- Solve linear recurrence of order 1 and of order 2.

## Learning Review

Please complete the table below (refer to the attached Learning Process table).

Learning Objective	Concept	Step	Strategy	Resource	Reflection	Learning
	What concept / key- word did you focus on?		apply? Why did you	use? Why did you choose this? Did it		Generalise: what you learned that could be applied in the future ir a different context
		Identify	Identify Concepts and make a list of resources needed	Unit Site Content		
	Find the elements of	Making Sense	Read Text and Site Content, watch lec- ture videos, watch	Prescribed Text Book		
Recurrence	a sequence given in closed form or in re-	iviaking sense	and follow external videos	Recorded Lectures		
	currence form	Making Meaning	Attempt practical questions, verify answers against online tools to identify any mistakes and try again	External Videos		

		Identify	Identify Concepts and make a list of re- sources needed		
Sequences	Evaluate partial sums of sequences	Making Sense	Read Text and Site Content, watch lec- ture videos, watch and follow external videos	Recorded Lectures	
		Making Meaning	Attempt practical questions, verify answers against online tools to identify any mistakes and try again	External Videos	
		Identify	Identify Concepts and make a list of re- sources needed		
Recurrence	Solve linear recur- rence of order 1 and of order 2	Making Sense	Read Text and Site Content, watch lec- ture videos, watch and follow external videos	Unit Site content Prescribed Text Book Recorded Lectures	
	or order 2	Making Meaning	Attempt practical questions, verify answers against online tools to identify any mistakes and try again	External Videos	

## Learning Evidence

0	29	
-		
-		PRACTICAL - EVALVATING Sequences
		$0 \qquad x_i = 2 + 6i$
		$= 2+6xi  i \mid xi$
		$0/2+6\times0=2$
		$1/2+6\times1=8$
		$1.1-2, =8$ $2 + 6 \times 2 = 14$
		$1.2-x_6=38$ $3 2+6\times 3=20$
_		1.3 - 28 = 50 $4 = 26$
-		$1.4 - x_{16} = 62$ $5 = 2 + 6 \times 5 = 32$
		$6   2 + 6 \times 6 = 38$
		$\frac{7}{2+6} \times 7 = 44$
		8 2+6×8= 50
		$9 2 + 6 \times 9 = 56$
		10 12+6×10=62
		(6.17)
		$ab_i = -2 - 10i - 6i^2$
		$=$ $-2$ $-10\times i - 6\times i^2$ $i \mid bi$
		$0 / 2 - 10 \times 0 - 6 \times 0^2 = -2$
		$1 -2 - 10 \times 1 - 6 \times 1^2 = -18$
		$2.1 - b_0 = -2$ $2 - 2 - 10 \times 2 - 6 \times 2^2 = -46$
		$\lambda \cdot \lambda - b3 = -86$ 3 $-2 - 10 \times 3 - 6 \times 3^2 = -86$
		2.3-64=-138 4 -2-10x4-6x4=-138
		2.4-bg=-578 5 -2-10x5-6x5=-202
		6 -2-10×6-6×62=-278
		$7 - 2 - 10 \times 7 - 6 \times 7^2 = -366$
9		$8 \left( -2 - 10 \times 8 - 6 \times 9^{2} = -466 \right)$
9		$9 \left(-2 - 10 \times 9 - 6 \times 9^2 = -578\right)$
•		$9  -2 - 10 \times 9 - 6 \times 9^{2} = -578$ $10  -2 - 10 \times 10^{-6} \times 10^{2} = -702$
1		
PPPI		
-		
-		
3		
-		

000000000000000		
	/80-	
	0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
0	0	$b_i = -3 + b_{i-1} \qquad i \int b_i$
-		0 2
•		3.1 - b, = -1 $1 - 3 + 2 = -1$
3		$3.2-b_3 = -7$ $2 - 3+1 = -4$ $3.3-b_3 = -13$ $3 - 3+-4 = -7$ $3.4-b_9 = -25$ $4 - 3+-7 = -10$
-		3.3-6345=-13 3 -3+-4=-7
-		
-		5 -3+70=-13
-		6 -3+73=-16
-		7 -3+-16=-19
-	0	8 -3+ -19= -22
-		9 -3+-22=-25
		10 -3+-22=228
-		
100		9 °0 = 1
_		e, = 1 + 6ei-1 - 7ei-1
-		
		i / bi
		0/1
-		$4.1^{-}a_{1}=0$ $1/1+6\times1-7\times1^{2}=0$
_		4.2-ay=1 2 (1+6x0-7x02=01
		4.3- e5=0 3 1+6×1-7×1= 0
9		$4.4 - 2.0 = 1$ $4 = 1 + 6 \times 0 - 7 \times 0^2 = 1$
		1.1-1. 111 = 0
4		$6   1 + 6x0 - 7x0^2 = 1$
0		$7 \left[ 1 + 6x1 - 7x1^2 = 0 \right]$
		$8   1 + 6 \times 0 - 7 \times 0^2 = 1$
-		1 $1 + 6 \times 1 - 7 \times 1^2 = 0$
1	- 60	10 1+6x0-7x0=1
3		
9		
9		
3	34	

3	
-	Sums of sequences
- 0	$(5)$ $a_i = 10 + 3i + 2i^2$
3 0	$= 10 + 3xi + 2xi^2 \qquad i \qquad e;$
-	$6   0   10+3\times0+2\times0^2 = 1$
-	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
3	- 5.0
-3	$\frac{6}{3} 10 + 313 + 213^2 = 3;$
3	$\sum_{i=1}^{n} Q_{i} = 315 \qquad \qquad 4 / 0 + 3 \times 4 + 2 \times 4^{2} = 54$
	$\int 10 + 3x5 + 2x5^2 = 75$
-3	$6   10 + 3x6 + 2x6^2 = 100$
3	
-	$(6)   5; = -9 - 5; -4;^2$
-3	$= -9 - 5 \times i - 4 \times i^2 \qquad \qquad i \mid 5i$
-	$\sum_{i=1}^{5} \frac{0}{322} = \frac{9}{1} = \frac{9}{9-5} \times 0 - \frac{4}{3} \times 0^{2} = -9$
-3	
3 (4)	$\frac{1}{2} = \frac{1}{9} - 5 \times 2 - 4 \times 2^{2} = -35$
- 0	$\frac{3 - 9 - 5 \times 3 - 4 \times 3^{2} = 60}{4 - 9 - 5 \times 4 - 4 \times 4^{2} = -93}$
- 0	5 -9-5x5-4x52=-134
9	6 -9-5×6-4×62=-183
-0	7 -9-5x 9-4x7 = -240
3 0	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
-3	D bo = -5
-0	$b_i = 7+3b_{i-1}$ $i \mid b_i$
	4 0 -5
-	$\sum b_i = 1006  1 = 7 + 3 \times 5 = -22$
-0	i=1 2 -7+3x-22=-73
-3	3 -7+3×-73=-226
-3	4 - 7 + 3 x - 226 = -685
-3	
-	
-9	
-5	

0		
0		
950		
0		8 20=1 i/a;
-	-	e; = 5e; 1 0 1-1 = 5
-		1 -5× 20 = 25
-		2 -5 × e, = +125
-		0) $5x1 = 5 = 5$ $3 = 5 \times 42 = -625$
		1) $5 \times 5 = 25 = 5^2$ 4 $5 \times 23 = 3125$
		2)5 x 25 = 125 = 5° 5   5 x 24 = - 15625
000000000000000		3)5 x125= 625 = 54
		4)5×625=3125 =55
		\$5x7125=15625 =56 = di5;x.(-5)
	0	= - (-5)'
-0		
-		@ 20=-2 i/a;
-		9i = 38i - 1 $0 = 2 = -2$
-		1 3 x 20 = -6
-	0	$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}$
-		i) $3x^{2} = 6 = 2x^{3}$ 3 $3x^{2} = -54$
		2) 3x -6 = -18 = 2x 3 4 3 x 93 = -162
		7) 3x-18 = -54 = 2x3
	(B)	4) 3x -54 = 162 = -2x34
-	9	= ei=51x3'
		$= -2 \times 3^{i}$
0		
0		
9	0	
9	6	7 %
9		
5		
9		

$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0			<i>y y</i>
$9; = 3a; 1 + 18a; 2$ $0$ $1$ $1$ $1$ $2$ $3$ $3 \times 6 + 18 \times 20 = 3$ $3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 = 3$ $3 \times 6 = 3$ $3 \times 6 \times $	0			
$9; = 3a; 1 + 18a; 2$ $0$ $1$ $1$ $1$ $2$ $3(3x-12=36)+(18x2=36)=0$ $2$ $3x e_1 + 18x e_2=3$ $3(3x 0 = 0)+(18x12=216)=-216$ $3(3x e_2)+(18x e_2)=648$ $4(3x e_2)+(18x e_2)=648$ $4(3x e_3)+(18x e_2)=648$ $4(3x e_2)+(18x e_3)=649$ $4(3x e_3)+(18x e_3)=$	0	0		
2(3x-12=36)+(18x2=36)=0 $2(3x-12=36)+(18x2=36)=0$ $3(3x-12=36)+(18x2=36)=-216$ $3(3x-12=36)+(18x-12=36)=-216$ $3(3x-12=36$	0	-0		i /e;
2(3x-12=36)+(18x2=36)=0 $2(3x-12=36)+(18x2=36)=0$ $3(3x-12=36)+(18x2=36)=-216$ $3(3x-12=36)+(18x-12=36)=-216$ $3(3x-12=36$	0	-	9; = 3a; 1 + 18Q; -2	0 2
3) (3x 0 = 0) + (18x12 = 216) = -216  3) (3x 0 = 6) + (18x22 = 26) = -648  4) (3x 0 = 648	0			1 -12
$ \frac{1}{3} (3x^{2}016 = \overline{6}48) + (18x 0 = 0) = \overline{6}48 \qquad 4 \qquad 3x 2y + 18x 2z = \overline{6} $ $ \frac{1}{3} (3x^{2}648 = \overline{1}944) + (18x^{2}6 = \overline{3}889 = \overline{1}1944) \qquad 5 \qquad 3x 2y + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}841 \qquad 6 \qquad 3x 2x + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}841 \qquad 6 \qquad 3x 2x + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}841 \qquad 6 \qquad 3x 2x + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}841 \qquad 6 \qquad 3x 2x + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}841 \qquad 6 \qquad 3x 2x + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}164) = \overline{5}841 \qquad 6 \qquad 3x 2x + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}841 \qquad 6 \qquad 3x 2x + 18x 2y = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2} = \overline{1}1664) = \overline{5}1 $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2}194 = 514) $ $ \frac{1}{3} (3x^{2}1944 = 5823) + (18x^{2}194 = 514) $ $ \frac{1}{3} (3x^{2}194 = 5823) + (18x^{2}194 = 514) $ $ \frac{1}{3} (3x^{2}194 = 5823) + (18x^{2}194 = 514) $ $ \frac{1}{3} (3x^{2}194 = 5x^{2}194 = 5x^{2}194 = 5x^{2}194 $ $ \frac{1}{3} (3x^{2}194 = 5x^{2}194 = 5x^{2}194 $ $\frac{1}{3} (3x^{2}194 = 5x^{2}194 = 5x^{2}194 $ $\frac{1}{3} (3x^{2}194 = 5x^{2}194 = 5x^{2}194 $ $\frac{1}{3} (3x^{2}194 = 5x^{2}194 = 5x^{2}194$	-0			2 / 3x 9 + 18x 90 =
$5)(3x^{6}48 = 1944) + (18x^{2}6 = 388) = 1944$ $5)(3x^{7}944 = 5823) + (18x^{2}11664) = 5841$ $7)$ $7)$ $7$ $3x^{2}6 + 18x^{2}4 = 58$ $7)$ $7$ $7$ $7$ $7$ $7$ $7$ $7$ $7$ $7$ $7$	-0		3) (3x 0 = 0) + (18x12= 7216) = -216	3 2x 22 + 18x21 =-
$5)(3x^{6}48 = 1944) + (18x^{2}6 = 388) = 1944$ $5)(3x^{7}944 = 5823) + (18x^{2}11664) = 5841$ $7)$ $7)$ $7$ $3x^{2}6 + 18x^{2}4 = 58$ $7)$ $7$ $7$ $7$ $7$ $7$ $7$ $7$ $7$ $7$ $7$	-		4)(3x016=648)+(18×0=0) = 648	4 3x 23 + 18x 22 = 6
7) $ \begin{array}{cccccccccccccccccccccccccccccccccccc$	-0	31	5)(3x648=1944)+(18x216=3889=11944	5 3x24+18x23=71
8 $3x97t18x86 = 9$ $9x89t18x87 = 10$ $10$ $3x89 t19x89 = 11$ $11$ $3x89 t19x89 = 11$ $12$ $3x81 t20x89 = 11$ $13$ $3x81 t20x89 = 11$ $13$ $3x81 t20x89 = 11$ $14$ $3x81 t20x89 = 11$ $15$ $3x81 t20x89 = 11$ $15$ $3x81 t20x89 = 11$ $17$ $3x81 t20x89 = 11$ $18$ $3x81 t20x89 = 11$ $3x81 t20x89 =$	-0		6 X 3x 7944 = 5823) + (18x = 11664) = 5841	6 3xes+18xe4=-50
8 $3xe_7 + 18xe_6 =$ 9 $9xe_8 + 18xe_7 =$ 10 $9xe_9 + 18xe_7 =$ 11 $9xe_1 + 19xe_2 =$ 11 $9xe_1 + 120xe_2 =$ 12 $9xe_1 + 120xe_2 =$ 13 $9xe_1 + 120xe_2 =$ 14 $9xe_1 + 120xe_2 =$ 15 $9xe_1 + 120xe_2 =$ 16 $9xe_1 + 120xe_2 =$ 17 $9xe_1 + 120xe_2 =$ 18 $9xe_1 + 120xe_2 =$ 19 $9xe_1 + 120xe_2 =$ 10 $9xe_1 + 120xe_2 =$ 11 $9xe_1 + 120xe_2 =$ 12 $9xe_1 + 120xe_2 =$ 13 $9xe_1 + 120xe_2 =$ 14 $9xe_1 + 120xe_2 =$ 15 $9xe_1 + 120xe_2 =$ 16 $9xe_1 + 120xe_2 =$ 17 $9xe_1 + 120xe_2 =$ 18 $9xe_1 + 120xe_2 =$ 19 $9xe_1 + 120xe_2 =$ 19 $9xe_1 + 120xe_2 =$ 10 $9xe_1 + 120xe_2 =$ 11 $9xe_1 + 120xe_2 =$ 12 $9xe_1 + 120xe_2 =$ 13 $9xe_1 + 120xe_2 =$ 14 $9xe_1 + 120xe_2 =$ 15 $9xe_1 + 120xe_2 =$ 16 $9xe_1 + 120xe_2 =$ 17 $9xe_1 + 120xe_2 =$ 18 $9xe_1 + 120xe_2 =$ 19 $9xe_1 + 120xe_2 =$ 19 $9xe_1 + 120xe_2 =$ 10 $9xe_1 + 120xe_2 =$ 11 $9xe_1 + 120xe_2 =$ 11 $9xe_1 + 120xe_2 =$ 12 $9xe_1 + 120xe_2 =$ 12 $9xe_1 + 120xe_2 =$ 13 $9xe_1 + 120xe_2 =$ 14 $9xe_1 + 120xe_2 =$ 15 $9xe_1 + 120xe_2 =$ 16 $9xe_1 + 120xe_2 =$ 17 $9xe_1 + 120xe_2 =$ 18 $9xe_1 + 120xe_2 =$ 19 $9xe_1 + 120xe_2 =$ 19 $9xe_1 + 120xe_2 =$ 10 $9xe_1 + 120xe_2 =$ 11 $9xe_1 + 120xe_2 =$ 12 $9xe_1 + 120xe_2 =$ 13 $9xe_1 + 120xe_2 =$ 14 $9xe_1 + 120xe_2 =$ 15 $9xe_1 + 120xe_2 =$ 16 $9xe_1 + 120xe_2 =$ 17 $9xe_1 + 120xe_2 =$ 18 $9xe_1 + 120xe_2 =$ 19	0		7)	7 3x26+18x25 =
9 $2x e_{g} + 18 x e_{g} =$ 10 $2x e_{g} + 18 x e_{g} =$ 11 $3x e_{10} + 19 x e_{g} =$ 12 $3x e_{11} + 20 x e_{10} =$ 13 $2x e_{12} + 21 x e_{13} =$ 14 $3x e_{13} + 21 x e_{13} =$ 15 $7x e_{13} + 21 x e_{13} =$ 16 $3x e_{13} + 24 x e_{13} =$ 17 $2x e_{13} + 24 x e_{13} =$ 18 $2x e_{13} + 24 x e_{13} =$ 19 $2x e_{13} + 24 x e_{13} =$ 11 $2x e_{13} + 24 x e_{13} =$ 12 $2x e_{13} + 24 x e_{13} =$ 13 $2x e_{13} + 24 x e_{13} =$ 14 $2x e_{13} + 24 x e_{13} =$ 15 $2x e_{13} + 24 x e_{13} =$ 17 $2x e_{13} + 26 x e_{13} =$ 18 $2x e_{13} + 26 x e_{13} =$				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				AND
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				11 3x and +19 xang -
13 3x a, 2 + 21 x a, 3 = 14				12 3x ay +20 xaro =
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		0	9	1
15   ]x a 14 + 2) x a 13 = 16   3 x a 15 + 24 x a 14 = 17   ]x a 16 + 25 x a 15 = 18   ]			3 X	
16 3 x 2,5 +24 x 2,4 ? 17 3 x 211 +25 x 2 15 ? 18 3 x 2,1 + 25 x 2 15 ? 18 3 x 2,1 + 26 x 2 16 ? 18 3 x 2,5 +24 X 2,4 ? 18 3 x 2,5 +24 X 2,5 ? 1				
17 7x 211 +25 x 2 15 7 18 7x 211 + 26 x 2 16 7 = 51 x (-6)' +52 x 3'				
=51 x (-6)' +52 x3'	0			
=51 x (-6)' +52 x3'	0			
	0			•
	-		=51 x (-	·6)' +52 x3'
	0			
	0			W.
	0			
	0			
	0			
	-0	1		
	0	9		
	-0	0		
	-3	19-3		
	0	3		
	9		v	

#### Self-Assessment evidence

# **Recurrence Relations**

Click on a question number to see how your answers were marked and, where available, full solutions.

Question Number		Score		
Order 1				
1	1	/	1	Review
2	1	/	1	Review
3	1	/	1	Review
Order 2				
4	1	1	1	Review
5	1	/	1	Review
Total	5	/	5 (10	00%)

#### Performance Summary

Exam Name: Recurrence Relations