Unit 7 Number Sequences and Patterns

Exercise 7.1

1. Using term to term rule complete the following number sequences.

(i) 10, 20, 30, _____, _____, _____

Solution: Here first term is 10 and second term is obtained by adding 10 in previous term. Using term to term rule:

1st term = 10
2nd term = 10 + 10 = 20
3rd term = 20 + 10 = 30
4th term = 30 + 10 = 40
5th term = 40 + 10 = 50
6th term = 50 + 10 = 60

So, the complete sequence is 10, 20, 30, 40, 50, 60.

Rule:
Any term of the given sequence can be obtained by adding 10 in previous term.

(ii) 15, 20, 25, 30, _____, _____, _____

Solution: Here first term is 15 and second term is obtained by adding 5 in previous term. Using term to term rule:

1st term = 15
2nd term = 15 + 5 = 20
3rd term = 20 + 5 = 25
4th term = 25 + 5 = 30
5th term = 30 + 5 = 35
6th term = 35 + 5 = 40
7th term = 40 + 5 = 45

So, the complete sequence is 15, 20, 25, 30, 35, 40, 45.

Rule:
Any term of the given sequence can be obtained by adding 5 in previous term.

(iii) 7, 9, 11, 13, _____, _____, _____

Solution: Here first term is 7 and second term is obtained by adding 2 in previous term. Using term to term rule:

1st term = 7
2nd term = 7 + 2 = 9
3rd term = 9 + 2 = 11
4th term = 11 + 2 = 13
5th term = 13 + 2 = 15
6th term = 15 + 2 = 17
7th term = 17 + 2 = 19

So, the complete sequence is 7, 9, 11, 13, 15, 17, 19.

Rule:
Any term of the given sequence can be obtained by adding 2 in previous term.

(iv) 12, 15, 18, 21, _____, _____, _____

Solution: Here first term is 12 and second term is obtained by adding 3 in previous term. Using term to term rule:

1st term = 12
2nd term = 12 + 3 = 15
3rd term = 15 + 3 = 18
4th term = 18 + 3 = 21
5th term = 21 + 3 = 24
6th term = 24 + 3 = 27
7th term = 27 + 3 = 30

So, the complete sequence is 12, 15, 18, 21, 24, 27, 30.

Rule:
Any term of the given sequence can be obtained by adding 3 in previous term.

(v) 4, 8, 12, 16, _____, _____, _____

Solution: Here first term is 4 and second term is obtained by adding 4 in previous term. Using term to term rule:

1st term = 4
2nd term = 4 + 4 = 8
3rd term = 8 + 4 = 12
4th term = 12 + 4 = 16
5th term = 16 + 4 = 20
6th term = 20 + 4 = 24
7th term = 24 + 4 = 28

So, the complete sequence is 4, 8, 12, 16, 20, 24, 28.

Rule:
Any term of the given sequence can be obtained by adding 4 in previous term.

(vi) 4, 16, 64, _____, _____, _____

Solution: Here first term is 4 and second term is obtained by multiplying previous term by 4. Using term to term rule:

1st term = 4
2nd term = 4 × 4 = 16
3rd term = 16 × 4 = 64
4th term = 64 × 4 = 256
5th term = 256 × 4 = 1024
6th term = 1024 × 4 = 4096

So, the complete sequence is 4, 16, 64, 256, 1024, 4096.

Rule:
Any term of the given sequence can be obtained by multiplying previous term by 4.

(vii) 3, 9, 27, _____, _____, _____

Solution: Here first term is 3 and second term is obtained by multiplying previous term by 3. Using term to term rule:

1st term = 3
2nd term = 3 × 3 = 9
3rd term = 9 × 3 = 27
4th term = 27 × 3 = 81
5th term = 81 × 3 = 243
6th term = 243 × 3 = 729

So, the complete sequence is 3, 9, 27, 81, 243, 729.

Rule:
Any term of the given sequence can be obtained by multiplying previous term by 3.

(viii) 1, 4, 7, 10, _____, _____, _____

Solution: Here first term is 1 and second term is obtained by adding 3 in previous term. Using term to term rule:

1st term = 1
2nd term = 1 + 3 = 4
3rd term = 4 + 3 = 7
4th term = 7 + 3 = 10
5th term = 10 + 3 = 13
6th term = 13 + 3 = 16
7th term = 16 + 3 = 19

So, the complete sequence is 1, 4, 7, 10, 13, 16, 19.

Rule:
Any term of the given sequence can be obtained by adding 3 in previous term.

2. Find the 16th term of the sequence below by position to term rule.

5, 10, 15, 20, ...

Solution: Using position to term rule make a table as given below.

Position	Terms of the sequence
1	5
2	10
3	15
4	20
.	.
.	.
.	.

Here, we can easily see that if we multiply the position of any term by 5 we will get the term of the sequence. So, for 16^{th} term

$$16 \times 5 = 80$$

Hence, 16^{th} term of the given sequence is 80.

3. Find the 19^{th} term of the following sequence by position to term rule:

8, 16, 24, 32, ...

Solution: Using position to term rule make a table as given below.

Position	Terms of the sequence
1	8
2	16
3	24
4	32
.	.
.	.
.	.

Here, we can easily see that if we multiply the position of any term by 8 we will get the term of the sequence. So, for 19^{th} term

$$19 \times 8 = 152$$

Hence, 19^{th} term of the given sequence is 152.

4. Find the 10^{th} term of the following sequence by position to term rule:

5, 25, 125, ...

Solution: Using position to term rule make a table

Position	Terms of the sequence
1	$5 = 5^1$
2	$25 = 5^2$
3	$125 = 5^3$
.	.
.	.
.	.

Here, we can easily see that if we take the position of the term as the power of 5 we will get the term of the sequence. So, for 10^{th} term

$$5^{10} = 9{,}765{,}625$$

Hence, 10^{th} term of the given sequence is 9,765,625.

5. Find the 12^{th} term of the following sequence by position to term rule:

3, 9, 27, 81, ...

Solution: Using position to term rule make a table

Position	Terms of the sequence
1	$3 = 3^1$
2	$9 = 3^2$
3	$27 = 3^3$
4	$81 = 3^4$
.	.
.	.
.	.

Here, we can easily see that if we take the position of the term as the power of 3 we will get the term of the sequence. So, for 12^{th} term

$$3^{12} = 531{,}441$$

Hence, 12^{th} term of the given sequence is 531,441.

Exercise 7.2

1. Construct the sequence whose n^{th} term is given below:

(i) $a_n = 2^{n+1}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 2^{n+1}$

Values of n	Terms of required sequence
For n = 1	$2^{1+1} = 2^2 = 4$
For n = 2	$2^{2+1} = 2^3 = 8$
For n = 3	$2^{3+1} = 2^4 = 16$
For n = 4	$2^{4+1} = 2^5 = 32$
For n = 5	$2^{5+1} = 2^6 = 64$

Hence, the required sequence is 4, 8, 16, 32, 64, …

(ii) $a_n = 5n - 3$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 5n - 3$

Values of n	Terms of required sequence
For n = 1	5(1) – 3 = 5 – 3 = 2
For n = 2	5(2) – 3 = 10 – 3 = 7
For n = 3	5(3) – 3 = 15 – 3 = 12
For n = 4	5(4) – 3 = 20 – 3 = 17
For n = 5	5(5) – 3 = 25 – 3 = 22

Hence, the required sequence is 2, 7, 12, 17, 22, …

(iii) $a_n = 5n + 3$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 5n + 3$

Values of n	Terms of required sequence
For n = 1	5(1) + 3 = 5 + 3 = 8
For n = 2	5(2) + 3 = 10 + 3 = 13
For n = 3	5(3) + 3 = 15 + 3 = 18
For n = 4	5(4) + 3 = 20 + 3 = 23
For n = 5	5(5) + 3 = 25 + 3 = 28

Hence, the required sequence is 8, 13, 18, 23, 28, …

(iv) $a_n = n^2 + 1$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = n^2 + 1$

Values of n	Terms of required sequence
For n = 1	$(1)^2 + 1 = 1 + 1 = 2$
For n = 2	$(2)^2 + 1 = 4 + 1 = 5$
For n = 3	$(3)^2 + 1 = 9 + 1 = 10$
For n = 4	$(4)^2 + 1 = 16 + 1 = 17$
For n = 5	$(5)^2 + 1 = 25 + 1 = 26$

Hence, the required sequence is 2, 5, 10, 17, 26, …

(v) $a_n = 2n^2 - 3$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 2n^2 - 3$

Values of n	Terms of required sequence
For n = 1	$2(1)^2 - 3 = 2(1) - 3 = 2 - 3 = -1$
For n = 2	$2(2)^2 - 3 = 2(4) - 3 = 8 - 3 = 5$
For n = 3	$2(3)^2 - 3 = 2(9) - 3 = 18 - 3 = 15$
For n = 4	$2(4)^2 - 3 = 2(16) - 3 = 32 - 3 = 29$
For n = 5	$2(5)^2 - 3 = 2(25) - 3 = 50 - 3 = 47$

Hence, the required sequence is –1, 5, 15, 29, 47, …

(vi) $\mathbf{a_n = 3n + 1}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 3n + 1$

Values of n	Terms of required sequence
For n = 1	$3(1) + 1 = 3 + 1 = 4$
For n = 2	$3(2) + 1 = 6 + 1 = 7$
For n = 3	$3(3) + 1 = 9 + 1 = 10$
For n = 4	$3(4) + 1 = 12 + 1 = 13$
For n = 5	$3(5) + 1 = 15 + 1 = 16$

Hence, the required sequence is 4, 7, 10, 13, 16, …

(vii) $\mathbf{a_n = n^{(n+1)}}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = n^{(n+1)}$

Values of n	Terms of required sequence
For n = 1	$(1)^{1+1} = (1)^2 = 1 \times 1 = 1$
For n = 2	$(2)^{2+1} = (2)^3 = 2 \times 2 \times 2 = 8$
For n = 3	$(3)^{3+1} = (3)^4 = 3 \times 3 \times 3 \times 3 = 81$
For n = 4	$(4)^{4+1} = (4)^5 = 4 \times 4 \times 4 \times 4 \times 4 = 1024$
For n = 5	$(5)^{5+1} = (5)^6 = 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 15625$

Hence, the required sequence is 1, 8, 81, 1024, 15625, …

(viii) $\mathbf{a_n = \frac{1}{n^{(n+1)}}}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = \frac{1}{n^{(n+1)}}$.

Values of n	Terms of required sequence
For n = 1	$\frac{1}{(1)^{1+1}} = \frac{1}{(1)^2} = \frac{1}{1} = 1$
For n = 2	$\frac{1}{(2)^{2+1}} = \frac{1}{(2)^3} = \frac{1}{8}$
For n = 3	$\frac{1}{(3)^{3+1}} = \frac{1}{(3)^4} = \frac{1}{81}$
For n = 4	$\frac{1}{(4)^{4+1}} = \frac{1}{(4)^5} = \frac{1}{1024}$
For n = 5	$\frac{1}{(5)^{5+1}} = \frac{1}{(5)^6} = \frac{1}{15625}$

Hence, the required sequence is $1, \frac{1}{8}, \frac{1}{81}, \frac{1}{1024}, \frac{1}{15625}, \ldots$

(ix) $a_n = 2^n + n$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 2^n + n$

Values of n	Terms of required sequence
For n = 1	$(2)^1 + 1 = 2 + 1 = 3$
For n = 2	$(2)^2 + 2 = 4 + 2 = 6$
For n = 3	$(2)^3 + 3 = 8 + 3 = 11$
For n = 4	$(2)^4 + 4 = 16 + 4 = 20$
For n = 5	$(2)^5 + 5 = 32 + 5 = 37$

Hence, the required sequence is 3, 6, 11, 20, 37, …

(x) $a_n = n^2 + n + 1$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = n^2 + n + 1$

Values of n	Terms of required sequence
For n = 1	$(1)^2 + 1 + 1 = 1 + 2 = 3$
For n = 2	$(2)^2 + 2 + 1 = 4 + 3 = 7$
For n = 3	$(3)^2 + 3 + 1 = 9 + 4 = 13$
For n = 4	$(4)^2 + 4 + 1 = 16 + 5 = 21$
For n = 5	$(5)^2 + 5 + 1 = 25 + 6 = 31$

Hence, the required sequence is 3, 7, 13, 21, 31, …

(xi) $a_n = 2 \cdot 3^{2n}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 2 \cdot 3^{2n}$

Values of n	Terms of required sequence
For n = 1	$2 \times 3^{2\times1} = 2 \times 3^2 = 2 \times 9 = 18$
For n = 2	$2 \times 3^{2\times2} = 2 \times 3^4 = 2 \times 81 = 162$
For n = 3	$2 \times 3^{2\times3} = 2 \times 3^6 = 2 \times 729 = 1458$
For n = 4	$2 \times 3^{2\times4} = 2 \times 3^8 = 2 \times 6561 = 13122$
For n = 5	$2 \times 3^{2\times5} = 2 \times 3^{10} = 2 \times 59049 = 118098$

Hence, the required sequence is 18, 162, 1458, 13122, 118098, …

(xii) $a_n = 5 \cdot 7^n$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 5 \cdot 7^n$

Values of n	Terms of required sequence
For n = 1	$5 \times 7^1 = 5 \times 7 = 35$
For n = 2	$5 \times 7^2 = 5 \times 49 = 245$
For n = 3	$5 \times 7^3 = 5 \times 343 = 1715$
For n = 4	$5 \times 7^4 = 5 \times 2401 = 12005$
For n = 5	$5 \times 7^5 = 5 \times 16807 = 84035$

Hence, the required sequence is 35, 245, 1715, 12005, 84035, …

2. Shoaib types 30 words on a typewriter on first day, 35 words on second day, 40 words on third day and so on. How many words will he type on 7th day?

Solution: Given that

Shoaib types 30 words on 1st day, 35 words on 2nd day and 40 words on 3rd day.

If we observe, it is a sequence 30, 35, 40, …

1st day = 30

2nd day	30 + 5 = 35
3rd day	35 + 5 = 40
4th day	40 + 5 = 45
5th day	45 + 5 = 50
6th day	50 + 5 = 55
7th day	55 + 5 = 60

Hence, Shoaib will type 60 words on 7th day.

3. Wareesha travels on a car first day 20 km, second day 40 km, third day 80 km and so on. How many kilometres will she travel on the car on 5th day?

Solution: Given that

Wareesha travels 20 km on 1st day, 40 km on 2nd day and 80 km on 3rd day.

If we observe, it is a sequence 20, 40, 80, …

1st day = 20 km

2nd day	20 × 2 = 40
3rd day	40 × 2 = 80
4th day	80 × 2 = 160
5th day	160 × 2 = 320

Hence, Wareesha will travel 320 km on 5th day.

Review Exercise 7

1. Choose the correct option.

(i) Twentieth term of the sequence: $2^0, 2^1, 2^2, 2^3$, ... is

(a) 2^{20} (b) 2^{21} (c) 2^{19} (d) 2^{18}

(ii) 9 − 9 = ?

(a) 9 (b) 1 (c) 3 (d) 0

(iii) The ninth term of the sequence 8, 16, 24, 32, ... is:

(a) 72 (b) 64 (c) 80 (d) 88

(iv) The tenth term of 15, 20, 25, ... is:

(a) 65 (b) 55 (c) 60 (d) 45

(v) The n^{th} term of the sequence is $2^{n+1} - 1$ then the sequence is:

(a) 3, 7, 15, ... (b) 1, 3, 7, 15, ...

(c) 7, 15, 31, ... (d) 1, 7, 15, ...

2. Find the 10th term of the given sequence by position to term rule 7, 14, 21, ...

Solution: Using position to term rule make a table as given below.

Position	Terms of the sequence
1	7
2	14
3	21
. . .	. . .

Here, we can easily see that if we multiply the position of any term by 7 we will get the term of the sequence. So, for 10th term: $10 \times 7 = 70$

Hence, the 10th term of the given sequence is 70.

3. Find the 90th term of the given sequence by position to term rule 11, 22, 33, ...

Solution: Using position to term rule make a table as given below.

Position	Terms of the sequence
1	11
2	22
3	33
.	.
.	.
.	.

Here, we can easily see that if we multiply the position of any term by 11 we will get the term of the sequence. So, for 90th term: $90 \times 11 = 990$

Hence, the 90th term of the given sequence is 990.

4. Find the 100th term of the given sequence by position to term rule 13, 26, 39, 52, ...

Solution: Using position to term rule make a table as given below.

Position	Terms of the sequence
1	13
2	26
3	39
4	52
.	.
.	.
.	.

Here, we can easily see that if we multiply the position of any term by 13 we will get the term of the sequence. So, for 100th term: $100 \times 13 = 1300$

Hence, the 100th term of the given sequence is 1300.

5. Find the 33rd term of the given sequence by position to term rule 15, 30, 45, 60, ...

Solution: Using position to term rule make a table as given below.

Position	Terms of the sequence
1	15
2	30
3	45
4	60
.	.
.	.
.	.

Here, we can easily see that if we multiply the position of any term by 15 we will get the term of the sequence. So, for 33rd term: $33 \times 15 = 495$

Hence, the 33rd term of the given sequence is 495.

6. Construct the sequence whose nth term is given below:

(i) $a_n = (n + 1)^n$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = (n + 1)^n$

Values of n	Terms of required sequence
For n = 1	$(1+1)^1 = 2^1 = 2$
For n = 2	$(2+1)^2 = 3^2 = 3 \times 3 = 9$
For n = 3	$(3+1)^3 = 4^3 = 4 \times 4 \times 4 = 64$
For n = 4	$(4+1)^4 = 5^4 = 5 \times 5 \times 5 \times 5 = 625$
For n = 5	$(5+1)^5 = 6^5 = 6 \times 6 \times 6 \times 6 \times 6 = 7776$

Hence, the required sequence is 2, 9, 64, 625, 7776, …

(ii) $\mathbf{a_n = (n+1)^{n+1} - n^n}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = (n+1)^{n+1} - n^n$

Values of n	Terms of required sequence
For n = 1	$(1+1)^{1+1} - (1)^1 = (2)^2 - 1 = 4 - 1 = 3$
For n = 2	$(2+1)^{2+1} - (2)^2 = (3)^3 - 4 = 27 - 4 = 23$
For n = 3	$(3+1)^{3+1} - (3)^3 = (4)^4 - 27 = 256 - 27 = 229$
For n = 4	$(4+1)^{4+1} - (4)^4 = (5)^5 - 256 = 3125 - 256 = 2869$
For n = 5	$(5+1)^{5+1} - (5)^5 = (6)^6 - 3125 = 46656 - 3125 = 43531$

Hence, the required sequence is 3, 23, 229, 2869, 43531, …

(iii) $\mathbf{a_n = \frac{1}{2^n} + \frac{1}{3^n}}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = \frac{1}{2^n} + \frac{1}{3^n}$.

Values of n	Terms of required sequence
For n = 1	$\frac{1}{2^1} + \frac{1}{3^1} = \frac{1}{2} + \frac{1}{3} = \frac{3+2}{6} = \frac{5}{6}$
For n = 2	$\frac{1}{2^2} + \frac{1}{3^2} = \frac{1}{4} + \frac{1}{9} = \frac{9+4}{36} = \frac{13}{36}$
For n = 3	$\frac{1}{2^3} + \frac{1}{3^3} = \frac{1}{8} + \frac{1}{27} = \frac{27+8}{216} = \frac{35}{216}$
For n = 4	$\frac{1}{2^4} + \frac{1}{3^4} = \frac{1}{16} + \frac{1}{81} = \frac{81+16}{1296} = \frac{97}{1296}$
For n = 5	$\frac{1}{2^5} + \frac{1}{3^5} = \frac{1}{32} + \frac{1}{243} = \frac{243+32}{7776} = \frac{275}{7776}$

Hence, the required sequence is $\frac{5}{6}, \frac{13}{36}, \frac{35}{216}, \frac{97}{1296}, \frac{275}{7776}, \ldots$

(iv) $\mathbf{a_n = n^n + 2^n}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = n^n + 2^n$

Values of n	Terms of required sequence
For n = 1	$(1)^1 + 2^1 = 1 + 2 = 3$
For n = 2	$(2)^2 + 2^2 = 4 + 4 = 8$
For n = 3	$(3)^3 + 2^3 = 27 + 8 = 35$
For n = 4	$(4)^4 + 2^4 = 256 + 16 = 272$
For n = 5	$(5)^5 + 2^5 = 3125 + 32 = 3157$

Hence, the required sequence is 3, 8, 35, 272, 3157, …

(v) $\mathbf{a_n = 3 \cdot 2^{3n}}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = 3 \cdot 2^{3n}$

Values of n	Terms of required sequence
For n = 1	$3 \times 2^{3\times1} = 3 \times 2^3 = 3 \times 8 = 24$
For n = 2	$3 \times 2^{3\times2} = 3 \times 2^6 = 3 \times 64 = 192$
For n = 3	$3 \times 2^{3\times3} = 3 \times 2^9 = 3 \times 512 = 1536$
For n = 4	$3 \times 2^{3\times4} = 3 \times 2^{12} = 3 \times 4096 = 12288$
For n = 5	$3 \times 2^{3\times5} = 3 \times 2^{15} = 3 \times 32768 = 98304$

Hence, the required sequence is 24, 192, 1536, 12288, 98304, …

(vi) $\mathbf{a_n = n^3 - 1}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = n^3 - 1$

Values of n	Terms of required sequence
For n = 1	$(1)^3 - 1 = 1 - 1 = 0$
For n = 2	$(2)^3 - 1 = 8 - 1 = 7$
For n = 3	$(3)^3 - 1 = 27 - 1 = 26$
For n = 4	$(4)^3 - 1 = 64 - 1 = 63$
For n = 5	$(5)^3 - 1 = 125 - 1 = 124$

Hence, the required sequence is 0, 7, 26, 63, 124, …

(vii) $\mathbf{a_n = \frac{1}{n} + \frac{1}{n+1} + \frac{1}{n+2}}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = \frac{1}{n} + \frac{1}{n+1} + \frac{1}{n+2}$.

Values of n	Terms of required sequence
For n = 1	$\frac{1}{1} + \frac{1}{1+1} + \frac{1}{1+2} = \frac{1}{1} + \frac{1}{2} + \frac{1}{3} = \frac{6+3+2}{6} = \frac{11}{6}$
For n = 2	$\frac{1}{2} + \frac{1}{2+1} + \frac{1}{2+2} = \frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{6+4+3}{12} = \frac{13}{12}$
For n = 3	$\frac{1}{3} + \frac{1}{3+1} + \frac{1}{3+2} = \frac{1}{3} + \frac{1}{4} + \frac{1}{5} = \frac{20+15+12}{60} = \frac{47}{60}$
For n = 4	$\frac{1}{4} + \frac{1}{4+1} + \frac{1}{4+2} = \frac{1}{4} + \frac{1}{5} + \frac{1}{6} = \frac{15+12+10}{60} = \frac{37}{60}$
For n = 5	$\frac{1}{5} + \frac{1}{5+1} + \frac{1}{5+2} = \frac{1}{5} + \frac{1}{6} + \frac{1}{7} = \frac{42+35+30}{210} = \frac{107}{210}$

Hence, the required sequence is $\frac{11}{6}, \frac{13}{12}, \frac{47}{60}, \frac{37}{60}, \frac{107}{210}, \ldots$

(viii) $\mathbf{a_n = n^2 - 5n + 6}$

Solution: To construct the required sequence put n = 1, 2, 3, 4, … in $a_n = n^2 - 5n + 6$

Values of n	Terms of required sequence
For n = 1	$(1)^2 - 5(1) + 6 = 1 - 5 + 6 = 2$
For n = 2	$(2)^2 - 5(2) + 6 = 4 - 10 + 6 = 0$
For n = 3	$(3)^2 - 5(3) + 6 = 9 - 15 + 6 = 0$
For n = 4	$(4)^2 - 5(4) + 6 = 16 - 20 + 6 = 2$
For n = 5	$(5)^2 - 5(5) + 6 = 25 - 25 + 6 = 6$

Hence, the required sequence is 2, 0, 0, 2, 6, …