

# Sequences

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## Sequences: Example

Let the sequence  $u_n$  be defined by the recurrence relation:

$$u_{n+1} = u_n + 2n,$$

for  $n = 1, 2, 3, \dots$

Initial Condition:  $u_1 = 1$ .

Calculate  $u_2$ ,  $u_3$ ,  $u_4$  and  $u_5$ , showing all your workings.

# Sequences

Starting with  $n = 1$ ,

$$u_{n+1} = u_n + 2n,$$

$$u_{(1)+1} = u_1 + 2 \times 1,$$

$$u_2 = 1 + 2,$$

$$u_2 = 3.$$

# Sequences

With  $n = 2$ ,

$$u_{n+1} = u_n + 2n,$$

$$u_{(2)+1} = u_2 + 2 \times 2,$$

$$u_3 = 3 + 4,$$

$$u_3 = 7.$$

# Sequences

With  $n = 3$ ,

$$u_{n+1} = u_n + 2n,$$

$$u_{(3)+1} = u_3 + 2 \times 3,$$

$$u_4 = 7 + 6,$$

$$u_4 = 13.$$

# Sequences

With  $n = 4$ ,

$$u_{n+1} = u_n + 2n,$$

$$u_{(4)+1} = u_4 + 2 \times 4,$$

$$u_5 = 13 + 8,$$

$$u_5 = 21.$$

# Sequences

The first five elements of the sequence are as follows:

$$\{1, 3, 7, 13, 21, \dots\}$$