

Sequences and sets

Instructions: Study on the concept of sequences and sets from the book and online resources then answer the worksheets.

Exercise 1

1. Find the next three terms in each sequence and describe the rule you used to find them.

a) 11, 13, 15,.....

b) 88, 99, 110,.....

c) 64, 32, 16,.....

d) 8, 16, 24, 32,.....

e) -2, -4, -6, -8,.....

f) $\frac{1}{4}$, $\frac{1}{2}$, 1,.....

g) 1, 2, 4, 7,.....

h) 1, 6, 11, 16,.....

2. List the first four terms of the sequences that follow these rules.

a) Start with seven and add two each time.

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b) Start with 37 and subtract five each time.

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c) Start with one and multiply by $\frac{1}{2}$ each time.

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d) Start with five then multiply by two and add one each time.

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e) Start with 100, divide by two and subtract three each time.

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3. Write down the first three terms of each of these sequences. Then find the 35th term.

a) $T_n = 2n + 3$

.....

b) $T_n = n^2$

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c) $T_n = 6n - 1$

.....

d) $T_n = n^3 - 1$

.....

e) $T_n = n^2 - n$

.....

f) $T_n = 3 - 2n$

.....

4. Consider the sequences:

2, 10, 18, 26, 34, 42, 50,...

a) Find the n^{th} term of the sequence.

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b) Find the 200th term.

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c) Which term of this sequence has the value 234? Show full working.

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d) Show that 136 is not a term in the sequence.

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5. For each sequence below find the general term and the 50th term

a) 7, 9, 11, 13,...

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b) -5, -13, -21, -29,...

.....

c) 2, 8, 14, 20, 26,...

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d) 4, 9, 16, 25,...

.....

e) 2.3, 3.5, 4.7, 5.9,...

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Exercise 2

1. Write down all the irrational numbers in each set of real numbers.

a) $\frac{3}{8}, \sqrt{16}, \sqrt[3]{16}, \frac{22}{7}, \sqrt{12}, 0.090090009 \dots, \frac{31}{3}, 0.020202 \dots,$

.....

b) $23, \sqrt{45}, 0.\dot{6}, \frac{3}{4}, \sqrt[3]{90}, \pi, 5\frac{1}{2}, \sqrt{8}, 0.834,$

.....

2. Convert each of the following recurring decimals to a fraction in its simplest form.

a) $0.\dot{4}$

b) $0.\dot{5}$

c) $0.\dot{7}$

d) $0.\dot{7}\dot{4}$

e) $0.4\dot{5}$

f) $0.\dot{2}\dot{1}$

Mixed exercise

1. For each of the following sequences, find the n^{th} term and the 120^{th} term.

a) 1, 6, 11, 16... ..

b) 20, 14, 8, 2... ..

c) 2, 5, 8, 11... ..

2. Which of the following numbers are irrational?

$$1\frac{5}{8}, 0.213231234 \dots, \sqrt{25}, \frac{7}{17}, 0.1, -0.654, \sqrt{2}, \frac{22}{5}, 4\pi$$

.....

3. Write each recurring decimal as a fraction in its simplest form.

a) $0.\dot{2}$

b) $0.4\dot{2}$

c) $0.\dot{2}\dot{3}$

d) $0.28\dot{6}$