Algorithms for number patterns

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Start at 3. Write five terms, adding 4 each time. [2 marks]

Record the start, then make four increases.

Answer: 3,7,11,15,19.

2. Start at 2. Write terms by doubling until you have written five terms. [2 marks]

Each new term is twice the previous term.

Answer: 2,4,8,16,32.

3. Start at 0.2 and record it. Keep adding 0.2 and recording the new value while it is at most 1. Write the output. [2 marks]

Include 1 because at most 1 allows equality.

Answer: 0.2,0.4,0.6,0.8,1.0.

4. What changes if the preceding algorithm records only values less than 1? [2 marks]

Less than excludes equality.

Answer: The final 1.0 is omitted.

5. Write precise steps that generate 5,10,15,20 and then stop. [3 marks]

A correct algorithm specifies start, change, recording and a finite stop. Equivalent correct steps are acceptable.

Answer: For example: start at 5; record it; add 5; repeat recording and adding until four values have been recorded.

6. An algorithm starts at 1 and adds 2 until it equals 8. Why will it not stop? Give a repair. [3 marks]

Check the boundary values rather than assuming the target is reached.

Answer: It stays odd and never equals 8. Stop before the next value exceeds 8, giving 1,3,5,7.