Graphing Patterns on the Coordinate Plane: Plot Sequences and State the Rule

Complete worked example / separate answer key

Plot the sequence (1, 4), (2, 7), (3, 10), (4, 13), (5, 16). Connect the points in order and write the rule in words.

Answer: The points lie on a straight line. The first term value is 4, and each term value increases by 3. Rule: start at 4 and add 3 to each term. Equivalently, the term value is 3 times the term number plus 1.

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Original tasks 1, 2, 3 / complete keys

Task 1

Plot the sequence (1, 2), (2, 5), (3, 8), (4, 11), (5, 14). Connect the points in order and write the rule in words.

Answer: The points lie on a straight line. Rule: start at 2 and add 3 to each term. Equivalently, the term value is 3 times the term number minus 1.

Reason: The second coordinates are 2, 5, 8, 11, 14. Each increases by 3, and the first term value is 2. The relationship 3n - 1 gives 2, 5, 8, 11, 14 for n = 1 to 5.

Check: Subtract consecutive term values: 5-2=3, 8-5=3, 11-8=3, 14-11=3. Substitute n=1 and n=5 into the relationship to confirm 2 and 14.

Task 2

Plot the sequence (1, 10), (2, 8), (3, 6), (4, 4), (5, 2). Connect the points in order and write the rule in words.

Answer: The points lie on a straight line. Rule: start at 10 and subtract 2 from each term. Equivalently, the term value is 12 minus 2 times the term number.

Reason: The second coordinates decrease by 2 each time, starting at 10. The relationship 12 - 2n gives 10, 8, 6, 4, 2 for n = 1 to 5.

Check: Check the change: 8-10=-2, 6-8=-2, 4-6=-2, 2-4=-2. Substitute n=1 and n=5 into 12 - 2n to confirm 10 and 2.

Task 3

Plot the sequence (1, 1), (2, 4), (3, 9), (4, 16), (5, 25). Connect the points in order. The points do not lie on one straight line. Write a rule in words that describes how each term value is related to its term number.

Answer: The term value is the term number multiplied by itself. For example, term 3 has value 9 because 3 times 3 is 9.

Reason: The second coordinates are 1, 4, 9, 16, 25, which are the squares of the term numbers 1 through 5. Connecting the points produces a curve, not a straight line.

Check: Multiply each term number by itself and compare with the plotted value: 1x1=1, 2x2=4, 3x3=9, 4x4=16, 5x5=25.

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Original tasks 4 / complete keys

Task 4

Plot the sequence (1, 3), (2, 6), (3, 3), (4, 6), (5, 3). Connect the points in order. The pattern alternates. Write a rule in words that produces the sequence.

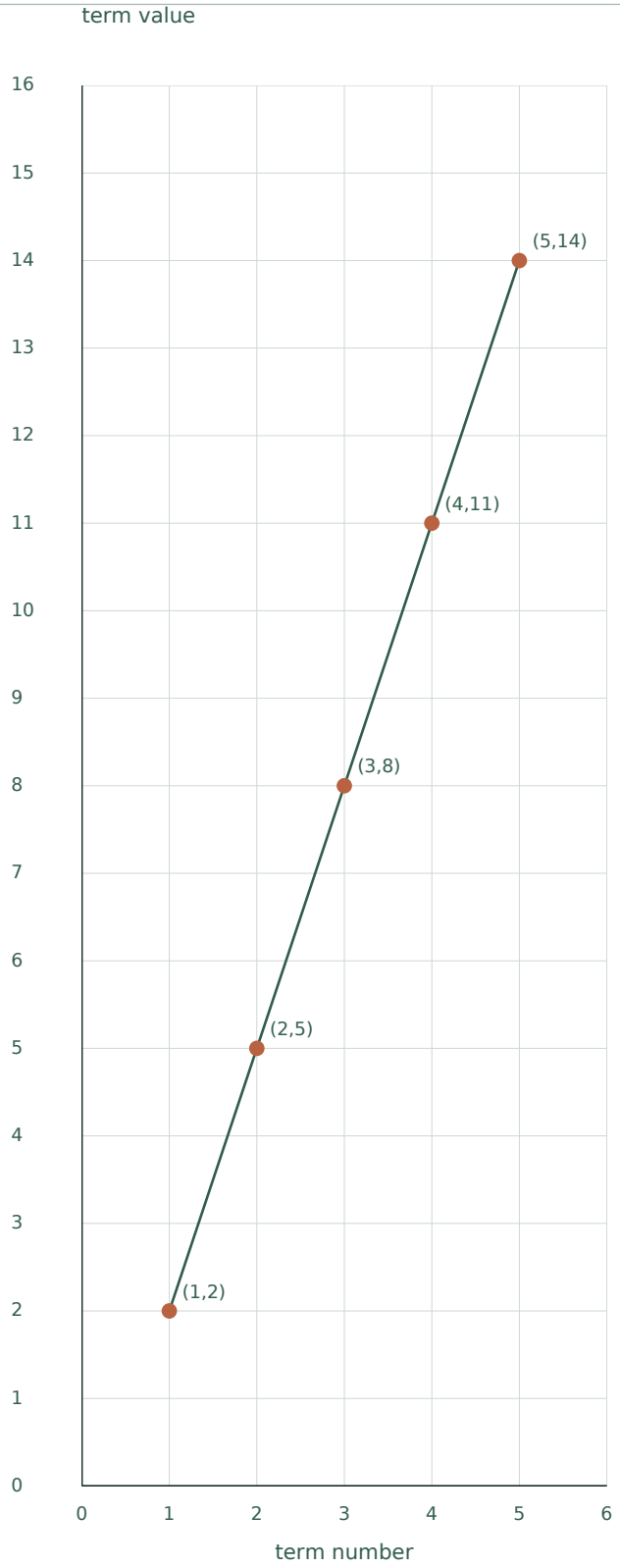
Answer: Start at 3. For odd term numbers the value is 3; for even term numbers the value is 6. One valid rule: if the term number is odd, the term value is 3; if the term number is even, the term value is 6.

Reason: The second coordinates alternate between 3 and 6. The first term value is 3, and the value changes by +3 then -3 repeatedly. A rule using odd and even term numbers matches every point.

Check: List the term numbers 1 to 5 and apply the odd-even rule: 1 odd gives 3, 2 even gives 6, 3 odd gives 3, 4 even gives 6, 5 odd gives 3. Compare with the plotted points.

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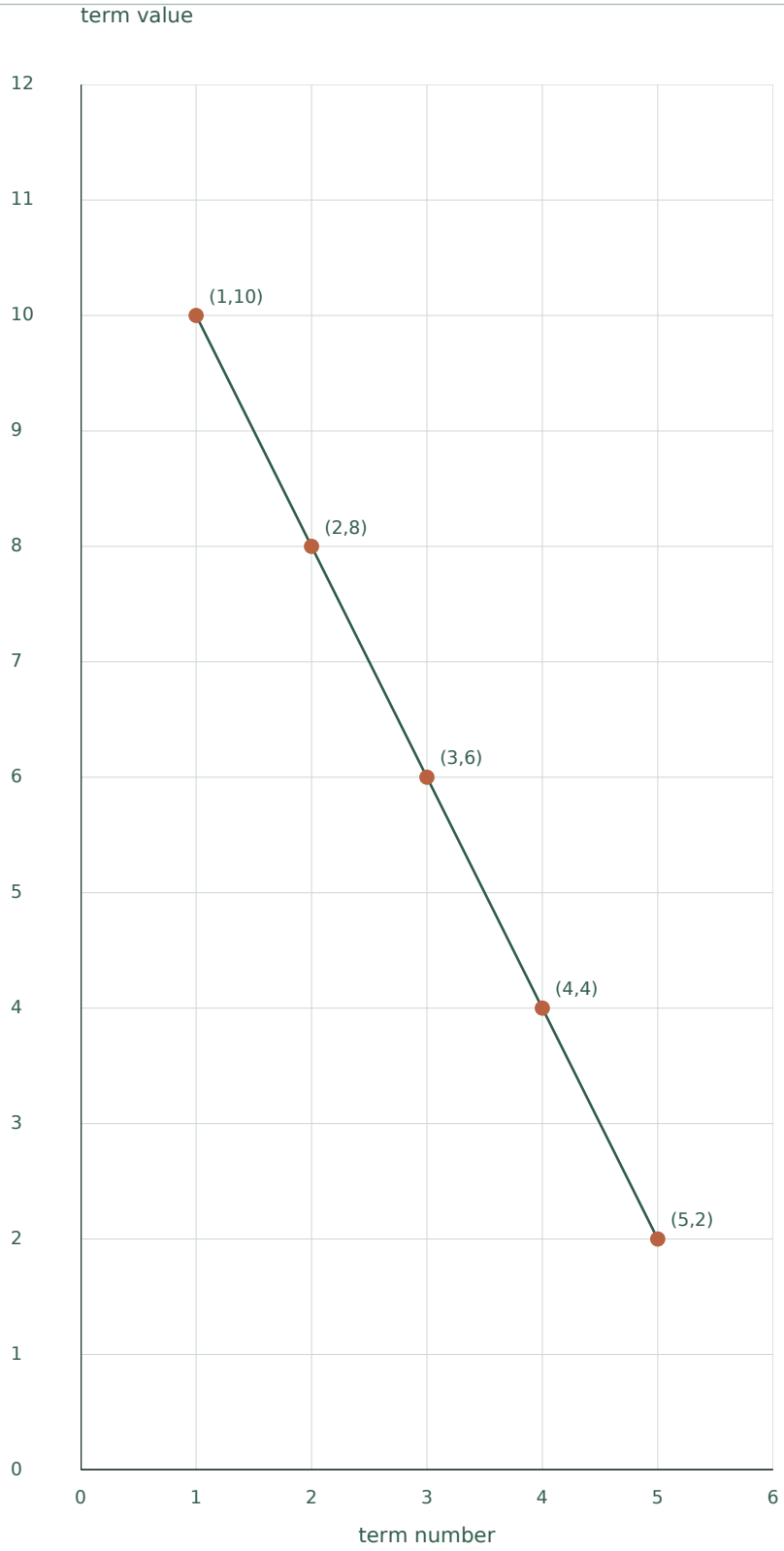
Task 1 / Exercise 1: plot (1,2),(2,5),(3,8),(4,11),(5,14)



Rule: start at 2 and add 3 to each term; equivalently term value = 3 times term number minus 1.

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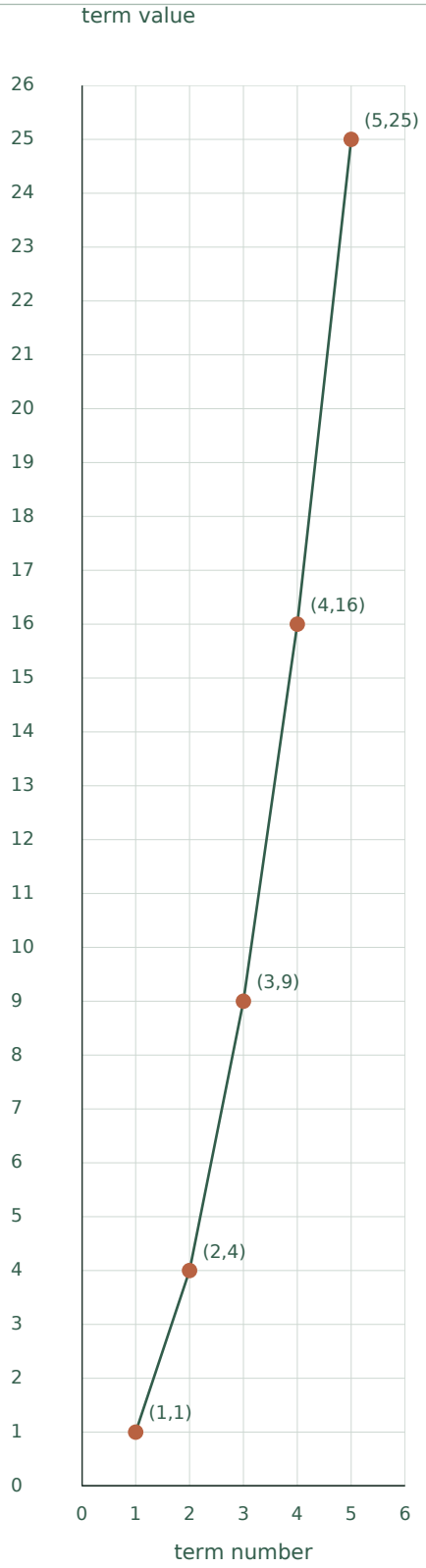
Task 2 / Exercise 2: plot (1,10),(2,8),(3,6),(4,4),(5,2)



Rule: start at 10 and subtract 2 from each term; equivalently term value = 12 minus 2 times term number.

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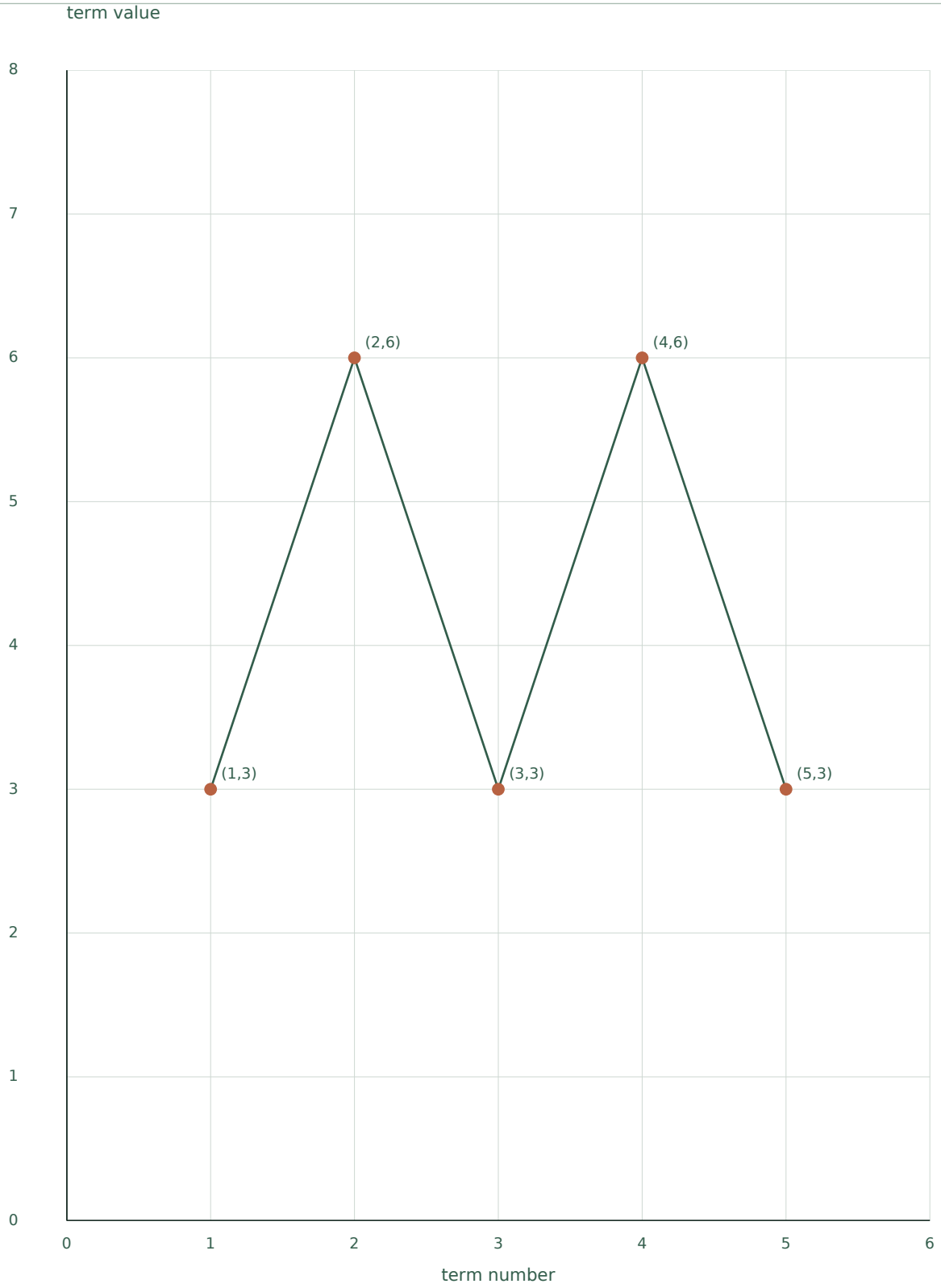
Task 3 / Exercise 3: plot (1,1),(2,4),(3,9),(4,16),(5,25)



Points form a curve, not a straight line. Rule: term value is the term number multiplied by itself.

Graphing Patterns on the Coordinate Plane: Plot Sequences and State the Rule

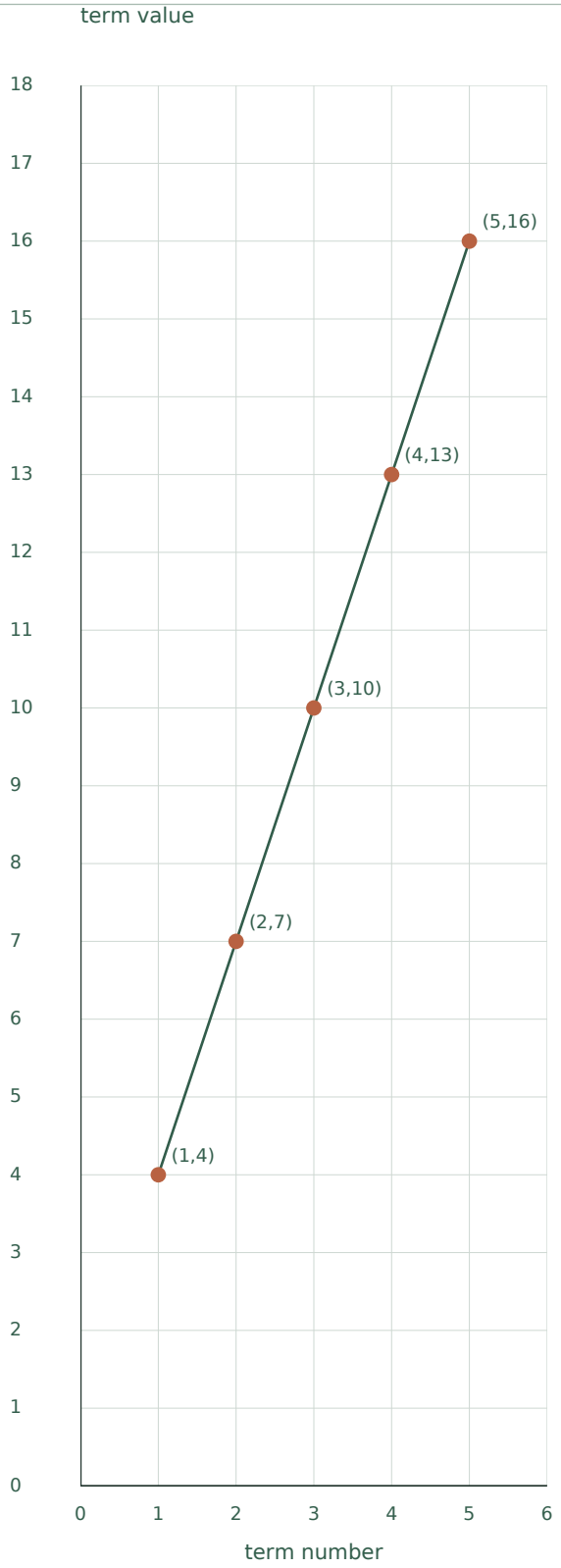
Task 4 / Exercise 4: plot (1,3),(2,6),(3,3),(4,6),(5,3)



Alternating pattern. Rule: odd term numbers give value 3; even term numbers give value 6.

Graphing Patterns on the Coordinate Plane: Plot Sequences and State the Rule

Worked example / Worked example: plot (1,4),(2,7),(3,10),(4,13),(5,16)



Points lie on a straight line; rule: start at 4 and add 3 to each term; equivalently term value = 3 times term number plus 1.

Graphing Patterns on the Coordinate Plane: Plot Sequences and State the Rule

Source rubric / reflection

- [ ] All ordered pairs are plotted with the first coordinate as horizontal movement and the second as vertical movement.
- [ ] Points are connected in order of increasing term number.
- [ ] The scale is stated and equal spacing represents equal amounts on each axis.
- [ ] The rule statement matches every plotted point and names the start value and change, or gives a correct relationship.
- [ ] The graph is readable, with labeled axes or a clear key, and point labels may be printed or cursive.

Reflection: What did you check, what did you change, and what will you try next?