Fish Scales vs Snake Scales: Side-by-Side Row Drawing

Original task 1 / complete key

Task 1

Draw a fish-scale row with 5 scales, each 3 cm wide, overlapping by one third. Then draw a snake-scale row with 5 scales, each 3 cm wide, meeting edge to edge. Use the same baseline and midline. Describe the visible width of each row using simple arithmetic.

Answer: Fish-scale row: 5 scales, each 3 cm wide, with 4 overlaps of one third of a scale width (1 cm each). Total overlap is 4 cm, so visible width is $15 - 4 = 11$ cm. Snake-scale row: 5 scales meeting edge to edge gives 5 full widths, or 15 cm. The fish-scale row appears narrower because of overlap.

Reason: Each fish scale overlaps one third of its width (1 cm), so across five scales the row loses $4 \times 1 = 4$ cm of visible width, giving $15 - 4 = 11$ cm.

Check: Count the scales and measure the visible width with a ruler. Confirm the fish-scale row is shorter than the snake-scale row by about 4 cm, which is the total overlap.

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Original task 2 / complete key

Task 2

A student draws a second row of snake scales directly under the first row, with each new scale centered under one scale above. Is the offset correct? Explain and fix it.

Answer: No. The offset should be half a scale width so each new scale sits between two scales above. Shift the second row right by half a scale width.

Reason: A half-width offset creates the staggered nesting that defines snake-scale rows. Centering under one scale above removes the stagger.

Check: Pick a scale in row two and check whether it sits between two scales in row one. If it sits under one scale, the offset is wrong.

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Original task 3 / complete key

Task 3

Draw a fish-scale row with 6 scales, each 2 cm wide, overlapping by one quarter of a scale width. Draw a snake-scale row with 6 scales, each 2 cm wide, meeting edge to edge. Which row has more visible scale edges? Explain using a simple count.

Answer: Using distinct internal boundaries as the simple count, neither row must have more: six edge-meeting shapes give 6 - 1 = 5 shared interfaces, and a selected overlapping six-shape row can still show five distinct front free-edge boundaries. One-quarter overlap reduces how much of an underlying outline is exposed, but it does not by itself prove that a boundary disappears. Counting fully exposed original sides instead would be a different metric and requires specified shapes and occlusion. State the metric before claiming one row has more.

Reason: There are five neighboring pairs in either six-shape row. Overlap changes visible extent and boundary type; the given one-quarter fraction alone does not determine a smaller count of distinct visible boundaries.

Check: Number the five neighboring interfaces or free boundaries in each selected drawing. Count distinct visible boundaries separately from their visible lengths or complete original perimeters. Do not count a hidden construction edge as visible.

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Original task 4 / complete key

Task 4

Compare two drawings: one fish-scale row with 4 scales of 2 cm width overlapping by one half, and one snake-scale row with 4 scales of 2 cm width meeting edge to edge. Both have a second row offset by half a width. Describe one mistake a student might make in each pattern and how to fix it.

Answer: Fish-scale mistake: drawing scales without overlap, making them look like snake scales. Fix: start each new scale behind the previous one. Snake-scale mistake: drawing scales with overlap, making them look like fish scales. Fix: start each new scale exactly where the previous one ends.

Reason: The defining difference is overlap versus meeting edges. Mixing these rules collapses the comparison.

Check: Check each row against its rule: fish scales must overlap; snake scales must meet. Confirm the second row offset is half a width in both.

Fish Scales vs Snake Scales: Side-by-Side Row Drawing

Task 1 / answers

Selected Pattern A / overlap versus selected Pattern B / edge meeting; real snake scales can overlap

A / selected overlap



first row 11 cm

B / selected edge meeting



first row 15 cm

Print 1:2: ruler lengths are half the labelled source dimensions. A first-row span is N x W - (N-1) x overlap; B is N x W. Pattern names are worksheet shorthand. Real fish/snake scale morphology varies, and actual snake scales can overlap. Chosen row height is an illustration parameter.

Fish Scales vs Snake Scales: Side-by-Side Row Drawing

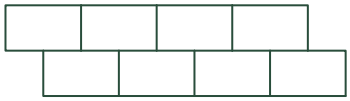
Task 2 / answers

Selected Pattern A / overlap versus selected Pattern B / edge meeting; real snake scales can overlap

GIVEN / no offset



FIX / half-width offset



Task 2 uses four shapes per row as a selected illustration. At a chosen width of 20 mm, half-width is 10 mm; printed offsets are 5 mm at 1:2. The original aligned second row is explicitly marked GIVEN, and the correction is separate. Pattern B is a selected edge-meeting drawing rule, not a claim that actual snakes never have overlapping scales.

Fish Scales vs Snake Scales: Side-by-Side Row Drawing

Task 3 / answers

Selected Pattern A / overlap versus selected Pattern B / edge meeting; real snake scales can overlap

A / selected overlap



1 2 3 4 5

first row 9.5 cm

B / selected edge meeting



1 2 3 4 5

first row 12 cm

Print 1:2: ruler lengths are half the labelled source dimensions. A first-row span is N x W - (N-1) x overlap; B is N x W. The five numbered INTERNAL neighbor boundaries remain distinct in both rows; overlap changes exposed length and boundary type, not necessarily count. Do not add the outer row boundary to this internal count. Pattern names are worksheet shorthand. Real fish/snake scale morphology varies, and actual snake scales can overlap. Chosen row height is an illustration parameter.

Fish Scales vs Snake Scales: Side-by-Side Row Drawing

Task 4 / answers

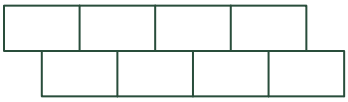
Selected Pattern A / overlap versus selected Pattern B / edge meeting; real snake scales can overlap

A / selected overlap



first row 5 cm

B / selected edge meeting



first row 8 cm

Print 1:2: ruler lengths are half the labelled source dimensions. A first-row span is N x W - (N-1) x overlap; B is N x W. A possible A mistake is eliminating its overlap; restore the specified half-width overlap. A possible B mistake is overlaying its tiles; restore meeting edges. Pattern names are worksheet shorthand. Real fish/snake scale morphology varies, and actual snake scales can overlap. Chosen row height is an illustration parameter.

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Source rubric / reflection

- [ ] Both patterns share one baseline and one midline.
- [ ] Fish scales overlap consistently, with each front scale covering part of the one behind.
- [ ] Snake scales meet edge to edge with no overlap.
- [ ] Second rows are offset by half a scale width in both patterns.
- [ ] Scale widths are consistent within each row.
- [ ] The comparison notes at least one clear difference in row construction.
- [ ] Valid alternatives: scale shape may vary; overlap amount may vary if consistent; snake scales may be rounded or elongated.

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