Ladybug Symmetry Drawing: Mirror Halves and Spot Placement

Original tasks 1, 2 / complete keys

Task 1

On a blank half-frame, the left half shows a body half-oval 5 cm tall and 2 cm wide from the axis, a head half-circle 1 cm tall centered on the axis, and two spots: spot A at 1 cm from the axis and 2 cm from the top with 0.5 cm diameter; spot B at 1.5 cm from the axis and 4 cm from the top with 0.5 cm diameter. Describe the right-half features and the mirrored spot positions.

Answer: Right half: body half-oval 5 cm tall and 2 cm wide from the axis; head half-circle 1 cm tall centered on the axis; spot A at 1 cm right of the axis and 2 cm from the top with 0.5 cm diameter; spot B at 1.5 cm right of the axis and 4 cm from the top with 0.5 cm diameter.

Reason: Mirroring keeps vertical distances and diameters the same and reverses horizontal distance from the axis. Each left spot therefore has a right partner at the same height and size.

Check: List the pairs: A (1 cm left, 2 cm down, 0.5 cm) with (1 cm right, 2 cm down, 0.5 cm); B (1.5 cm left, 4 cm down, 0.5 cm) with (1.5 cm right, 4 cm down, 0.5 cm). Count two spots on each side.

Task 2

A student draws a ladybug with three spots on the left at vertical distances 1 cm, 3 cm, and 5 cm from the top, and only two spots on the right at 1 cm and 5 cm. All spots are 1 cm in diameter and none are on the axis. Identify the symmetry error and state the correction.

Answer: The right side is missing the spot at 3 cm from the top. Add a 1 cm spot on the right at the same horizontal distance as the left spot at 3 cm, so both sides have three spots.

Reason: Symmetry requires each non-axis spot to have a partner at the same vertical distance. The 3 cm left spot has no right partner, so the counts differ.

Check: Count spots per side: left 3, right 2. Pair by vertical distance: 1 cm paired, 5 cm paired, 3 cm unpaired. After adding the missing spot, counts are equal and all pairs match.

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Original tasks 3, 4 / complete keys

Task 3

A ladybug body is 6 cm tall. A spot is centered on the axis at 2 cm from the top with a 1 cm diameter. Another spot is 2 cm from the axis on the left at 4 cm from the top with a 1 cm diameter. How many spots are on the right side, and what are their positions?

Answer: There is one spot on the right side: 2 cm from the axis on the right at 4 cm from the top with a 1 cm diameter. The axis-centered spot does not need a mirror partner.

Reason: A spot centered on the axis is its own mirror image. Only the left spot at 4 cm requires a right partner at the same height and size.

Check: List spots: axis spot (0 cm from axis, 2 cm down, 1 cm) counts as centered; left spot (2 cm left, 4 cm down, 1 cm) pairs with right spot (2 cm right, 4 cm down, 1 cm). Right-side count excluding axis-centered spots is 1.

Task 4

A half-ladybug reference uses oval spots 1 cm wide and 0.5 cm tall. The left half has a spot at 1.5 cm from the axis and 3 cm from the top. A student mirrors it with a round spot 1 cm in diameter at 1.5 cm from the axis and 3 cm from the top. Is this a valid mirror? Explain using the convention and rubric.

Answer: No. The position is correct, but the shape and size do not match the reference. The mirrored spot should be an oval 1 cm wide and 0.5 cm tall at the same position.

Reason: The convention allows valid alternative spot shapes only when the mirror partner matches the original in shape and size. A round 1 cm spot differs from a 1 cm by 0.5 cm oval.

Check: Compare spot records: left (1.5 cm left, 3 cm down, 1 cm wide by 0.5 cm tall) versus right (1.5 cm right, 3 cm down, 1 cm diameter). Position matches; dimensions do not. Redraw the right spot as the same oval.

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Source rubric / reflection

- [ ] Axis is vertical and clearly marked before drawing.
- [ ] Body halves match in height and widest-point position within 0.5 cm.
- [ ] Head is centered on the axis and mirrored correctly.
- [ ] Legs appear at matching heights and lengths on both sides.
- [ ] Each spot has a mirror partner with the same vertical distance, opposite horizontal distance, and equal diameter.
- [ ] Spot counts are equal on each side, excluding axis-centered spots.
- [ ] Fold check shows close overlap; small gaps from paper and pencil are acceptable.
- [ ] Valid alternative spot shapes are accepted if mirror partners match.

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