Drawing Symmetry Flowers: Axis Lines and Petal Mirroring

Original tasks 1, 2 / complete keys

Task 1

Draw a 6-petal symmetrical flower with a vertical axis. Use a tip distance of 3 cm. Describe how you space the petals and check symmetry.

Answer: Draw a vertical axis and center point. For 6 petals, adjacent petals are 60 degrees apart. Measure angles clockwise from the top of the vertical axis. Draw the first petal on the right at 30 degrees, tip 3 cm from center. Its mirror partner is on the left at 360 − 30 = 330 degrees. Draw the next pair at 90° and 360 − 90 = 270°; these two petals lie on the horizontal guide and mirror each other across the vertical axis. Draw the third pair at 150° and 360 − 150 = 210°. This gives 6 petals. Check by folding: each petal should align with its partner. Count 6 petals and confirm adjacent petals are about 60 degrees apart.

Reason: An even petal count ensures each petal has a mirror partner. The angle 360 divided by 6 equals 60 degrees, so petals are spaced evenly. Mirroring each petal across the vertical axis creates symmetry.

Check: Fold the paper along the vertical axis and see if petals align. Count petals to confirm 6. Measure or estimate the angle between two adjacent petals; it should be about 60 degrees.

Task 2

A student draws a flower with 5 petals and claims it is symmetrical across one vertical axis. Explain why this is a problem and how to fix it.

Answer: With 5 petals, one petal cannot have a mirror partner across a single vertical axis, so the flower is not symmetrical in the mirroring convention. Fix it by changing to an even petal count, such as 6 or 8, and redrawing so each petal has a partner across the axis.

Reason: Mirror symmetry across one axis requires pairs of petals. An odd count leaves one petal unpaired. Changing to an even count allows every petal to be mirrored.

Check: Count the petals. If the number is odd, check whether one petal lacks a partner when folded along the axis. Redraw with an even count and fold again to confirm.

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Original tasks 3, 4 / complete keys

Task 3

You want to draw an 8-petal flower with tip distance 5 cm. What is the angle between adjacent petals? Describe how you would draw and check the flower.

Answer: The angle is 360 divided by 8, which equals 45 degrees. Draw a vertical axis and center point. Measure angles clockwise from the top of the vertical axis. Draw the first petal on the right at 22.5 degrees with tip 5 cm from center. Its mirror partner is on the left at 360 − 22.5 = 337.5 degrees. Draw the pair 67.5° with 360 − 67.5 = 292.5°. The remaining four petals are the same two pairs reflected below the horizontal guide: 112.5° with 360 − 112.5 = 247.5°, and 157.5° with 360 − 157.5 = 202.5°. This gives 8 petals. Check by folding along the axis and counting 8 petals.

Reason: Dividing 360 by the petal count gives the spacing angle. Mirroring each petal across the vertical axis ensures symmetry. Measuring tip distance keeps petals consistent.

Check: Fold along the vertical axis to check mirroring. Count petals to confirm 8. Measure the angle between adjacent petals; it should be about 45 degrees. Check that each petal tip is about 5 cm from the center.

Task 4

Describe how to use a symmetry box to practice mirroring petals for a 4-petal flower. Include the angle between petals and a check method.

Answer: Draw a rectangle with a vertical axis through the middle. For 4 petals, adjacent petals are 90 degrees apart. Measure angles clockwise from the top of the vertical axis. Draw one petal on the right at 45 degrees, tip 3 cm from center, and mirror it on the left at 360 − 45 = 315 degrees. Draw the second pair below the horizontal guide at 135 degrees on the right and 360 − 135 = 225 degrees on the left. Check by folding along the axis and counting 4 petals. Confirm adjacent petals are about 90 degrees apart.

Reason: A symmetry box focuses attention on one half at a time. The angle 360 divided by 4 equals 90 degrees. Mirroring each petal across the axis creates a balanced flower.

Check: Fold the paper along the vertical axis and check that petals align. Count petals to confirm 4. Measure or estimate the angle between adjacent petals; it should be about 90 degrees.

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Source rubric / reflection

- [ ] Vertical axis line is present and light.
- [ ] Center point is marked.
- [ ] Petal count is even.
- [ ] Each petal has a mirror partner across the axis.
- [ ] Petal tip distances are roughly consistent.
- [ ] Angles between adjacent petals are roughly even.
- [ ] Flower looks balanced when folded along the axis.

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