Bicycle Rider Drawing: Frame Geometry and Posture

Original tasks 1, 2, 3 / complete keys

Task 1

A hypothetical bicycle has wheelbase 120 units and wheel radius 25 units. Compute the wheel diameter and the gap between wheel edges. Then describe where to place the wheel centers on a baseline.

Answer: Diameter is 50 units; edge gap is 120 minus 50 equals 70 units. Place rear and front wheel centers 120 units apart on the baseline and draw equal 25-unit radius circles.

Reason: Diameter is twice the radius. The edge gap is wheelbase minus diameter. Centers are separated by the wheelbase.

Check: Recompute 2 times 25 equals 50, then 120 minus 50 equals 70. Confirm both wheels use the same radius.

Task 2

A rider has saddle height 45 units above the bottom bracket and hip offset 6 units above the saddle. What is the hip height? If the midline is at 50 units, is the hip above or below it?

Answer: Hip height is 45 plus 6 equals 51 units. The hip is 1 unit above the midline.

Reason: Add saddle height and hip offset. Compare the result to the midline value.

Check: Subtract 50 from 51 to get 1; confirm the addition 45 plus 6 equals 51.

Task 3

A side-view drawing shows a torso length of 40 units and an arm length of 35 units. The hand must reach a grip 60 units from the hip. Is the reach plausible without stretching? Explain using a simple range check.

Answer: Yes, because 40 plus 35 equals 75 units, which is greater than 60 units. The arm can bend to cover 60 units without full extension.

Reason: The combined torso and arm length is an upper bound. If the required reach is less than this sum, the pose can be plausible with bending.

Check: Confirm 40 plus 35 equals 75 and 75 is greater than 60. Check that the elbow is bent in the drawing.

Bicycle Rider Drawing: Frame Geometry and Posture

Original tasks 4 / complete keys

Task 4

You choose a head angle of 70 degrees from horizontal and a seat angle of 73 degrees from horizontal. Describe how to place the head tube and seat tube on the grid, and state one consistency check.

Answer: Draw the seat tube from the bottom bracket at 73 degrees from horizontal to the saddle. Draw the head tube at the front at 70 degrees from horizontal. Check that the saddle and handlebar anchors sit above their respective tube tops and that the wheels remain on the baseline.

Reason: Angles are measured from horizontal. The tubes connect the bottom bracket to saddle and the front frame to handlebars.

Check: Use a protractor or grid slope to confirm each angle, then verify anchors align with tube tops and wheels touch the baseline.

Bicycle Rider Drawing: Frame Geometry and Posture

Source rubric / reflection

- [ ] Frame anchors are placed consistently with chosen geometry values and units.
- [ ] Wheels are equal and circular; wheelbase and edge gap arithmetic is correct.
- [ ] Rider contact points match saddle, grips, and pedals without unnatural stretching.
- [ ] Posture lean is plausible and within an acceptable range.
- [ ] Labels state the x-height convention and allow valid style alternatives.
- [ ] Construction lines are removed and final outlines are clear.

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