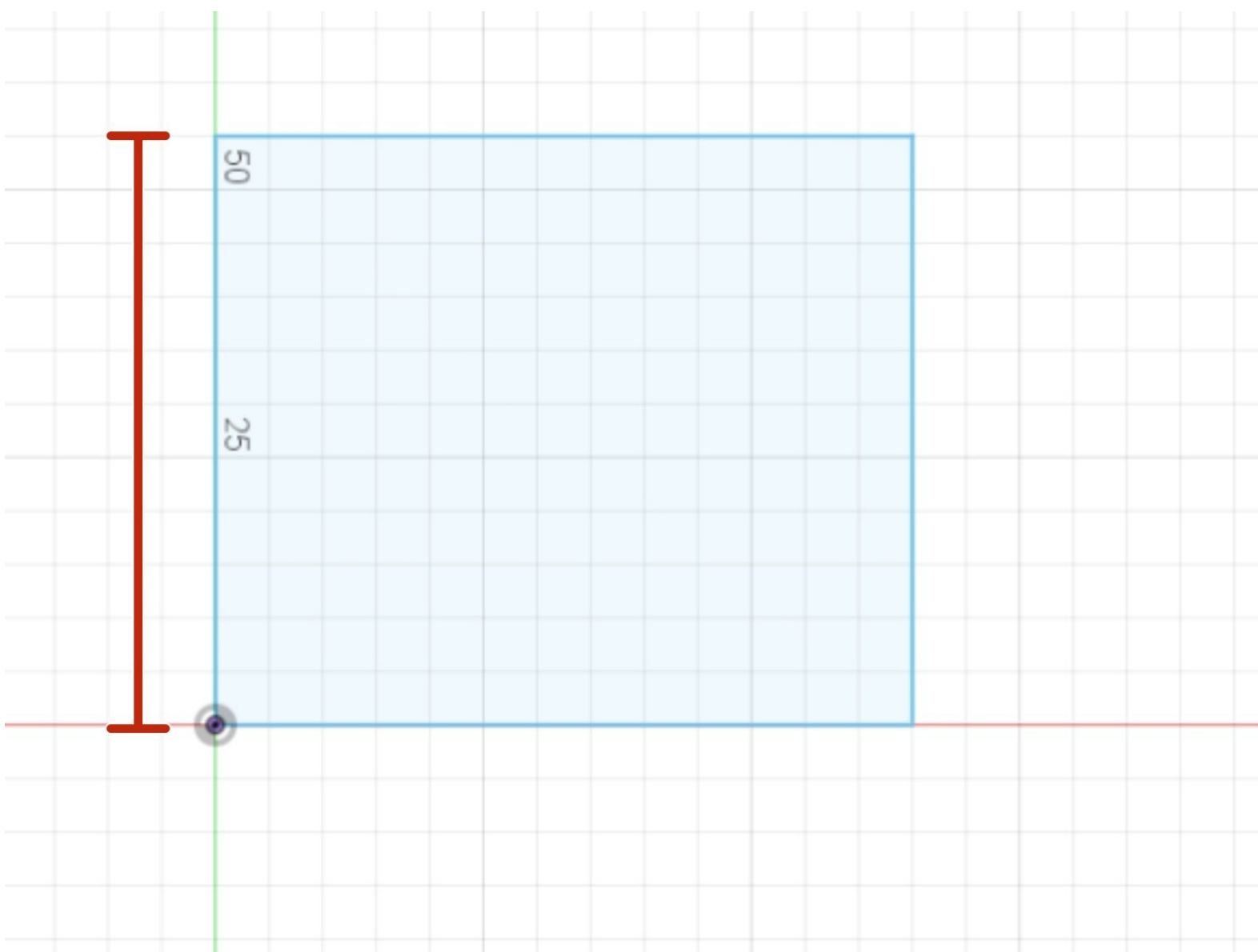




Sketch Constraints

Sketch constraints pin one sketch feature to another and are critical to maximizing parametric modeling techniques.

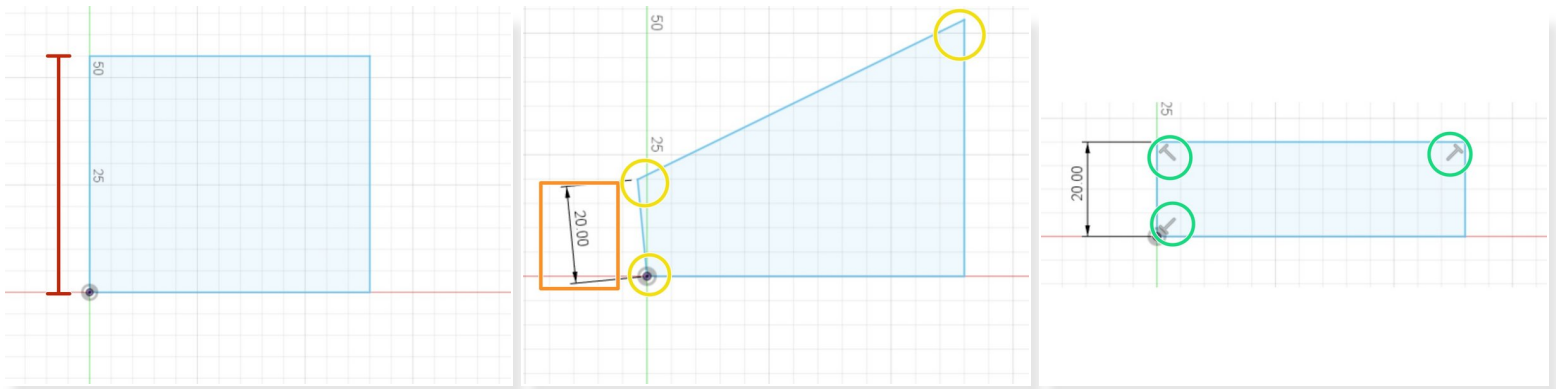
Written By: Eli Jared Fastow



Introduction

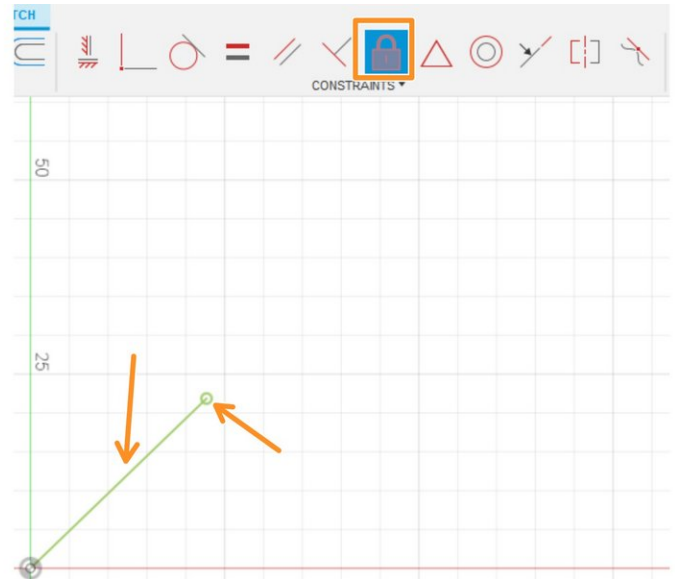
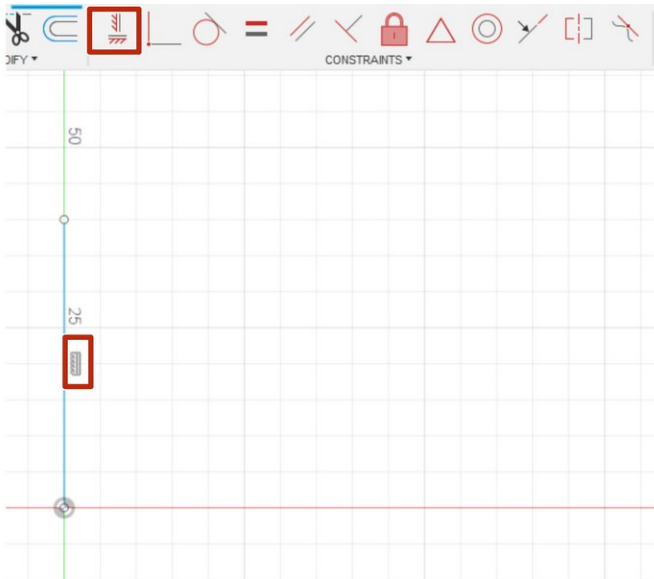
Sketch constraints pin one sketch feature to another and are critical to maximizing parametric modeling techniques.

Step 1 — Why Use Constraints



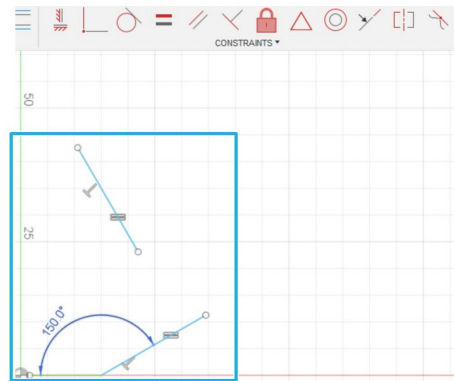
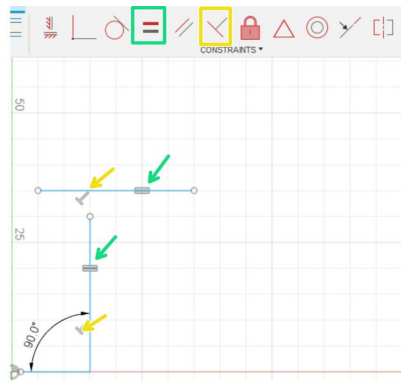
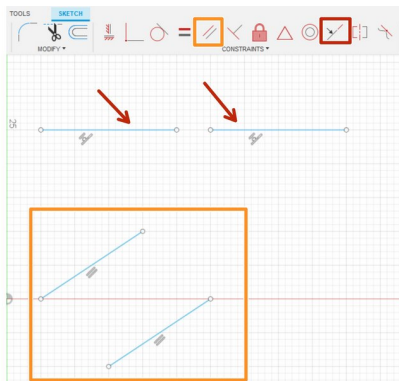
- Let's begin with a sketch of a rectangle 55 mm long in the y-axis
- If we want to make the rectangle 20 mm long in the y-axis, we might add a sketch dimension to one of the y-axis sides.
- However, no command exists to keep the sides of the rectangle perpendicular. Once we change the length of one side, the rectangle deforms into an irregular quadrilateral. Three of the vertices no longer have right angles.
- Constraints reduce the degrees of freedom of sketch features, often in relation to other features. If we constrained the sides of the rectangle to remain perpendicular, adding a dimension to one side would correctly alter the rectangle.
- ① By fixing sketch features relative to each other, constraints make precise dimensioning and parametric modeling much easier.

Step 2 — Constraining Independent Sketch Features



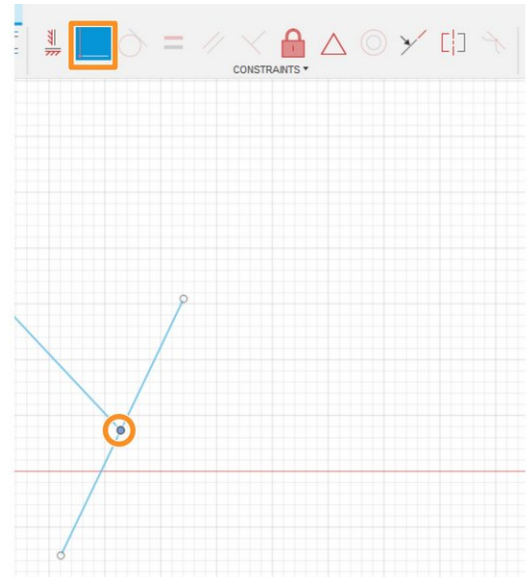
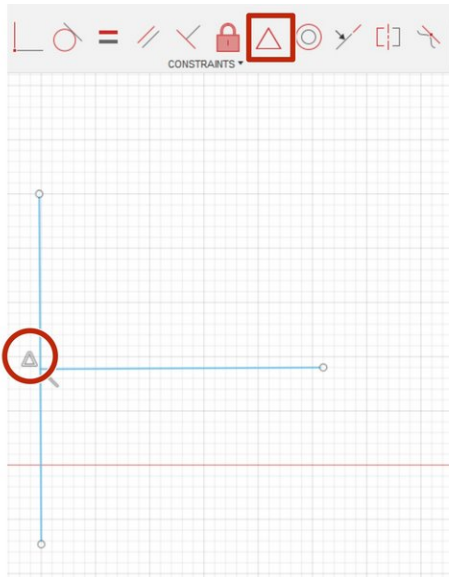
- The **fix** and **horizontal/vertical** constraints reduce the degrees of freedom of sketch features independently
- The **horizontal/vertical** constraint makes a line aligned with either the horizontal or vertical axis
- The **fix** constraint locks a feature's location and size

Step 3 — Constraining Separate Lines



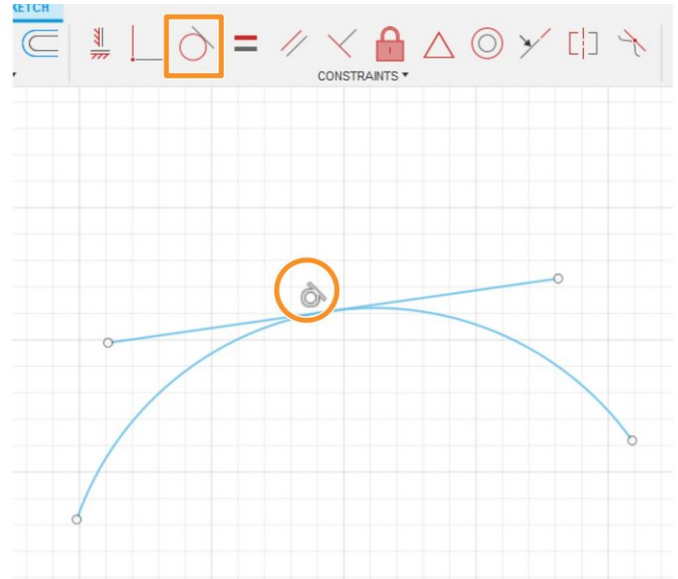
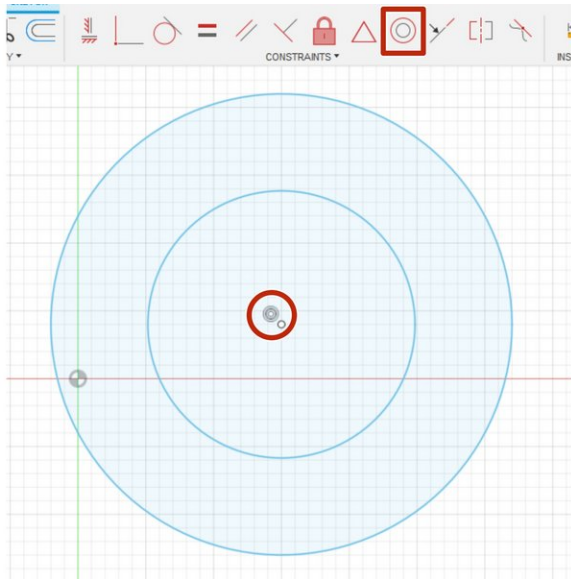
- The **perpendicular**, **parallel**, **equal**, and **co-linear** constrain lines relative to each other even if they are not touching
- The **co-linear** constraint keeps two separate lines or points on the same axis
- The **parallel** constraint keeps two separate lines parallel
- The **perpendicular** constrain keeps two separate or connected lines at a 90 degree angle
- The **equal** constraint makes the length of two lines equal to each other
- Note that altering the angle of one line automatically altered the angle of another given the constraints applied

Step 4 — Constraining Connected Lines or Curves



- The **midpoint** and **coincident** constraints pin lines or curves together
- The **midpoint** constraint insures that one line or curve intersects at the midpoint of another
- The **coincident** constraint connects two lines, curves, or points

Step 5 — Constraining Curves



- The **concentric** and **tangent** constraints help define the relationship between two curves or a curve and a line
- The **concentric** constraint ensures that two circles or curves have the same center point
- The **tangent** constraint makes a line tangent to a selected curve