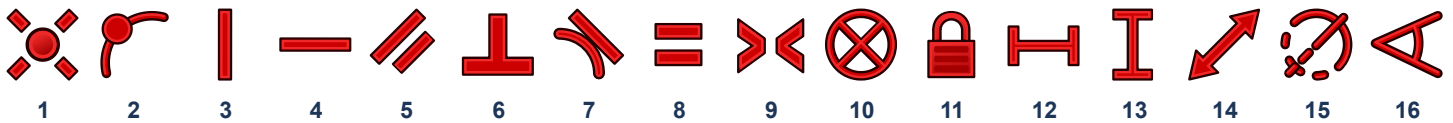


# FreeCAD Cheat Sheet: Sketcher Constraints


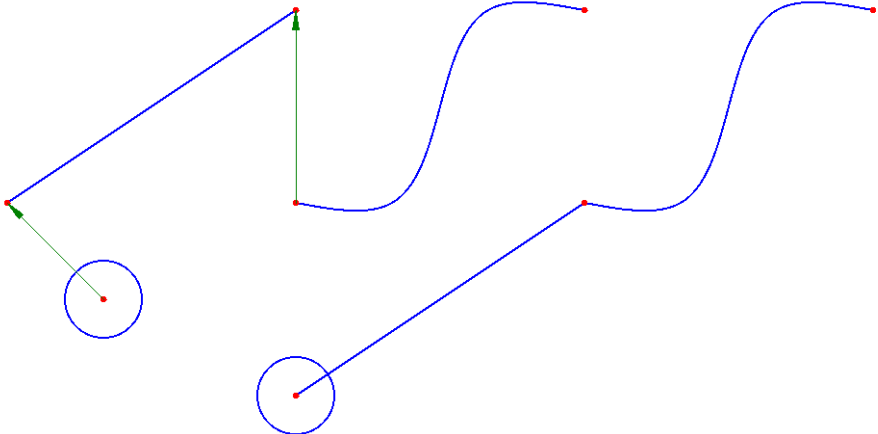



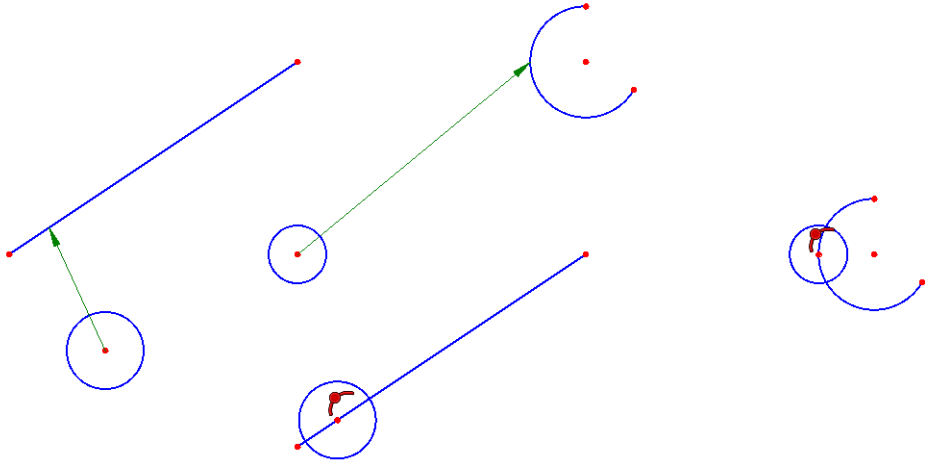


- |                      |                         |
|----------------------|-------------------------|
| 1) Coincident        | 11) Lock                |
| 2) Point onto Object | 12) Horizontal Distance |
| 3) Vertical          | 13) Vertical Distance   |
| 4) Horizontal        | 14) Distance            |
| 5) Parallel          | 15) Radius              |
| 6) Perpendicular     | 16) Angle               |
| 7) Tangent           |                         |
| 8) Equal             |                         |
| 9) Symmetric         |                         |
| 10) Block            |                         |


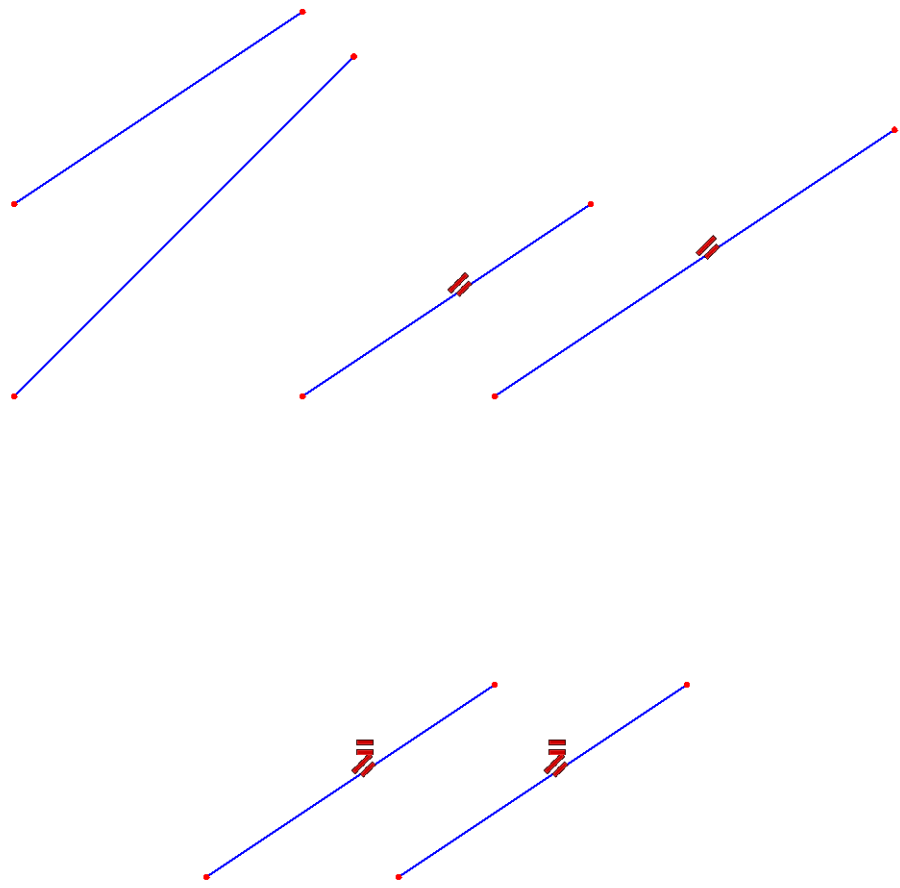
## What is a constraint?


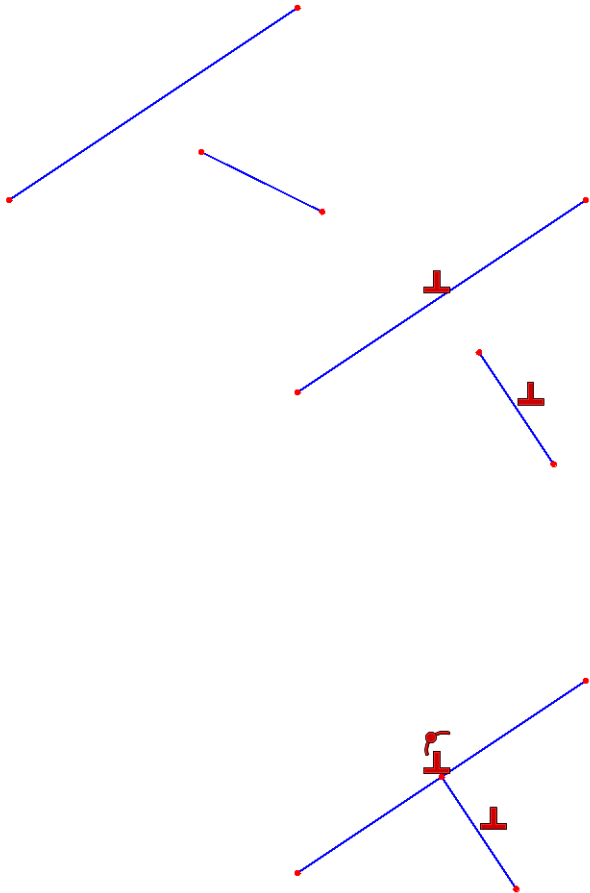
Constraints ensure points or lines with a geometric relationship stay consistent throughout the sketch.


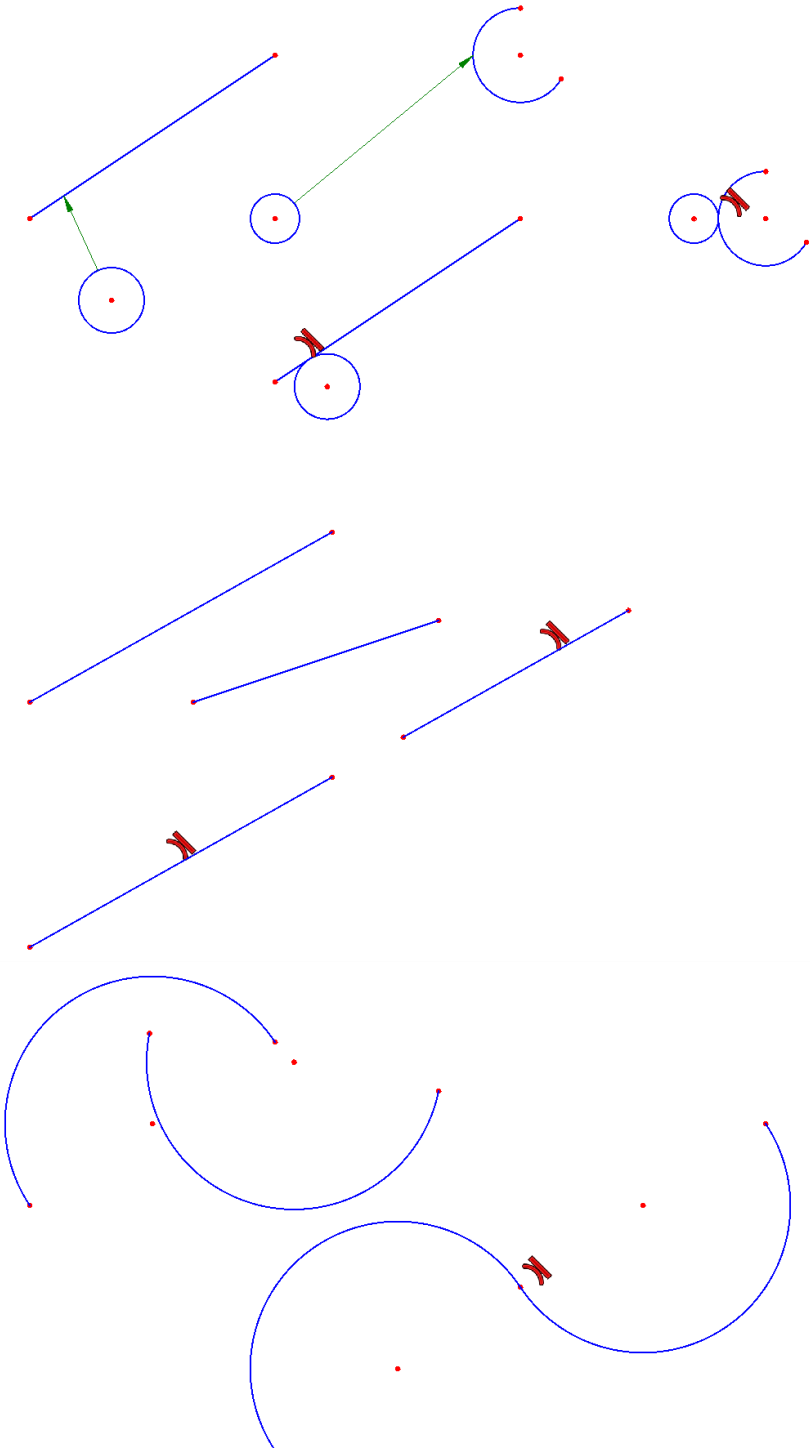




Constraint	Description & Example
	<p>Attach a point to another point. If both points are unconstrained the second point selected will move to the first point selected.</p>  <p>Coincident (C)</p>







Constraint	Description & Example
	<p data-bbox="430 266 1026 314">Attach a point to a line or arc.</p>  <p data-bbox="1123 1000 1485 1049">Point onto Object (O)</p>
	<p data-bbox="430 1159 1523 1261">Ensures the selected line always stays vertical on this sketch plane.</p> <p data-bbox="1295 1293 1485 1342">Vertical (V)</p>
	<p data-bbox="430 1447 1490 1549">Ensures the selected line always stays horizontal on this sketch plane.</p> <p data-bbox="1247 1921 1485 1970">Horizontal (H)</p>




Constraint	Description & Example
	<p data-bbox="430 234 1445 340">Orients two lines to be parallel. Use in conjunction with <b>Equal</b> to make both lines the same length.</p>  <p data-bbox="1291 1915 1485 1968">Parallel (P)</p>

Constraint	Description & Example
	<p data-bbox="430 208 1393 372">Orients two lines to be perpendicular. Use in conjunction with <b>Point on Object</b> to create a T-shape.</p>  <p data-bbox="1182 1915 1485 1968">Perpendicular (N)</p>

Constraint	Description & Example
	<p data-bbox="430 208 1523 368">Attach an arc or ellipse to a line or another arc/ellipse. Can also be used to make two arcs/ellipses tangent and two lines collinear.</p>  <p data-bbox="1287 1915 1485 1968">Tangent (T)</p>

Constraint	Description & Example
	<p data-bbox="431 183 1507 395">Ensures two lines share the same length or an arc or circle share the same radius. If both circles or arcs are unconstrained the second shape selected will match the first shape selected.</p> <p data-bbox="1325 470 1484 512">Equal (E)</p>
	<p data-bbox="431 563 1490 889">Orients two points to share the same distance and angle from a line. Preselect two points and a line before invoking this command. Use <b>Equal</b> to ensure figures symmetric across the line are mirrored. Use <b>Distance</b> to set the distance from the line of symmetry.</p> <div data-bbox="586 917 1360 1842"></div> <p data-bbox="1240 1917 1484 1959">Symmetric (S)</p>

Constraint	Description & Example
	<p>Prevents lines from changing slope/angle, length or location.</p> <p>Block (K, B)</p>
	<p>Applies a <b>Distance</b> constraint to a point relative to the sketch origin. Preselect one point before invoking this command.</p> <p>Lock (K, L)</p>
	<p>Dimensions the length of a horizontal line or distance between two points.</p> <p>Horizontal Distance (L)</p>
	<p>Dimensions the length of a vertical line or distance between two points.</p> <p>Vertical Distance (I)</p>
	<p>Dimensions a line or distance between two points.</p> <p>Distance (K, D)</p>
	<p>Dimensions the diameter of a circle or the radius of an arc.</p> <p>Radium (K, S)</p>

Constraint	Description & Example
	<p>Dimensions the radius of a circle or arc.</p> <p>Radius (K, R)</p>
	<p>Dimensions the diameter of a circle.</p> <p>Diameter (K, O)</p>
	<p>Dimensions the angle between two lines.</p> <p>Angle (K, A)</p>



# Sketcher Constraints: Shortcuts



Coincident (C)



Point onto Object (O)



Vertical (V)



Horizontal (H)



Parallel (P)



Perpendicular (N)



Tangent (T)



Equal (E)



Symmetric (S)



Block (K, B)



Lock (K, L)



Horizontal Distance (L)



Vertical Distance (I)



Distance (K, D)



Radiam (K, S)



Radius (K, R)



Diameter (K, O)



Angle (K, A)

## Customize shortcuts!

Menu bar → Tools →  
Customize... → Keyboard →  
Category: Sketcher

