

I-DEAS Sketching Do's and Don'ts

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Premium Partners:



Microsoft

Brian Slick – I-DEAS History

- Co-op with SDRC, Fall 1996 (MS3)
- I-DEAS Instructor, June 1998 – October 2001
 - Design-related topics: Part Design, Assembly, 2D/3D Drafting, Best Practices, Surfacing, Harness, and C3P equivalents
- Contract Drafter → Sr. Project Engineer – Ferno
 - Created hundreds of parts, assemblies, drawings
 - “Assembly Manager” for several large (700+ instance) assemblies
 - User training and support
 - CAD evaluation and testing
- Winner of 2004 and 2005 PLM World “Top Gun” Contests



Ferno-Washington, Inc.

- Privately held, global company
- Multiple product lines in Emergency, Mortuary, Therapy, and Veterinary markets.



FERNO



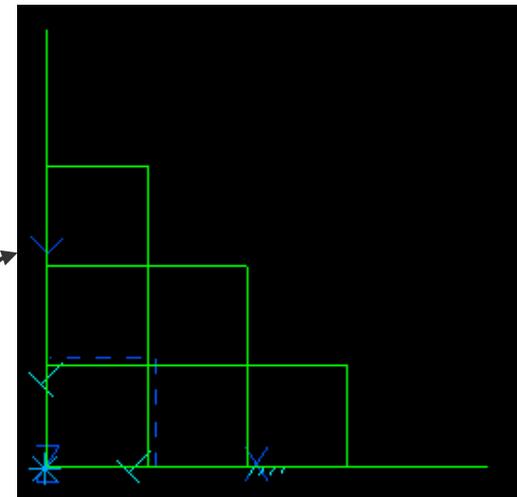
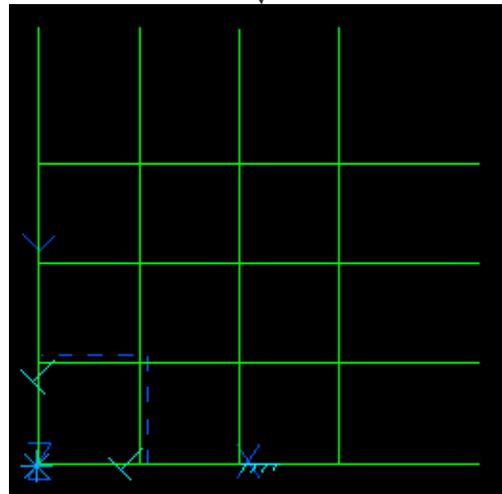
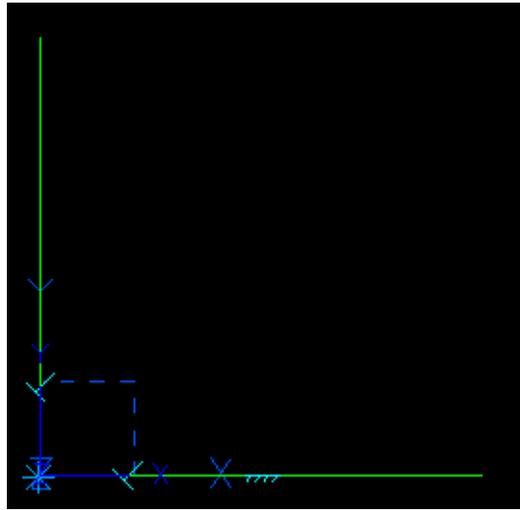
Overview

- Trimming
- Sketching Approach
- Section Mapping
- Centering Techniques
- Spacing Techniques
- Miscellaneous Tips

General Sketching Method

1. Start with a rough sketch. Shape is more important than size.
2. Apply constraints and dimensions as desired. Fully constrained is highly recommended, though not required.
3. Modify dimensions to the desired values.
4. Define the section.

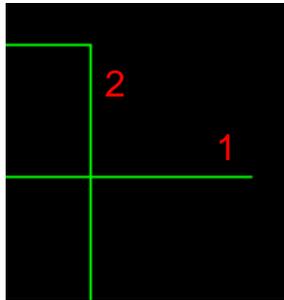
Don't – Offset & Trim - Method



This is an outdated method that attempts to force Modeler to behave like drafting software. It is slow and inefficient.

Constrain vs. Trim - 1

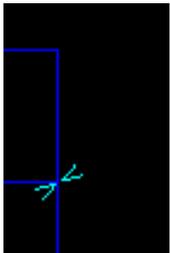
Constrain



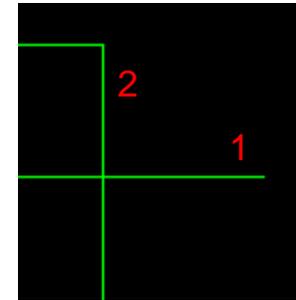
2 Clicks:

1. End of line
2. Limiting line

Result:



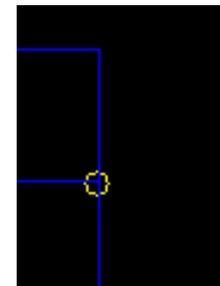
Trim



2 Clicks:

1. End of line
2. Limiting line

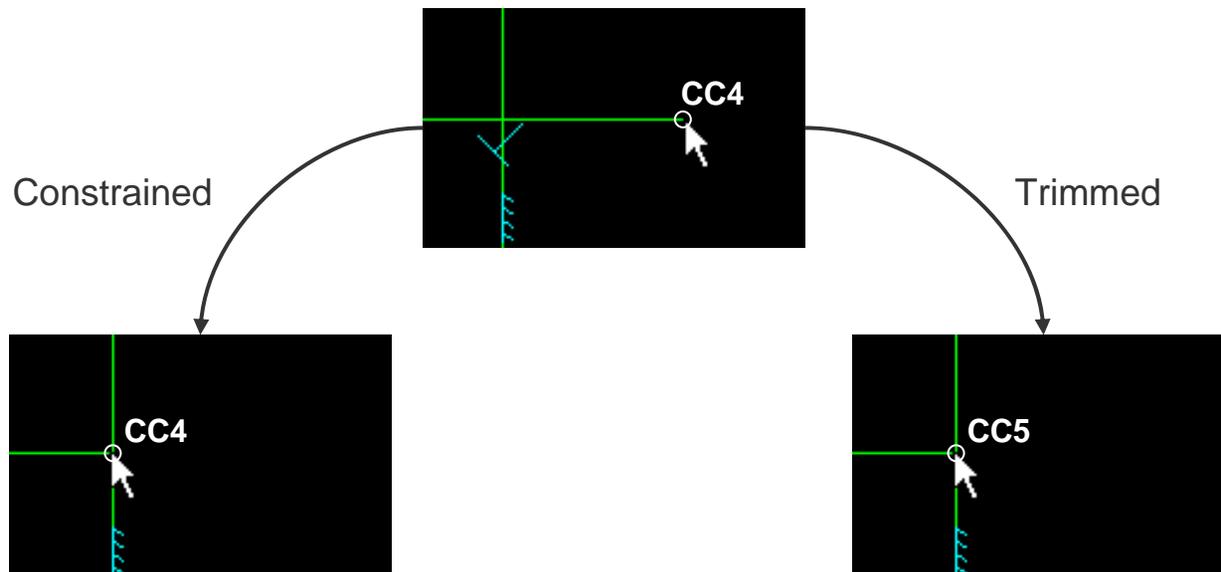
Result:



The trimmed line isn't constrained (indicated by the yellow circle), which means it should still be constrained (2 more clicks), which means the Trim command was a waste of time and effort.

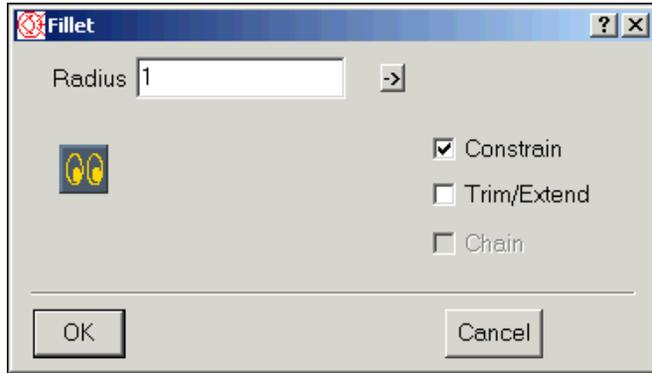
Constrain vs. Trim - 2

The difference between trimming and constraining is more than mere semantics. The software behaves differently depending on which action was performed.

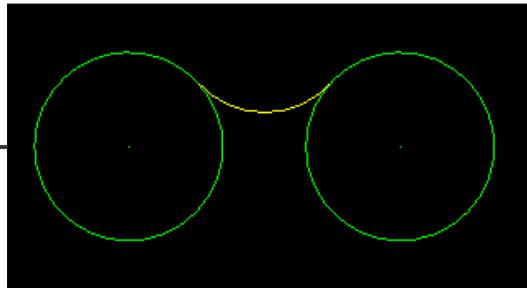


Constraining changed the length of the line, but the line is otherwise unharmed. Trimming chopped the line and created a new endpoint.

Trimming – Fillet Command

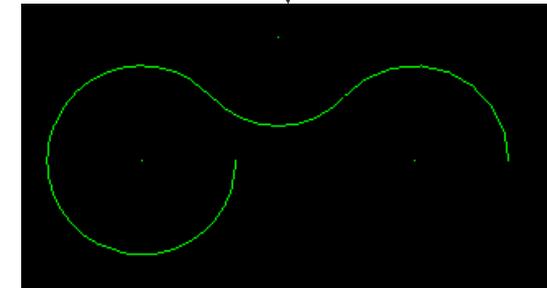
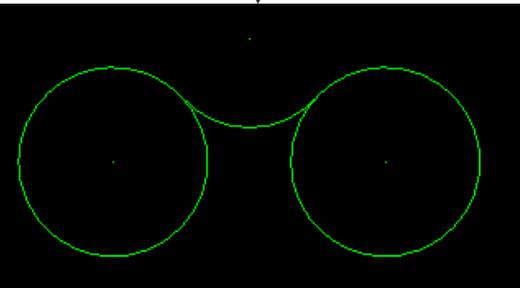


Be very careful with the Fillet command. It has trimming capabilities, the results can be disastrous, and **Undo is not available**. Leave Trim/Extend off.



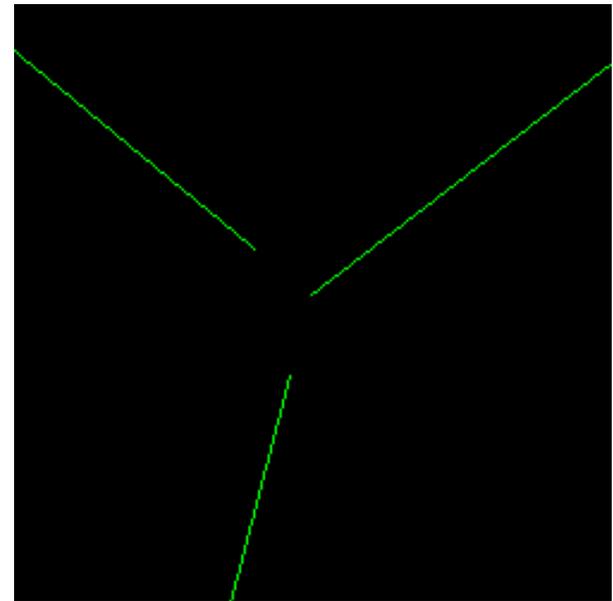
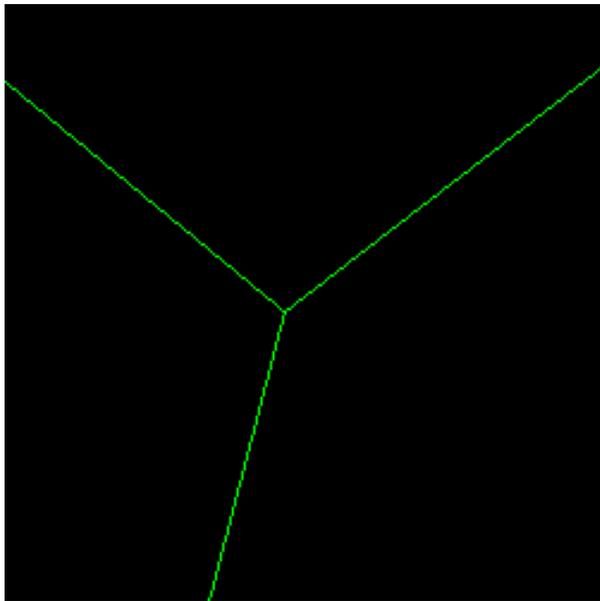
Trim/Extend Off

Trim/Extend On



Trim – Legitimate Use

Although the use should be minimized, there are scenarios where Trim is the best option. An example is the need to break apart implicit constraints.

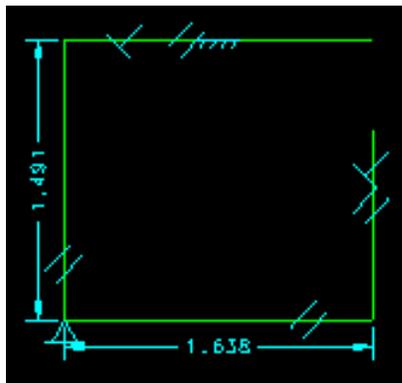


3 lines are attached, but there is no constraint to remove if design intent changes.

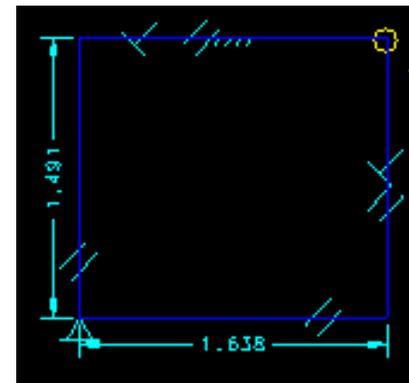
Use Trim to free up endpoints, which can now be reconstrained with a different design intent

Make Corner

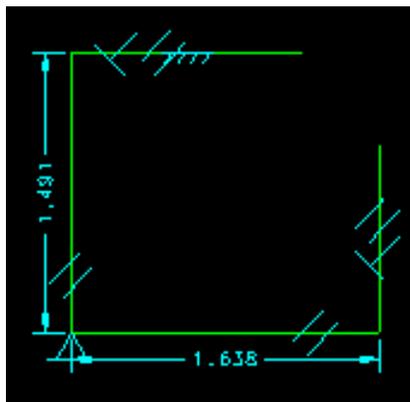
The Make Corner command can be useful, but there is a behavioral quirk to be aware of.



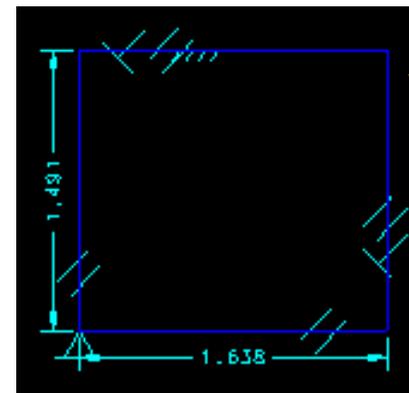
If only one endpoint moves



Not constrained or attached

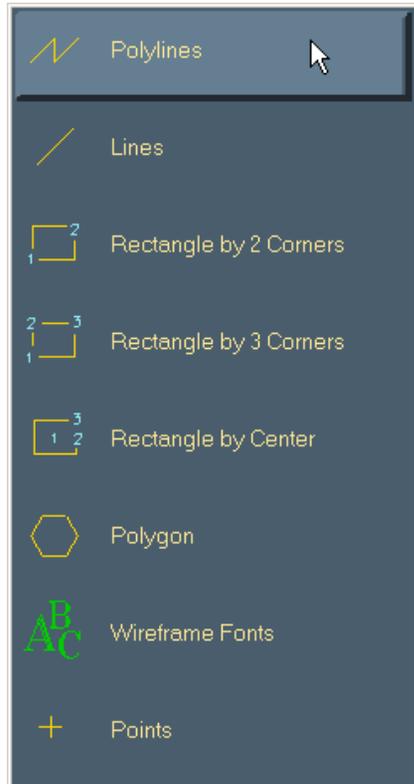


If both endpoints move

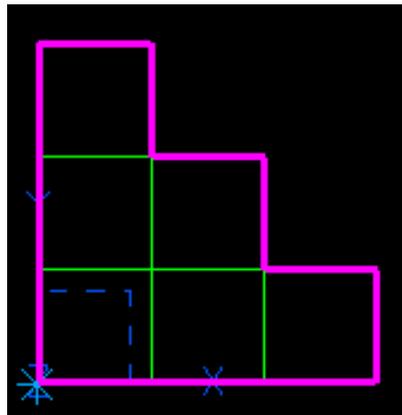


Constrained

Do – Draw Shapes And Use Haystacking



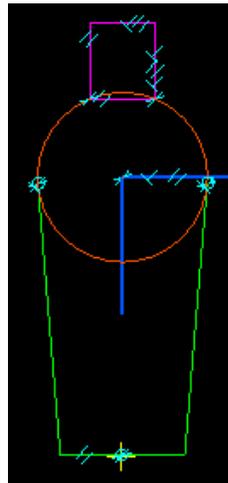
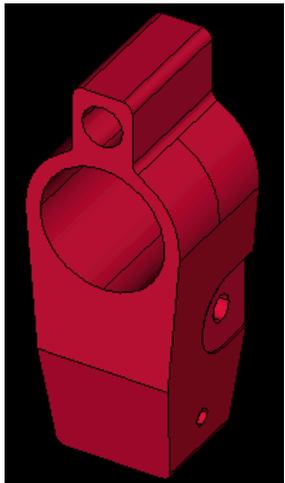
Approach the sketch from a “shape” standpoint, rather than from a “series of lines” standpoint. This is typically easier and faster. For example, a rectangle provides 4 lines with as few as 2 clicks and, depending on Navigator settings, can be fully constrained automatically.



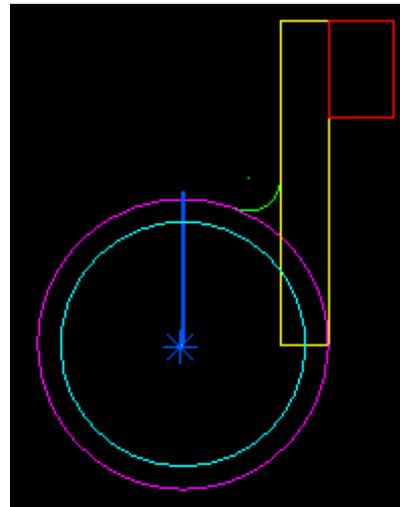
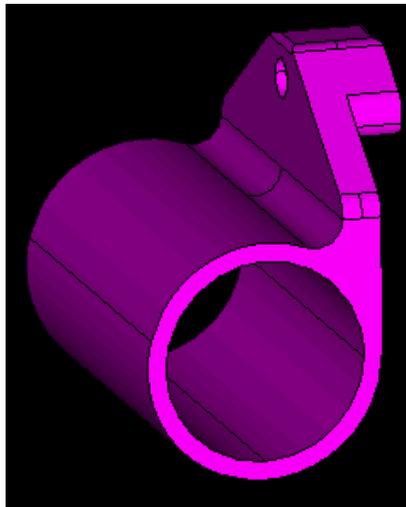
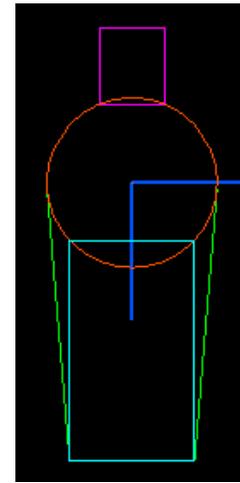
I-DEAS does not require curves to be trimmed, and therefore trimming often causes more problems than it solves. The section lays on top of the underlying sketch curves, and is the entity passed on to commands like Extrude.

Sketching Approach

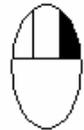
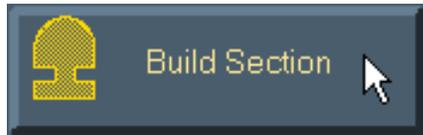
Look for basic shapes in the part being modeled, and use those shapes in the sketch



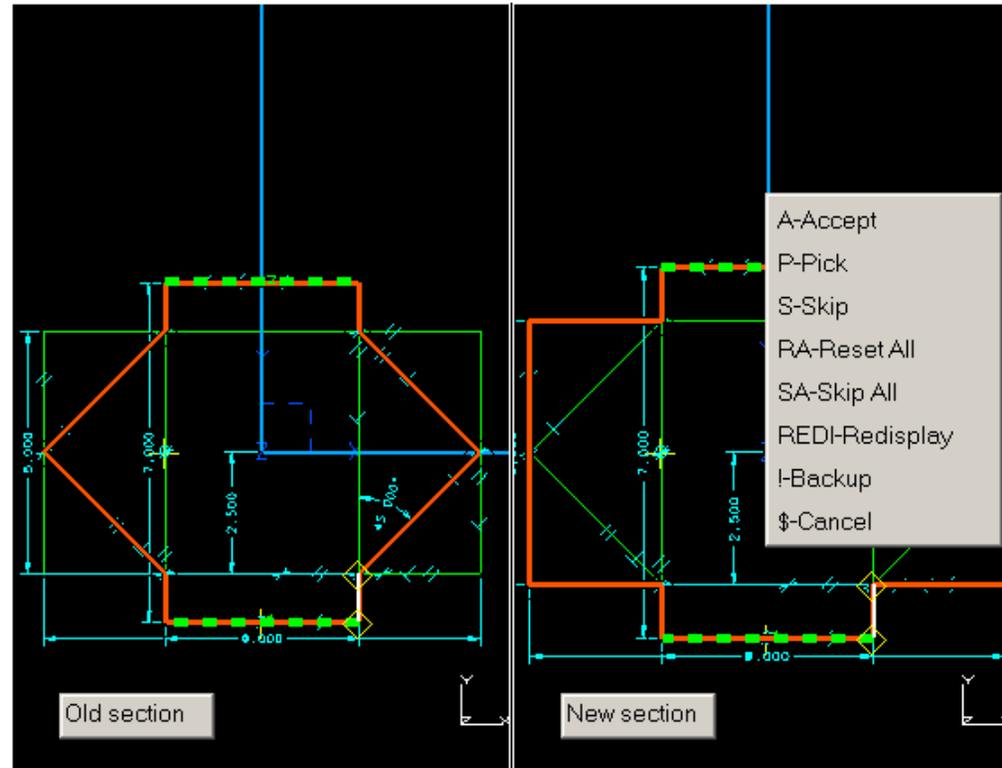
-or-



Section Mapping – What Is It?

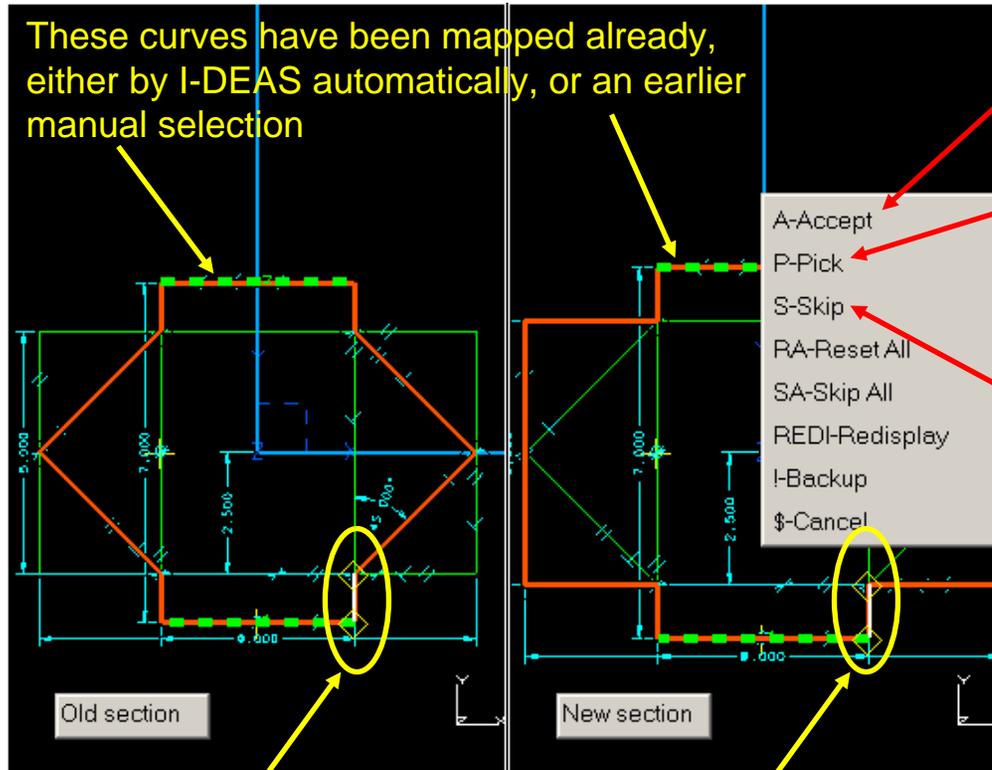


- VIS-Visible
- LAB-Label
- OP-Section Options...
- ZOO-Zoom All
- PAF-Turn Autopan OFF
- RI-Remove Invalid Curves
- SAN-Section Analyzer...
- EI-Interactive Mapping ON**
- PO-Pick Only



When Section Mapping is turned on, I-DEAS will present an interface allowing the user to assist the software in determining the impact of changes to the section. I-DEAS is trying to correlate what “was” with what “is now,” and may need some help. An effective map can avoid downstream associativity problems. A bad map or no map will increase the amount of downstream repair that is required.

Section Mapping – How To Use It



Accept current highlighted old/new pairing

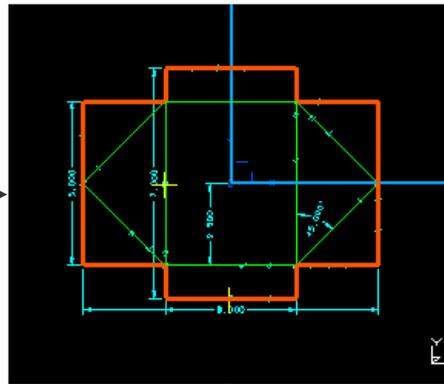
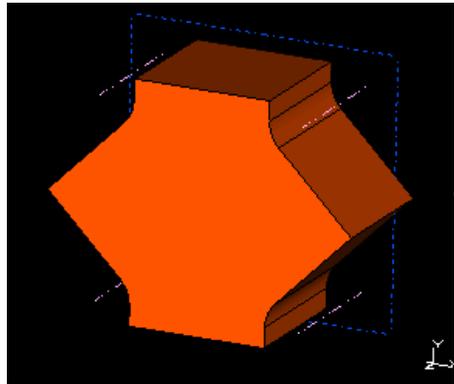
Select a different "New" segment if a different map is desired, or if I-DEAS chose poorly initially

Skip the "Old" segment indicated and go to a different one

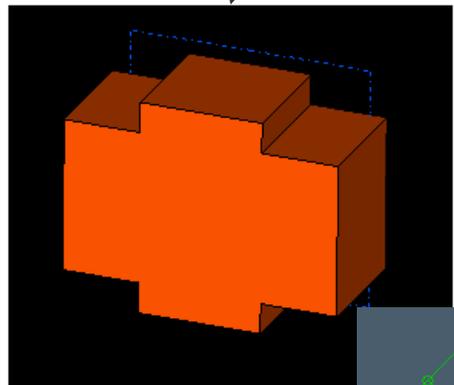
Segment of old section that I-DEAS is unsure about, and needs help with

Segment of new section that I-DEAS thinks best correlates to old section

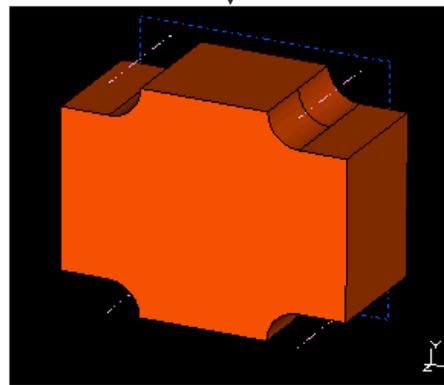
Section Mapping – Why Should You?



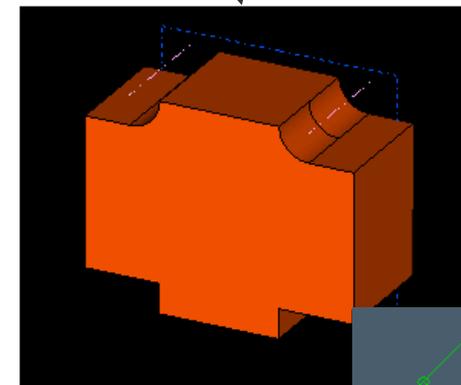
Spending the time to logically map the new section can reduce or eliminate errors and warnings downstream in the history tree.



No Mapping



Preferred Mapping

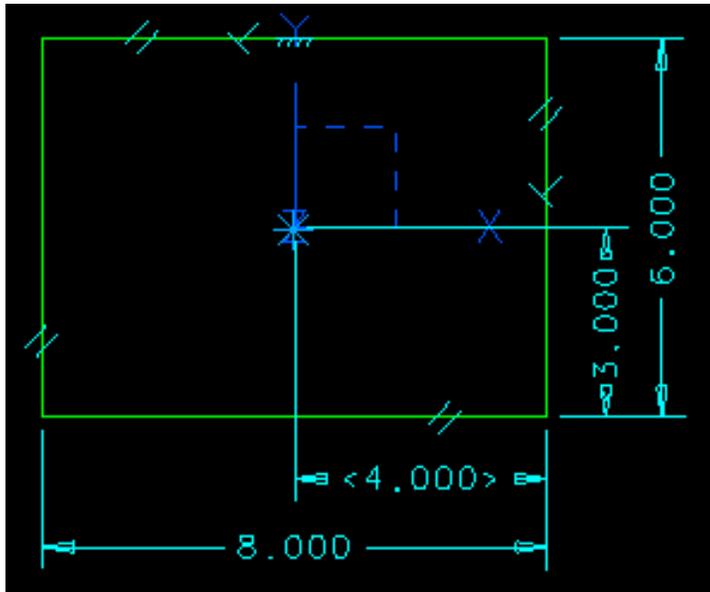


Alternate Mapping

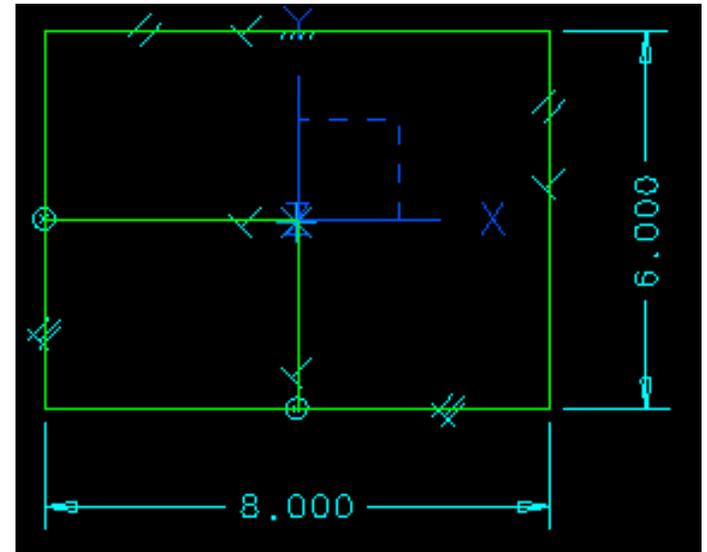
Centering Techniques - 1

There are a variety of ways to center sketch geometry

The two techniques are dimensional and geometric. As long as the desired behavior is captured, all methods are equally valid

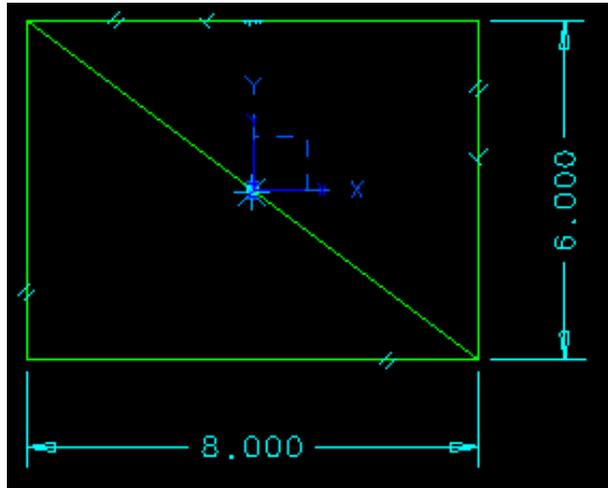


Dimensions matched/2

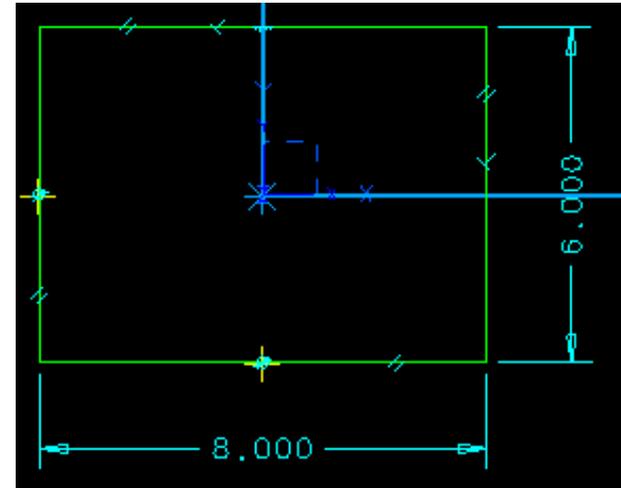


Extra lines with particular constraints

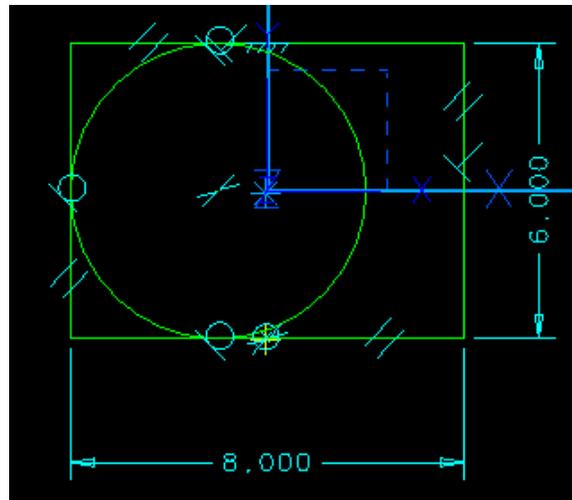
Centering Techniques - 2



Extra line with particular constraints



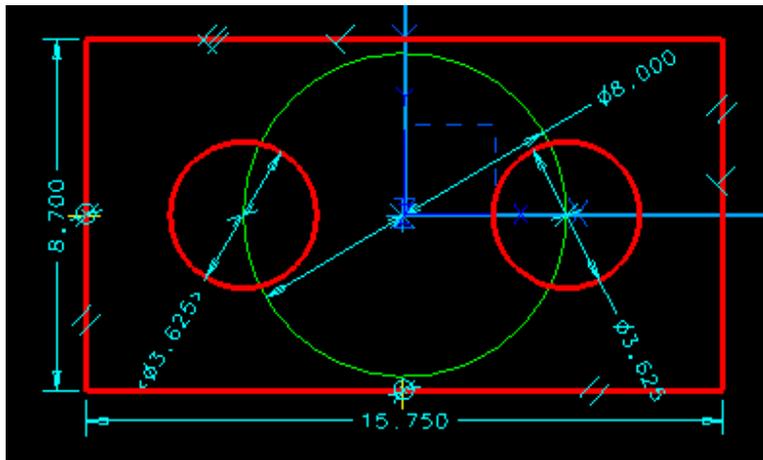
Points opposite focused axes



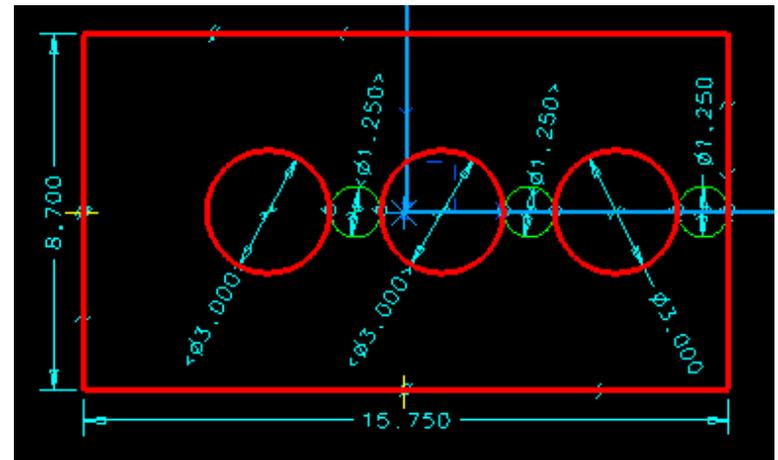
Use center points if available

Spacing Techniques 1 - Circles

Circles can be very handy for establishing consistent spacing



Force equal distance from a point
(definition of circle)

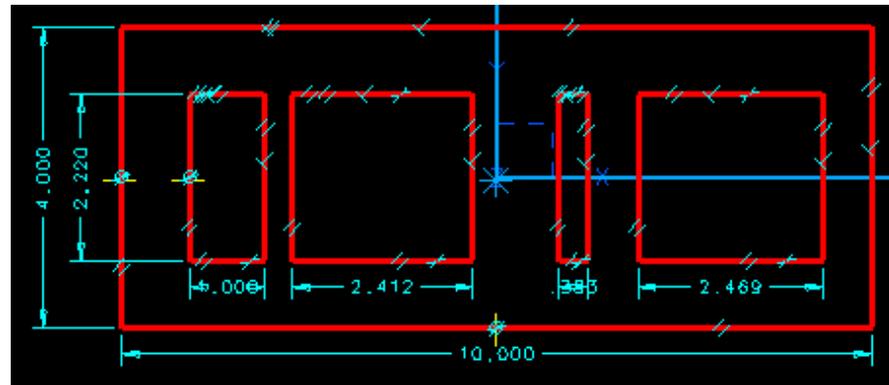


Easily establish consistent space between circles

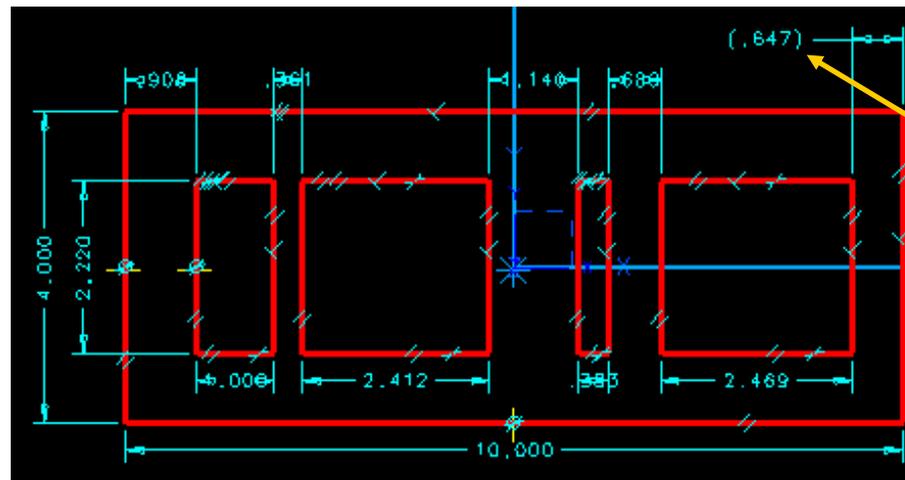
Spacing Techniques 2 - Equations

It is possible to use equations to force equal spacing. The method is simple enough to use, but not intuitive.

Step 1: Draw geometry



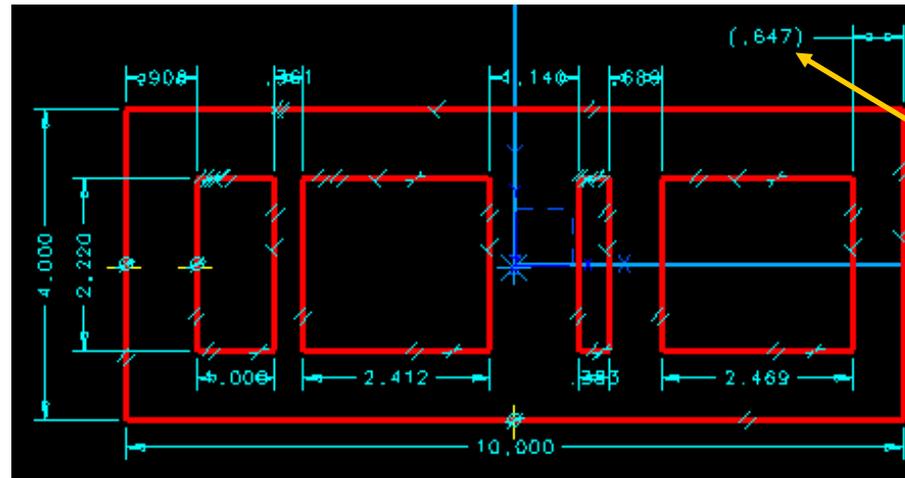
Step 2: Over-dimension



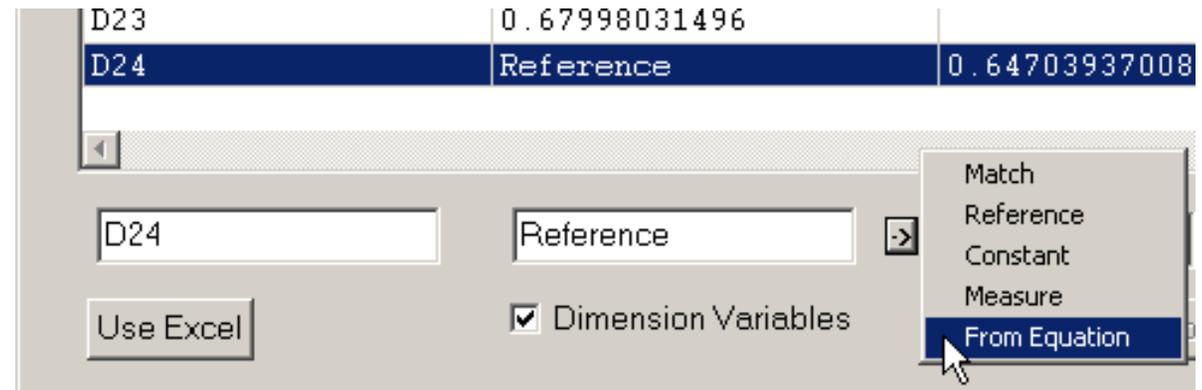
Reference dimension is important

Spacing Techniques 2 – Equations (cont.)

Step 3: Part Equations, then select the reference dimension

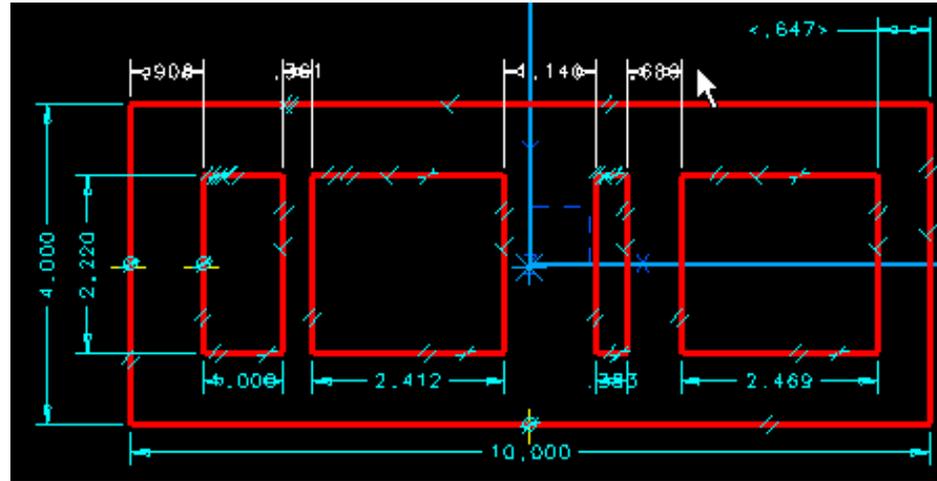


Step 4: In Part Equations form, select the reference dimension, then set it to be From Equation



Spacing Techniques 2 – Equations (cont.)

Step 5: Select the other spacing dimensions and Modify them



Step 6: Match the dimensions to the From Equations dimension (displayed as a matched dimension)

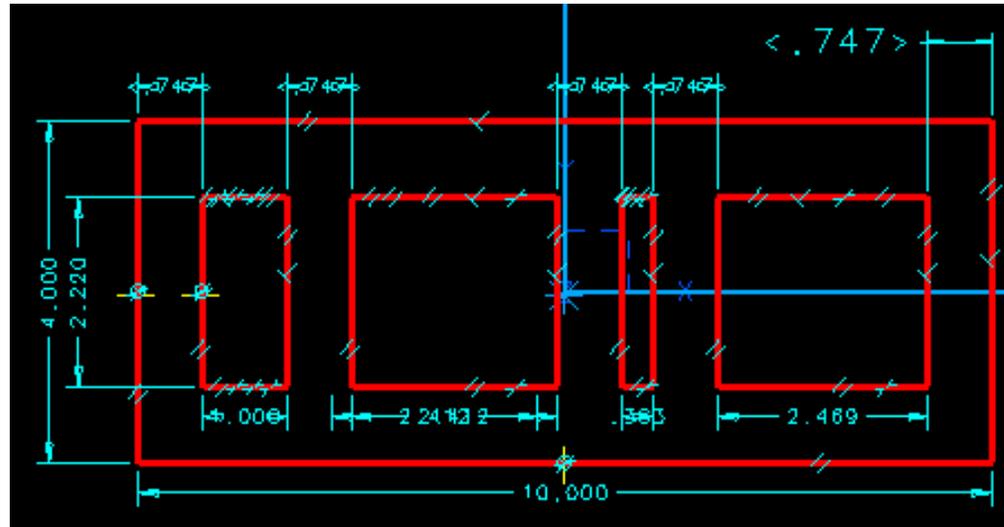
Name	Expression	Displayed Value
D20	0.908	
D21	0.36098031496	
D22	1.14	
D23	0.67998031496	

Match
Reference
Constant
Measure

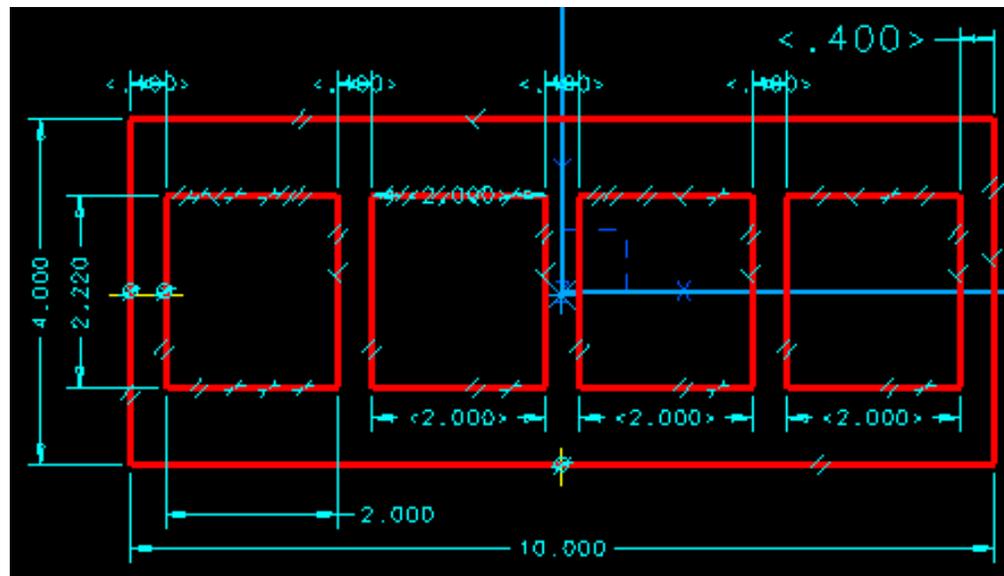
Match to this one

Spacing Techniques 2 – Equations (cont.)

Result:



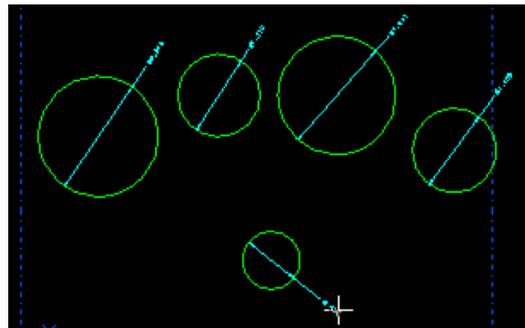
Optional: Match the box dimensions to each other



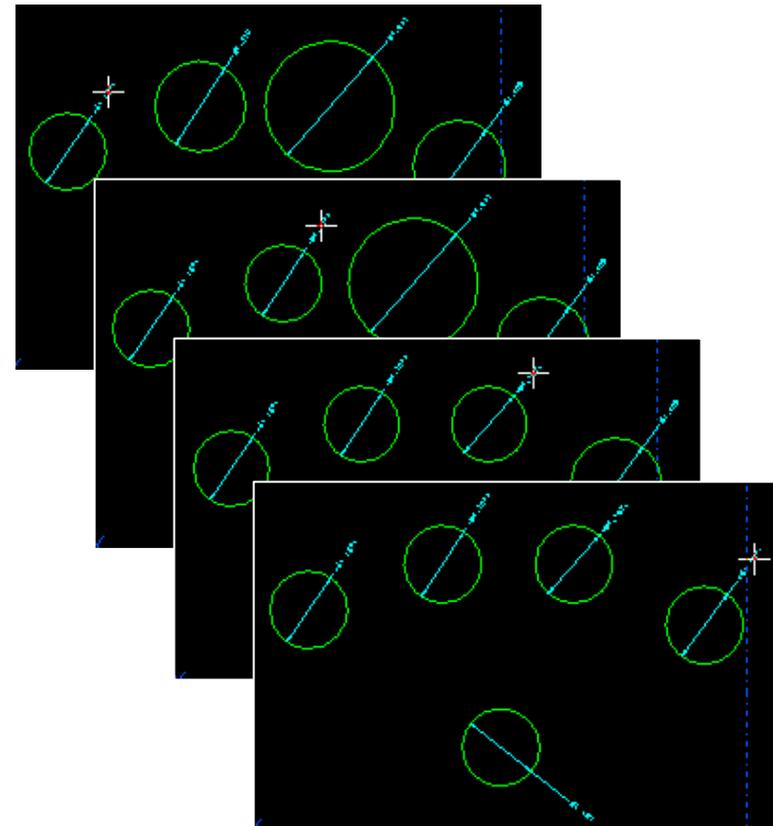
Miscellaneous Tips – Multiple Match

There is a “hidden” method for matching dimensions: Ctrl-D

Step 1: Hit Ctrl-D
Nothing needs to be selected beforehand



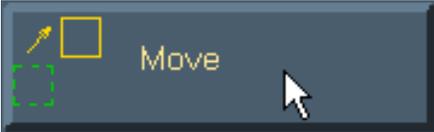
Step 2: Pick the “driver” dimension



Step 3: Pick any other dimensions to be matched

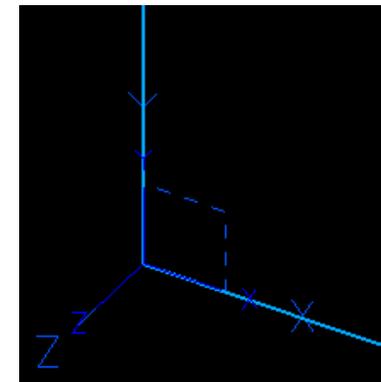
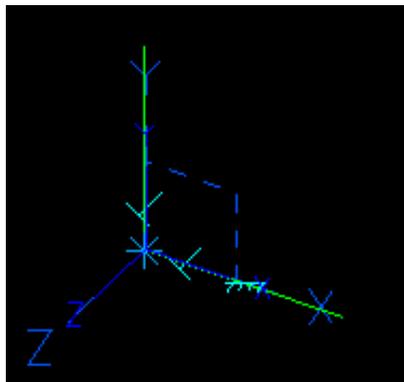
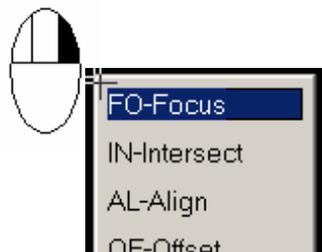
This is also available in the Menus through
Constrain → Quick Match Dimension, or
/cn qm

Miscellaneous Tips – Move vs. Drag

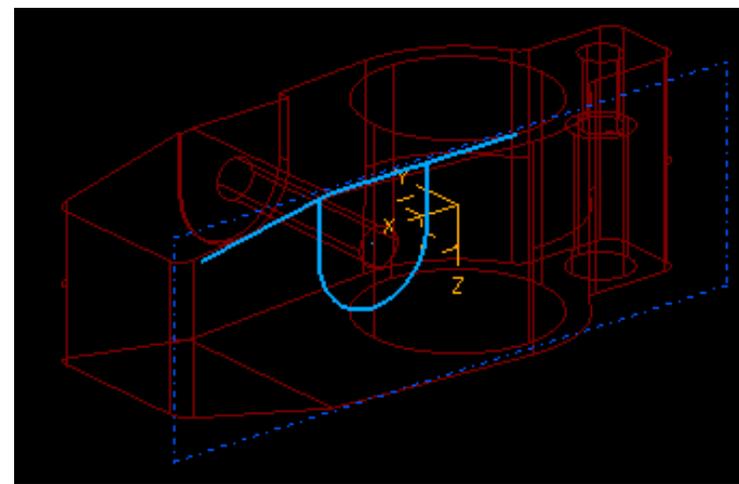
Command	On Dimensions	On Curves
 The icon for the 'Move' command shows a yellow square being moved from one position to another, with a mouse cursor pointing at it. The word 'Move' is written in yellow text to the right of the icon.	<p>Relocates dimensions</p> <p>This is harmless</p>	<p>Has the ability to relocate geometry in 3D space. Curves can be pulled off of sketch planes.</p> <p><u>Be careful!</u></p>
 The icon for the 'Drag' command shows a yellow square being dragged from one position to another, with a mouse cursor pointing at it. The word 'Drag' is written in yellow text to the right of the icon.	<p>Relocates, modifies, or reattaches, depending on mouse click location.</p> <p>Extremely useful and powerful, but do <u>be careful</u>.</p>	<p>Relocates or modifies unconstrained geometry within the sketch plane. Can't do anything with constrained geometry.</p> <p>Almost always is a better choice than Move.</p>

Miscellaneous Tips – Focus

Don't bother drawing something that can be focused



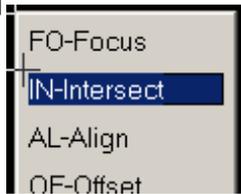
Focused axes are good, but no feature associativity



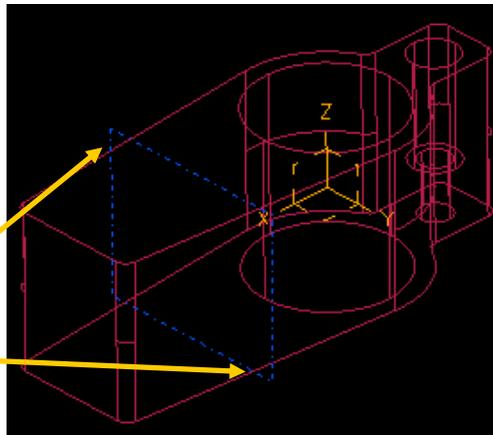
Better

Miscellaneous Tips – Intersect

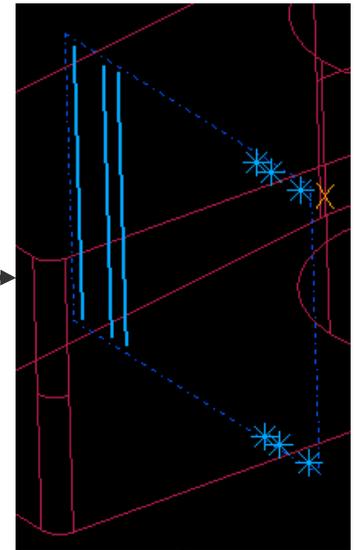
Intersect can be more robust than Focus in some cases, or provide correct associative geometry when Focus doesn't work for the scenario



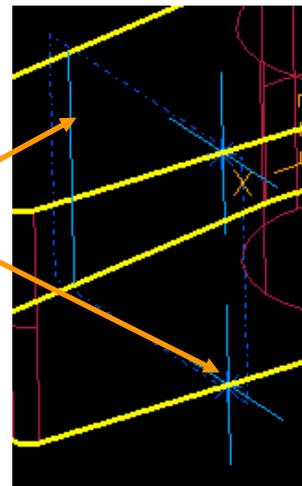
Want to relate sketch to edges, but...



...available entities for Focus do not produce useful results



Intersect creates curve(s) or a point between sketch plane and selected surface or edge



The End

Questions? Comments?

Brian Slick

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