CSWP Segment #1 Concept Review

Segment 1: (90 Minutes)

- Creating a part from a drawing

- Using linked dimensions and equations to aid in modeling

- Using equations to relate dimensions

- Updating parameters and dimension sizes

- Mass property analysis

- Modifying geometry on initial part to create a more complex part

- Modifying parameters on the part at different stages while maintaining all other dimensions and design intent

Start the exam by making sure you are in the correct unit system and selecting your material.

Schedule:

Monday: Review concepts and (Pages 2-9).
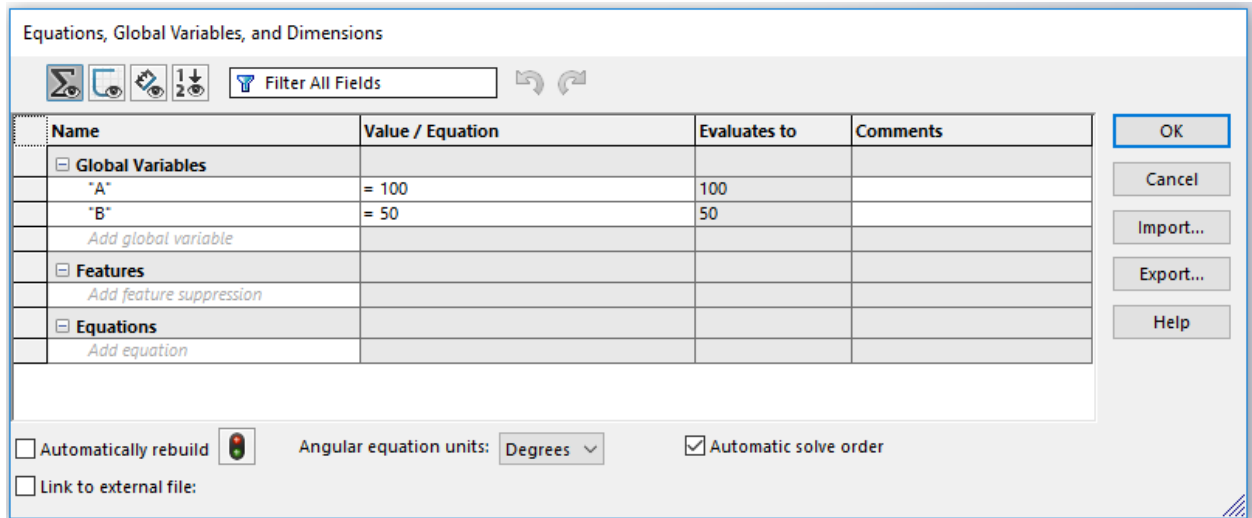**Tuesday:** Go through the practice exam (Pages 10-16)
Wednesday: Self-study subjects that are trouble areas
Thursday: Take the timed practice exam (Page 17)
**Friday:** Take the CSWP Segment #1

Creating Global Variables

Start a new part in SolidWorks. Go to tools>Equations. The box shown below will pop up. Create global variables "A" and "B" as shown. Don't forget the quotation marks.


Create a rectangle sketch. Set the length using variable "A" and the width using variable "B".

This is done by clicking the smart dimension tool, selecting the entity you wish to dimension (in this case the length or width) and then typing ="A" or ="B" in the dimension box.
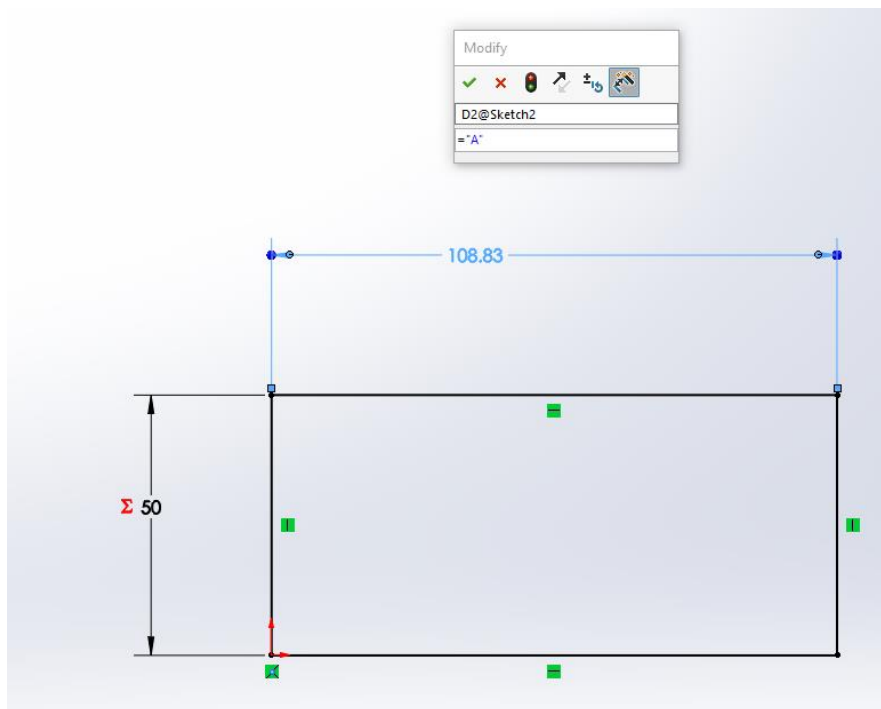
You can also create global variables as you go. Draw a circle anywhere inside your rectangle. Dimension the diameter by typing ="C" in the dimension box. Click yes to create new global variable. It will then prompt you to enter the value for C; type 25. A new global variable "C" is created.
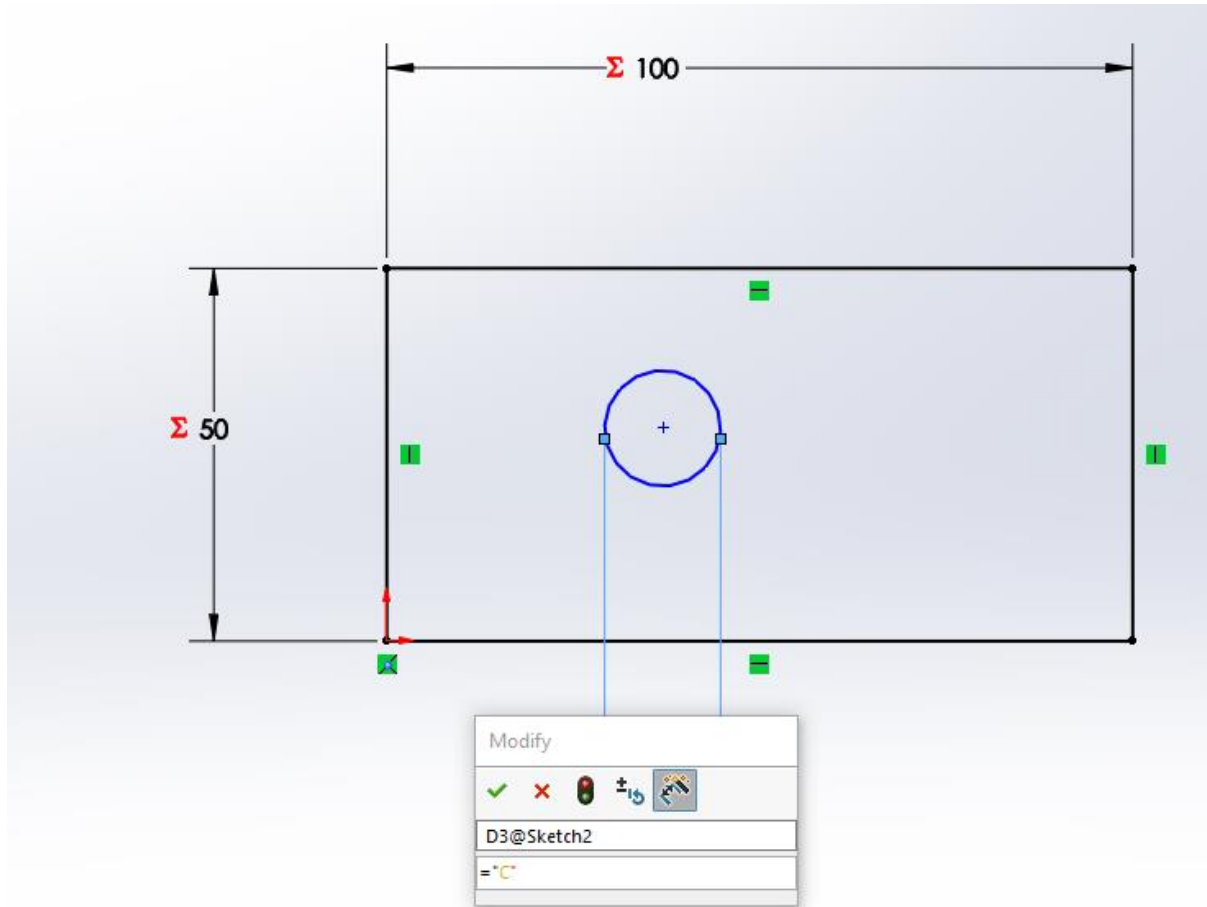

Now go to the design tree. When you expand the equations folder, you should be able to see all your global variables. Right click the equations folder and select "manage equations". Click in the box below "C" and create a new global variable "D". Set "D" equal to "A"/2. Now go back to your sketch and extrude it to a length of "D" by typing ="D" for the distance to be extruded.

## Working with the Rollback Bar.

Start by sketching two 27mmx100mm rectangles spaced 25mm from the origin. Extrude them Mid Plane 27mm. This will create two pillars.
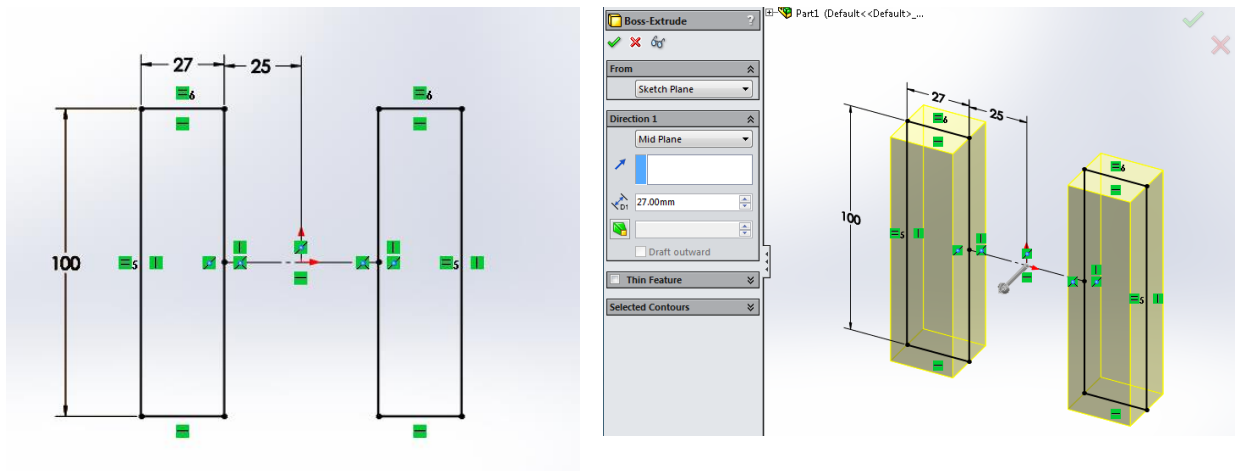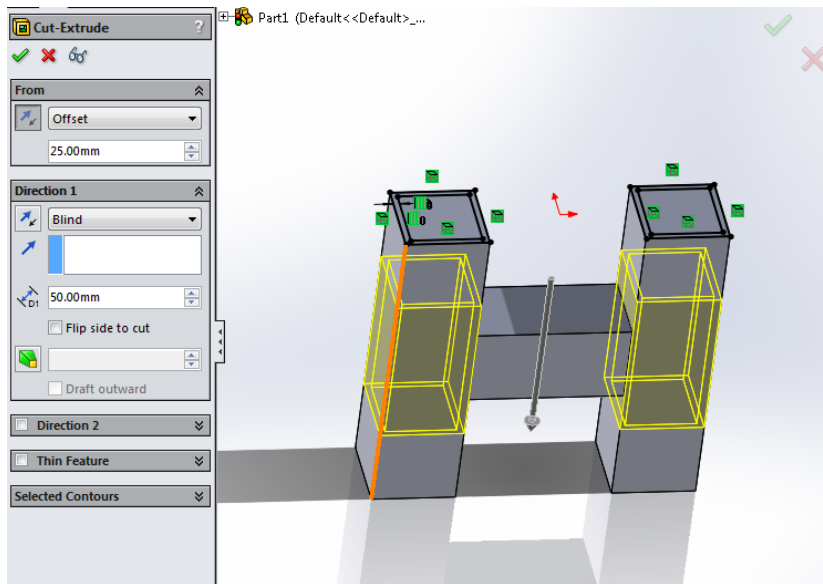
Next, sketch and extrude a 23x25 rectangle on the right plane. Extrude it 100mm Mid Plane. This will create an 'H' shape.
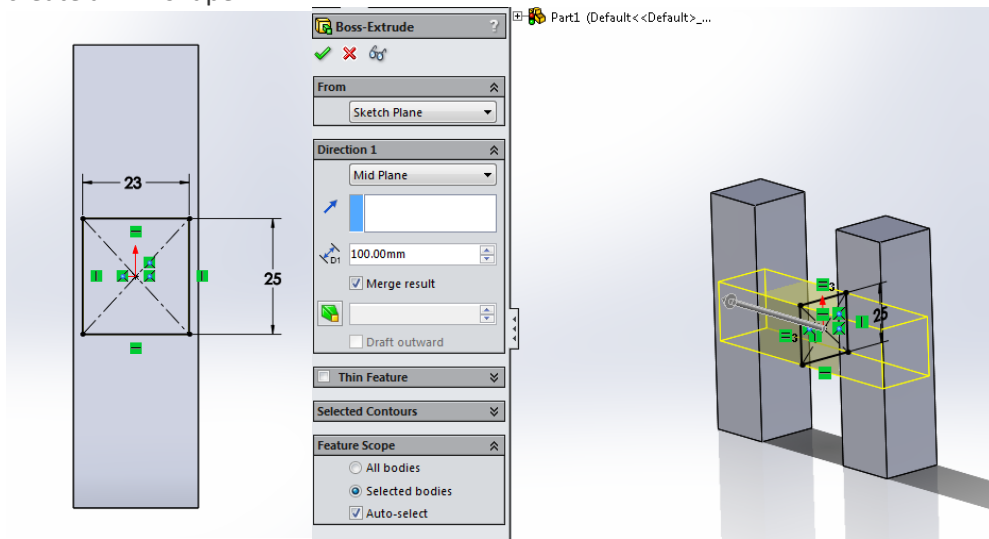

Now, start a sketch on the top surface of the 'H'. Use the convert entities and offset entities features to create the sketch shown below. Offset the inner square 2mm. Next, do an extrude cut 50mm that is offset 25mm.
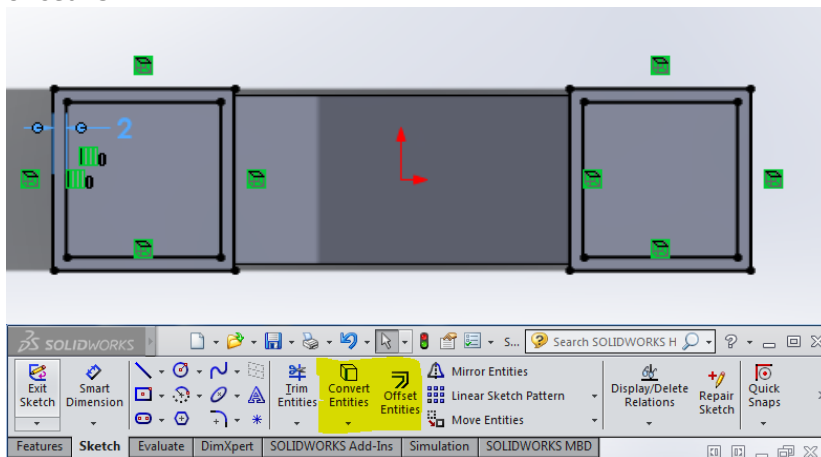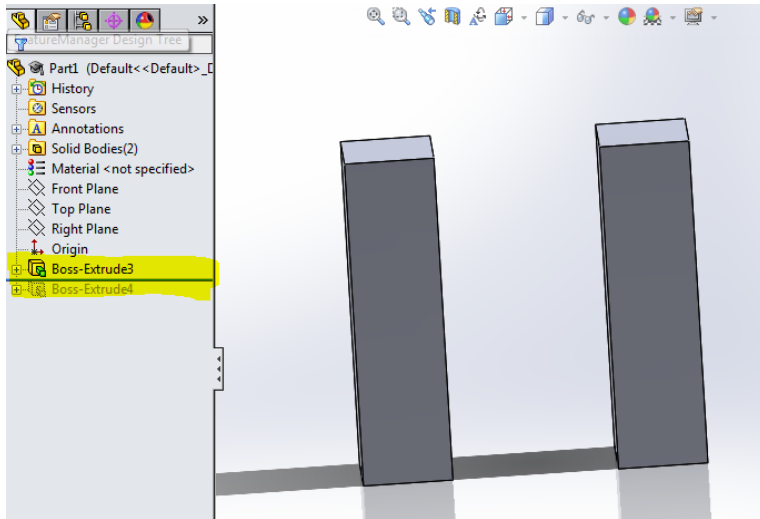
As you can see, doing this causes a gap between the pillars. One way to fix this would be to create the connection after making the final cut. In this example, that would be an easy solution. However in more complex parts, it is not always that easy.
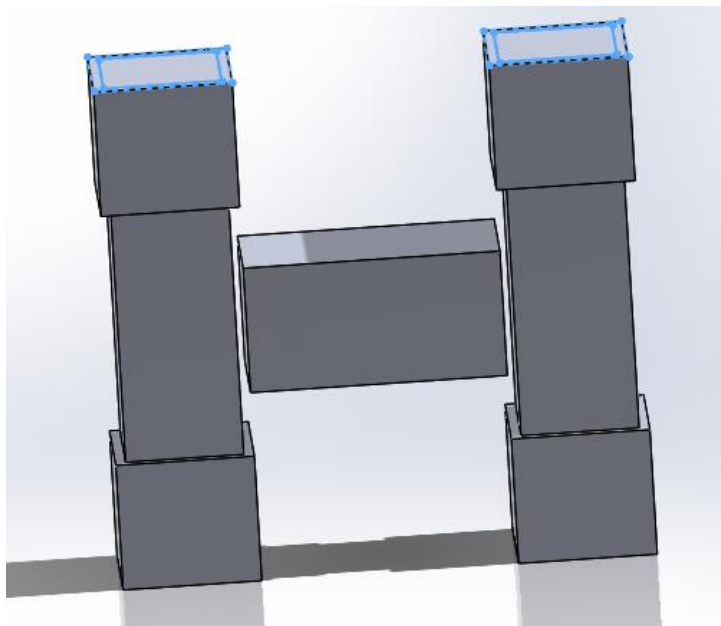

Next, delete the last cut you made (Feature and sketch). Use the roll back bar to move up the design tree as shown.

Now with the roll back bar as shown, sketch the cut you made before. Here is the drawing in case you forgot. Again, use the convert entities and offset entities features. Go ahead and make the cut again.
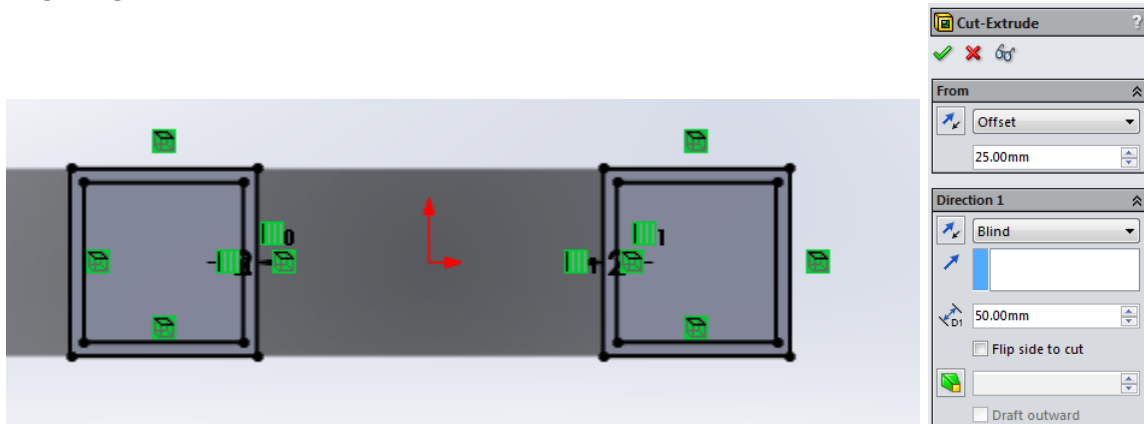
As you can see, we were able to place a feature higher up in the design tree by using the roll back bar.
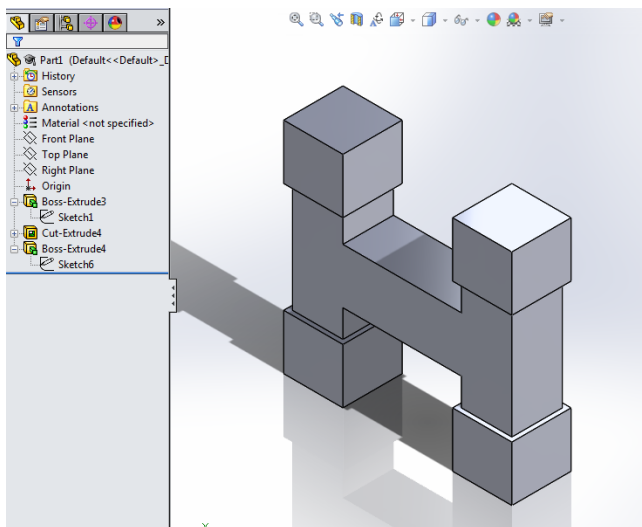
Christian's notes with commentary

Test One:

This was the first part that they have you build (from drawings). Quite a few of the dimensions on the drawings are given as letters and the values are given later in the problem. The lettered dimensions are the ones that will be changing in the subsequent problems so make sure that you use design tables, global variables or some other way to keep track of all of the changing numbers.

Something that needs to be taken into account in this problem is where you place your origin. Take an extra minute to look through the drawings and select a good origin. This will reduce the number of dimensions and construction lines that are needed and save a lot of time.
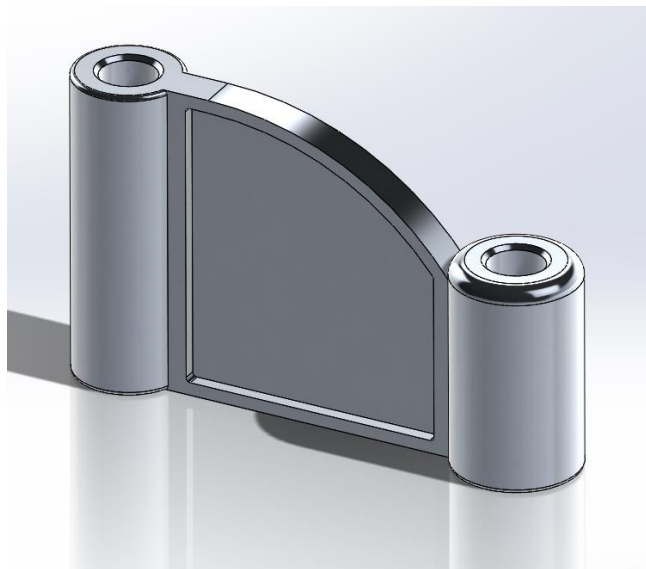
The second question just had you change all of the lettered dimensions so if you have them set up right (global variables!) this problem will only take 30 seconds.

The third question has you add some cutouts and extrusions noted in the drawings as well as change the lettered dimensions.

The fourth question has you change the lettered dimensions again.

The fifth and six questions follow the same pattern with adding more details and then changing the lettered dimensions.

These questions are the trickiest on the part. I recommend knowing how to work with the rollback bar to create features earlier on the design tree. Doing this will make this problem significantly easier.
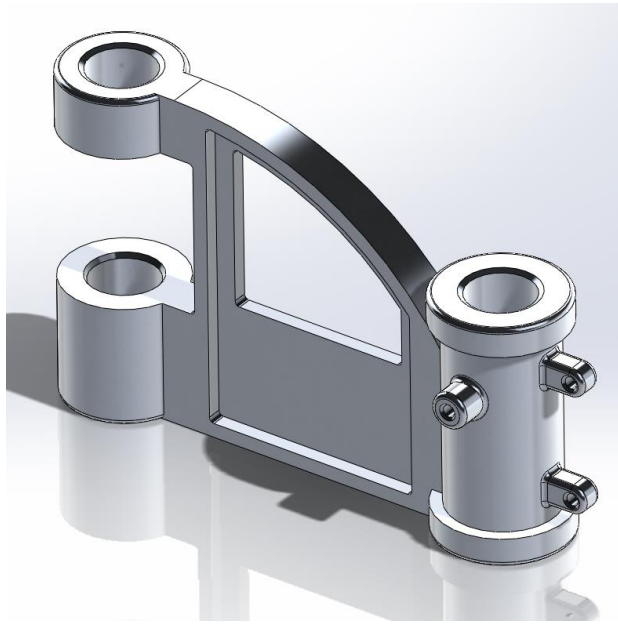
You do need to be fairly quick with your modeling. I rushed through the test and I barely had enough

Here are all of the websites that I looked through as prep for the exam. I found them to be very helpful.

- http://solidwize.com/passing-cswp/
- http://www.3dengr.com/2009/10/cswp-preparation.html
- http://www.design-point.com/media/152467/Tips_And_Tricks_To_Prep_For_The_CSWP.pdf
- http://www.hawkridgesys.com/blog/solidworks-cswp-top-10-speed-moves/
- http://www.gwlearning.com/CAD/9781605253343/student/resourceCenter/PDF/CSWA_Exam_Practice_Questions.pdf

Review for the CSWP Exam Part 1 (Chris Fraser and Jacquelin Remaley)

This portion of the exam is almost exactly like the part creation section of the CSWA. In essence, you are given a basic part and asked to modify its features and existing dimensions, taking masses along the way.

The key thing to remember here is that your gut instinct on how to create the part may work when you have unlimited time, but here you only have 90 minutes. You need to seriously think about the order of the features you create and how they relate to ease of construction later. Take a look at all the future edits to the part you will do, consider how those would be easiest to edit, and create the initial part accordingly.

General tips:

- Include all global variables from the beginning. Create one, then go into 'Manage Equations,' and create them all, so referencing them is easier.
- When referencing a variable, use correct syntax. **="A"** is different from **"A".** Using the equal sign tells Solidworks to reference that variable name forever, while no equals sign tells it to grab that dimension once, and never again. Changing the dimensions after this won't change the value if no equals sign is used.
- Take advantage of extruded cuts to remove material all at once.
- The rollback bar is your friend! You can rollback to before an extruded cut is made, create another feature, and move the bar back down, unsuppressing everything. The cut will also affect the feature you just created.
- Leave fillets and chamfers till the end, unless they can be used in a mirror feature or other cut. When adding fillets, use the features fillet, not the sketch fillets, you will get an incorrect mass if you use the sketch fillet.
- Offset entities is handy when you need the offset of an entire face.
- Save the part you use on every question as a separate part, even if you only changed the values of the variables.

The following pages contain drawing images and questions similar to the ones on the exam. If you can complete these, you should do just fine with plenty of time to spare.

Question 1
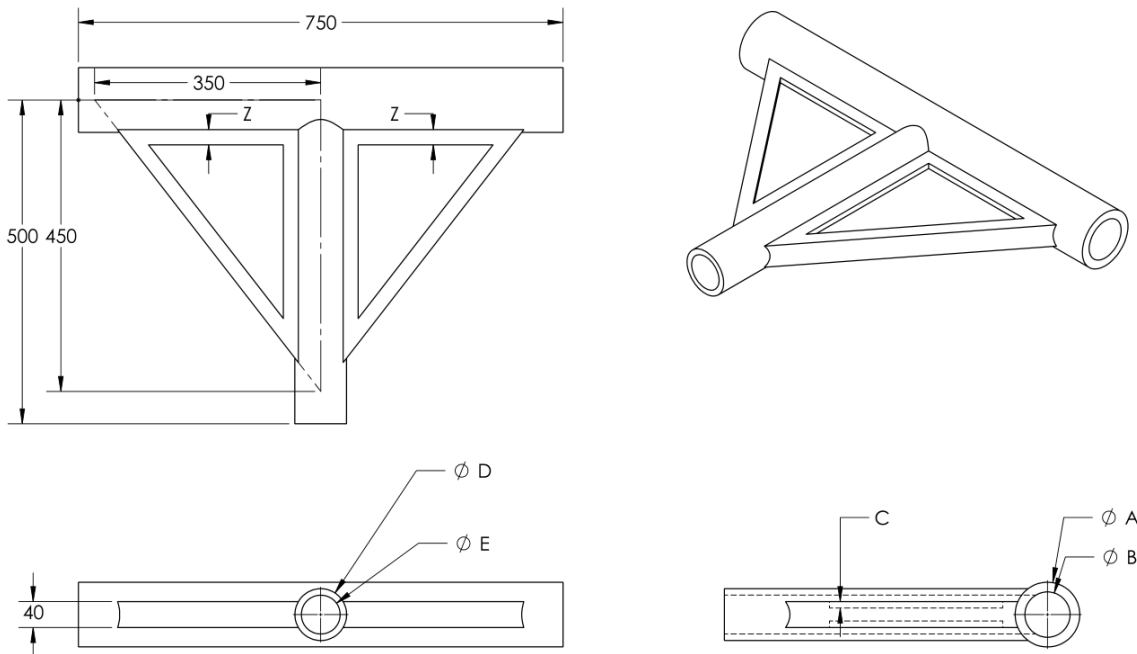
Create the part in Solidworks, using the following values for the given variables. Use the unit system MMGS, and Alloy Steel (density = 7700 kg/m^3). The cutouts on the webs are on both sides (there should be 4 total).

A = 100
B = 70
C = 10
D = 80
E = 60
Z = (C+E)/3

What is the mass of the part in grams?

    a) 6702.59
    b) 26207.45
    c) 53501.76
    d) 51609.93

Question 2

Modify the part to have the dimensions given.

A = 110
B = 73
C = 11
D = 88
E = 60
Z = (C+E)/3

What is the new mass of the part?

    a) 51609.93
    b) 60966.53
    c) 57760.08
    d) 55024.29

Question 3

Use the following drawing to make modifications to the existing part. Some dimensions are the same, and some have been changed. Use the values listed (in mm) for the variables in the drawing. All holes are thru unless listed otherwise. The center point of the Hole Wizard is coincident with the 90 degree corner of the triangular web.
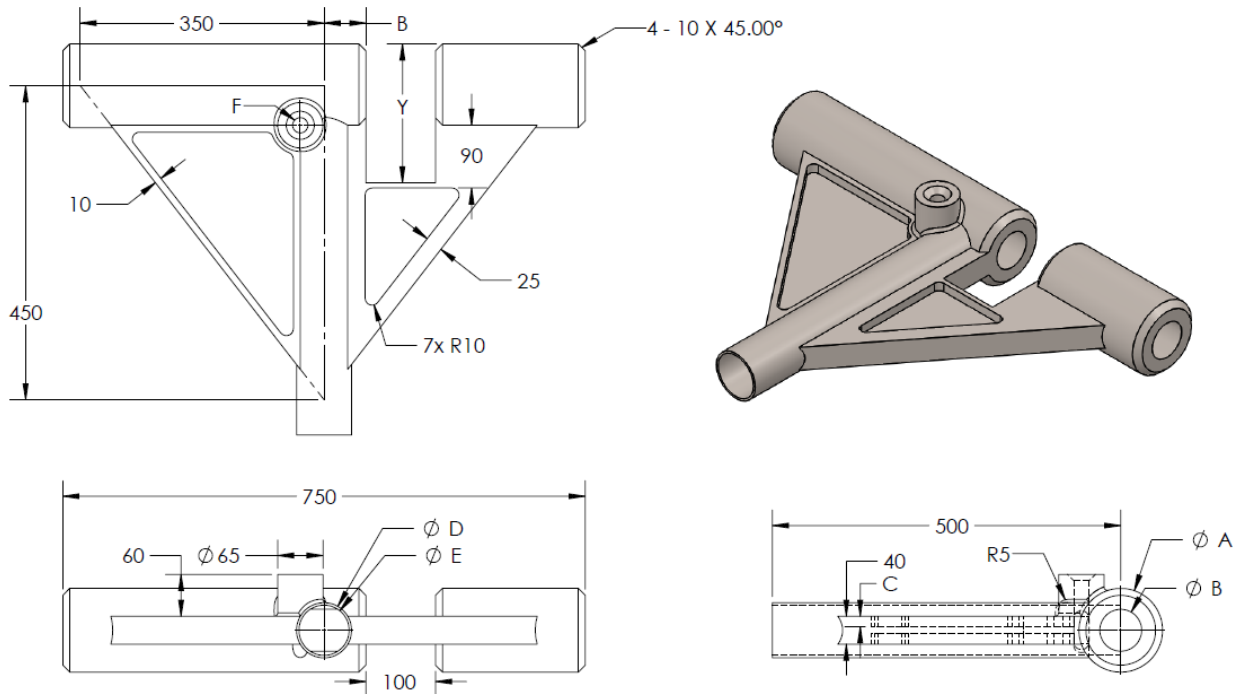
Material: Alloy Steel
A = 120
B = 60
C = 15
D = 79
E = 72
F = ANSI Metric Countersunk Head
       M20, Normal fit
       End condition: thru all
Y = A + D
Z = (C + E)/3

What is the mass of the part in grams?

    a) 56984.12
    b) 7633.30
    c) 58776.43
    d) 7856.37

Question 4

Use the following drawing to make modifications to the existing part. Some dimensions are the same, and some have been changed. Use the values listed (in mm) for the variables in the drawing. All holes are thru unless listed otherwise. Note the equation for Y has changed.
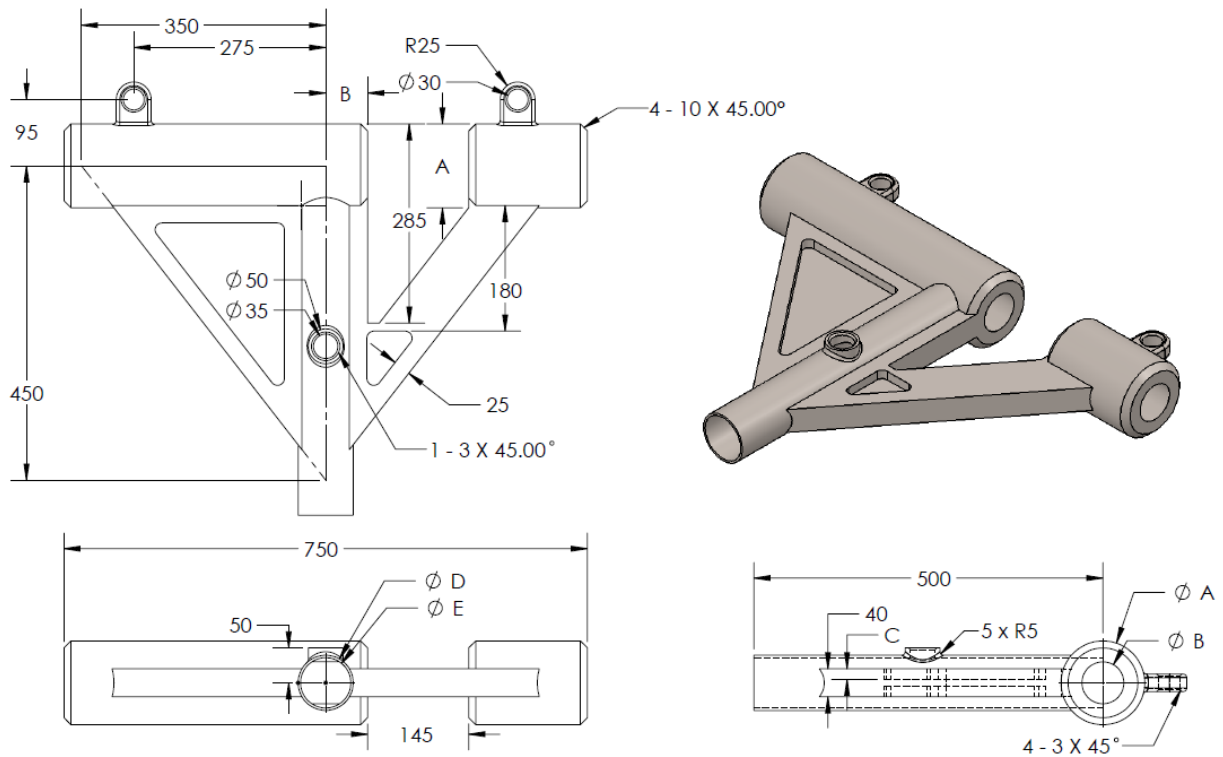
Material: Alloy Steel
A = 120
B = 60
C = 15
D = 79
E = 72
F = ANSI Metric Countersunk Head
        M20, Normal fit
        End condition: thru all
Y = (D-40)/2
Z = (C + E)/3

What is the mass of the part?

    a) 57152.62
    b) 59162.65
    c) 7683.46
    d) 57876.73

Question 5

Modify the part to have the dimensions given.

A = 125
B = 63
C = 18
D = 75
E = 72
Y = (D-40)/2
Z = (C + E)/3

What is the new mass of the part?

    a) 60438.79
    b) 60966.53
    c) 7849.19
    d) 58024.29

Answers:

1) D
2) B
3) C
4) B
5) A

The Part Files can be found:

Shared>>engineering>>Senior Design>>Course Folders>>ME 490>>CSWP Part 1

Timed Review Exam:

This website will walk you through the exam process and show you how to take the practice exam. https://www.solidworks.com/sw/docs/CSWPSampleExam.pdf

Go to https://solidworks.virtualtester.com/#home_button

Download the TesterPro Client

Open the Application and create an account or log in if you already have an account.

A list of tests should appear. Scroll to the bottom and find the CSWP segment 1 practice exam. You will be able to take this practice exam once for free.