

## CHECKSHEET FOR INITIALS ASSIGNMENT (HW6)

NAME: XXXXXXXXXX SECTION #: 1

27.5/30

### Part A. Pre-CAD Plan (submit doc/docx AND pdf for preliminary grading on Day 7)

- \_1\_ Ordered list of feature creation steps
  - \_5\_ Indicate sketch plane and position/orientation of origin (show **consistent** xyz coordinate system in all 2D and 3D sketches)
  - \_2\_ Identification/depiction of basic 2D shapes (2 pts)
  - \_1\_ Identification of key dimensions (attempting to minimize these)
  - \_2\_ Identification of key supporting relations (use SolidWorks icons) (2 pts)
  - \_1\_ Depictions of how/where you will use reference geometry
- Above and Beyond (Exemplary)**
- \_0\_ Exceptional organization and neatness
  - \_1\_ List/description of assumptions and potential roadblocks
  - \_ Other: \_\_\_\_\_

8.5/10

#### Deductions on 6A

- No cover page (-1)
  - Not a doc/docx file (-1)
  - Incorrect filename (-1)
- Use: HW6A\_firstname\_lastname

### Part B. Process Documentation

- \_1\_ Appropriate use of curvature/angled geometry in 2D sketches
  - \_2\_ Clear visualization of relations (2 pts)
  - \_1\_ Thoughtful/purposeful use of reference geometry
  - \_1\_ Details/rationale on implementation of SW features
  - \_1\_ Annotated design tree
  - \_1\_ Completed part properties custom tab
  - \_1\_ Compelling lessons learned
- Above and Beyond (Exemplary)**
- \_1\_ Exceptional organization and neatness
  - \_0\_ Sketches appear to be "powerful" (easily resized due to dimensions and relations)
  - \_ Other: \_\_\_\_\_

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### Part C. Products (based on finished model and drawing)

- \_2\_ Fully-defined sketches (2 pts)
  - \_2\_ Sufficiently complex solid model (2 pts)
  - \_1\_ Enhancements to appearance of solid model
  - \_1\_ Use of ME drawing template
  - \_1\_ Multiple, non-redundant views in 3<sup>rd</sup> Angle orientation
  - \_1\_ 6 general dimensions (size/position of letters)
- Above and Beyond (Exemplary)**
- \_1\_ Exceptional organization and neatness
  - \_1\_ Creative/complex design
  - \_ Other: \_\_\_\_\_

10/10

#### Deductions on 6B and 6C

- Not graded cover page from 6A submission (-2)
  - Not a .doc/.docx (-2)
  - Incorrect filename (-2)
- Use: HW6\_firstname\_lastname

## Pre-CAD Plan (1st Submission)

**Initial Assumptions:** This will be a 6-sided die. I am only showing the 2D sketch of the side with 6 (their should be hidden lines on the bottom side with its respective # but I didn't)

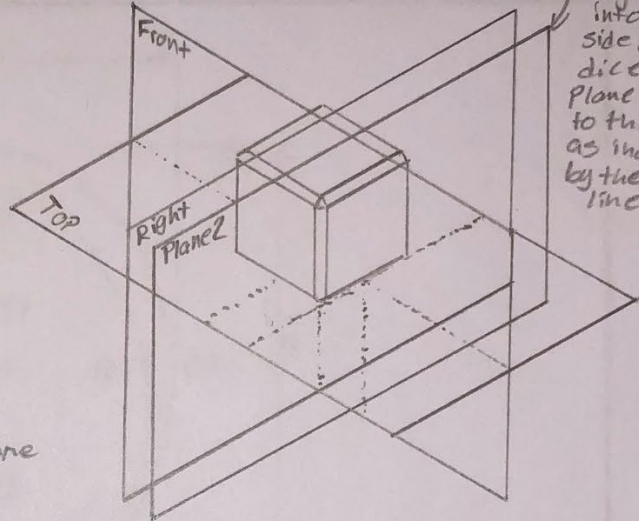
Have a dice lying around to confirm what that # should be.

This reference geometry Plane will be the #1 side of the dice where

**Bulleted Feature Creation Steps (Ex: 1. Top plane Extrude Boss; 2. Right plane Revolve Cut; 3. Face Chamfer; 4. Pattern; 5. Mirror about new Plane 1):**

My initials will be engraved into the side of the dice, this plane is flush to the side as indicated by the dotted lines.

1. TOP Plane Extrude Boss
2. Extrude cut (TOP Plane)
3. dome (TOP Plane)
4. Fillet (All faces)
5. Extrud cut (Plane 2)
- 6.



### More Details on Primary Features

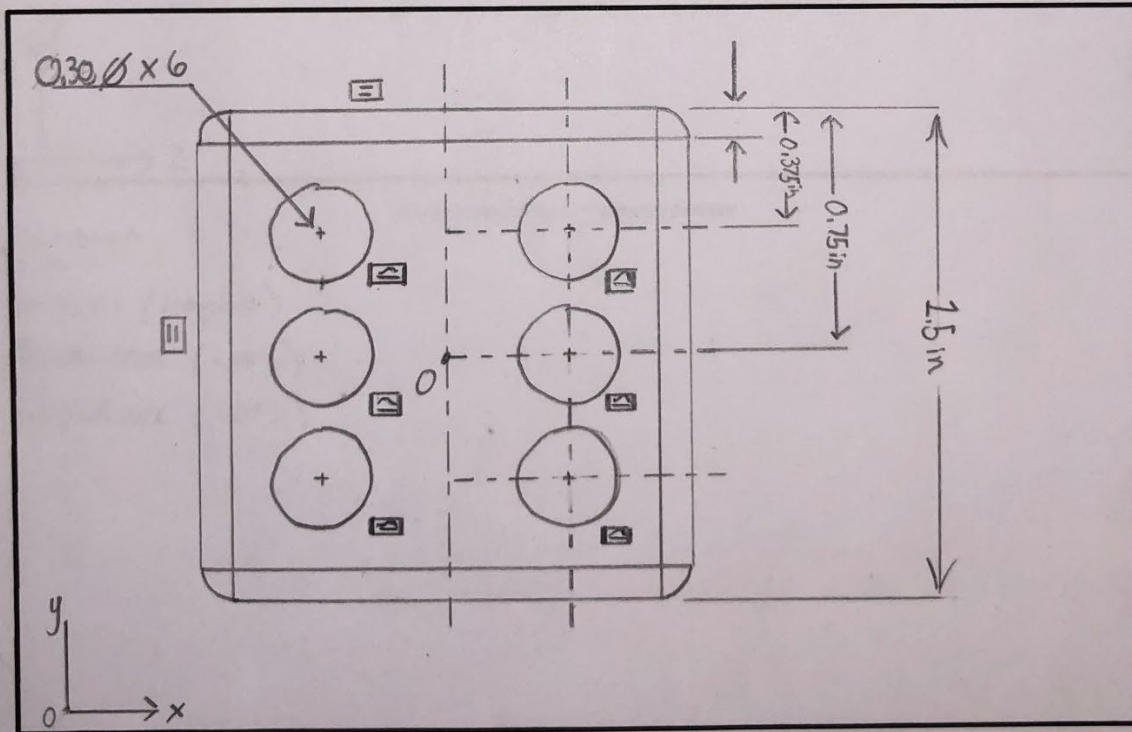
From Step (#): 3

Sketch Plane: TOP Plane

3D Feature type: Extrude (Boss and cut) (+) done

Key Feature Details (dimensions/end conditions):

Equal relations, 1.5 by 1.5, circles are extrude cut to then apply dome tool.



0 = Origin

2D Sketch(es) from 1st primary feature

### Tools needed

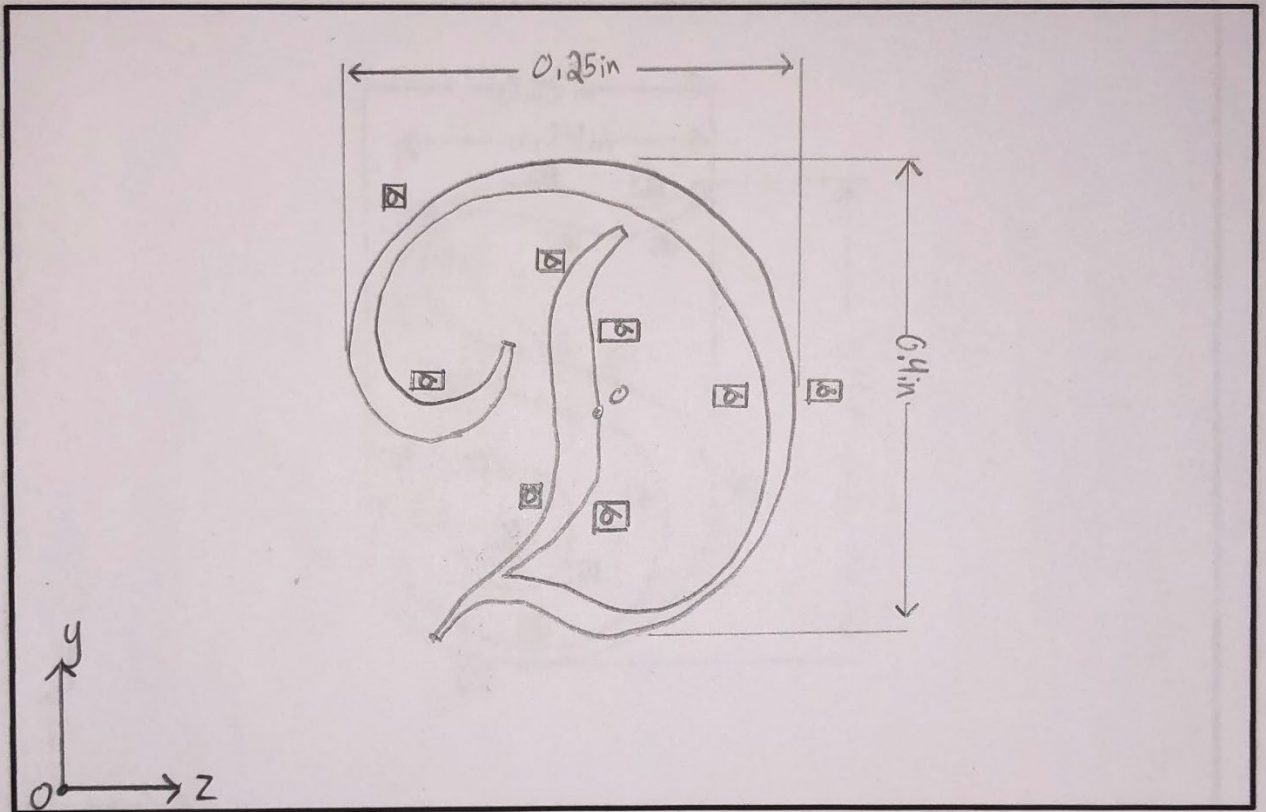
- 1.) Center rectangle tool
- 2.) construction lines
- 3.) circle tool
- 4.) mirror entities tool
- 5.) extrude boss/base
- 6.) Fillet
- 7.) Extrude cut
- 8.) Dome

From Step (#): 5

Sketch Plane: Plane 2

3D Feature type: Extrude cut

Key Feature Details (dimensions/end conditions): Extrude cut  $\approx$  0.1 inches into Plane



2D Sketch(es) from 2<sup>nd</sup> primary feature

Tools needed

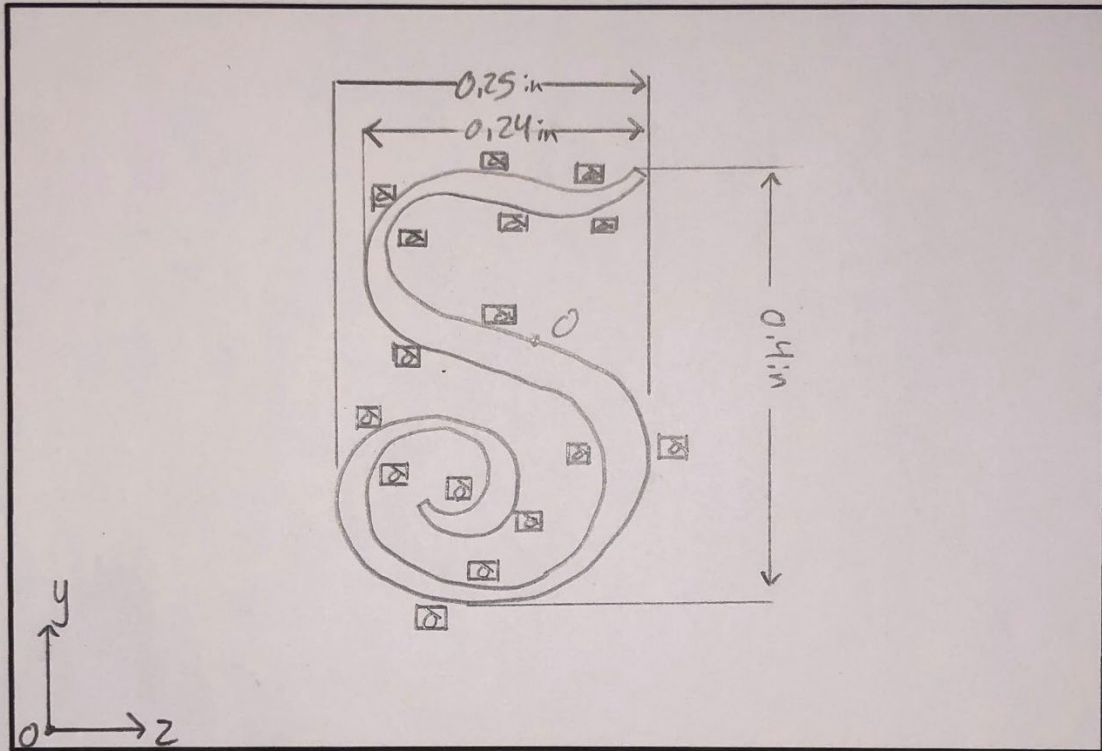
- 1.) Line tool (maybe)
- 2.) Spline tool (lots)
- 3.) 3-point arc (lots)

From Step (#): 5

Sketch Plane: Plane 2

3D Feature type: Extrude cut

Key Feature Details (dimensions/end conditions): Extrude cut  $\approx$  0.1 inches into Plane



Some tools as 2<sup>nd</sup> primary 2D Sketch(es) from 3<sup>rd</sup> primary feature

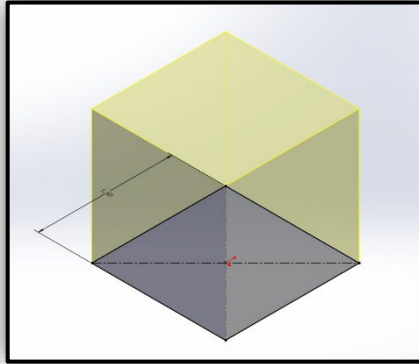
#### Potential Challenges:

- 1.) Drawing these shapes mostly with 3-point arcs & the spline tool may seem nice. However, it could make the overall letter after extruding to look "choppy" and not smooth.
- 2.) The complexity of the letters leaves lots of room for error when ensuring the sketch is fully defined. (Especially which I don't have on mine is radial curve dimensions),
- 3.) When engraving these small letters into dice it may be difficult to clearly see the initials (the point of the assignment) so I may have to consider other methods. Perhaps finding a way to wrap a letter into each domed circle (this would involve resizing my letters). That way I could alternate letters in each circle.

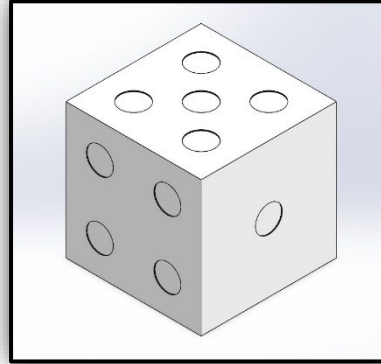
## Process Documentation

Steps of extrusion boss/cuts and dome feature. Just graphics of the dice making process the rest is about the initials

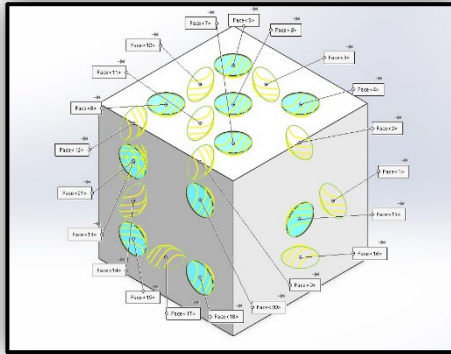
1



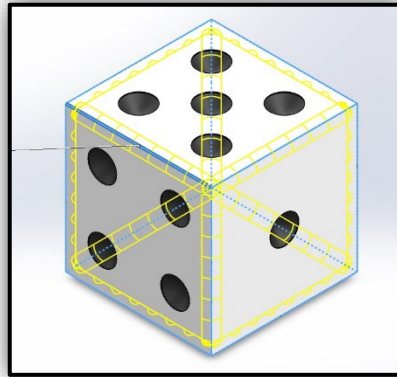
2



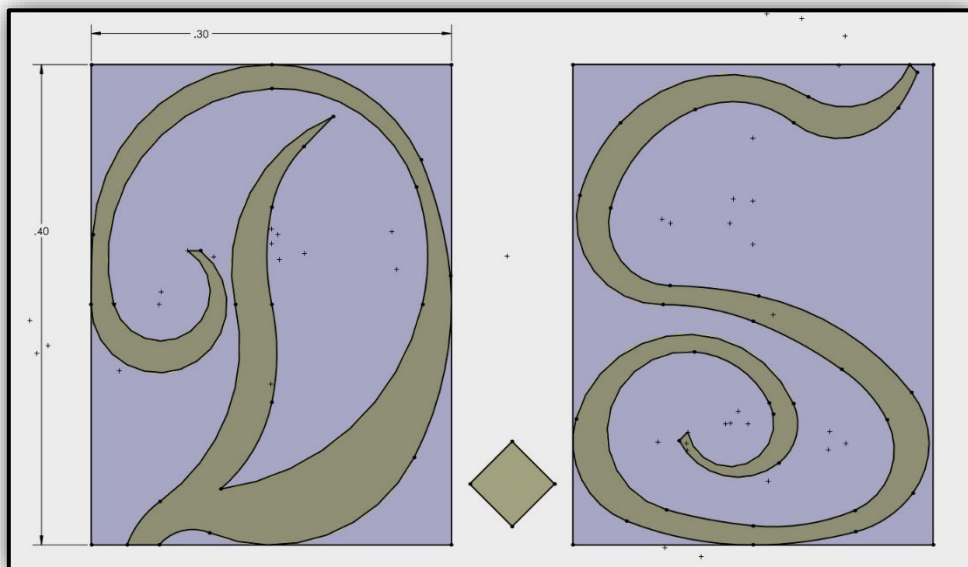
3



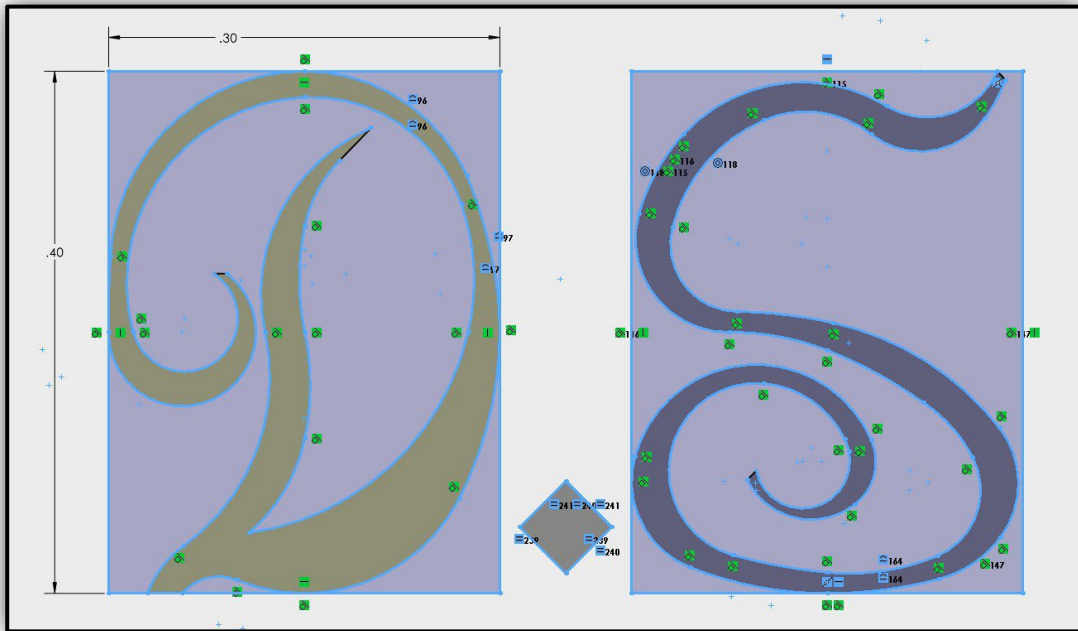
4



Appropriate use of curvature/angled geometry in 2D sketches

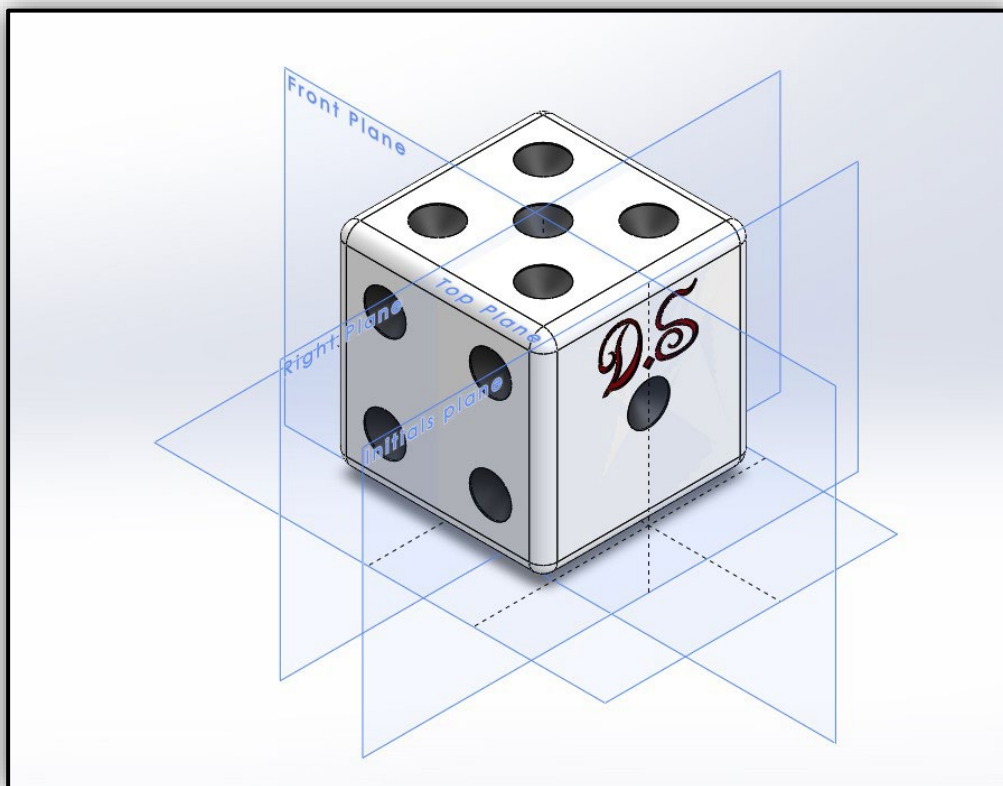


## Clear visualization of relations



## Thoughtful/purposeful use of reference geometry

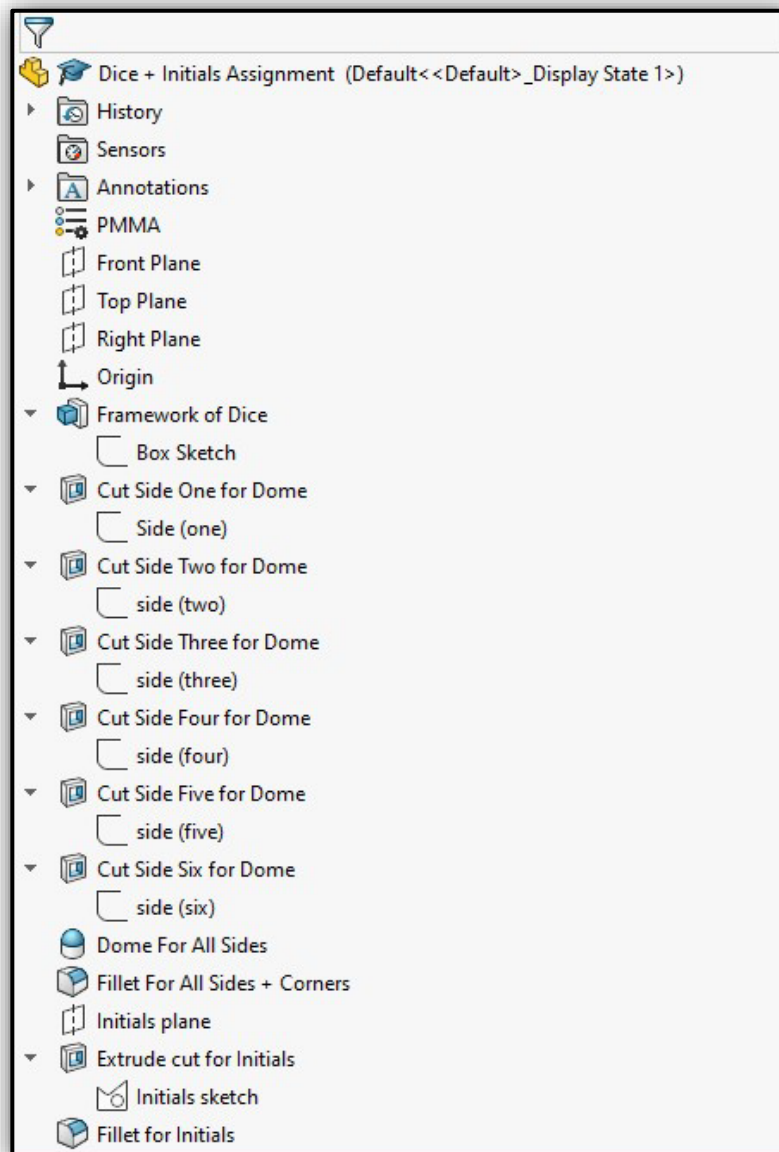
- I believe I purposefully used reference geometry by creating an additional plane on the right side (side one) that way I could sketch the initials and engrave them into the dice.



## Details/rationale on implementation of SW features

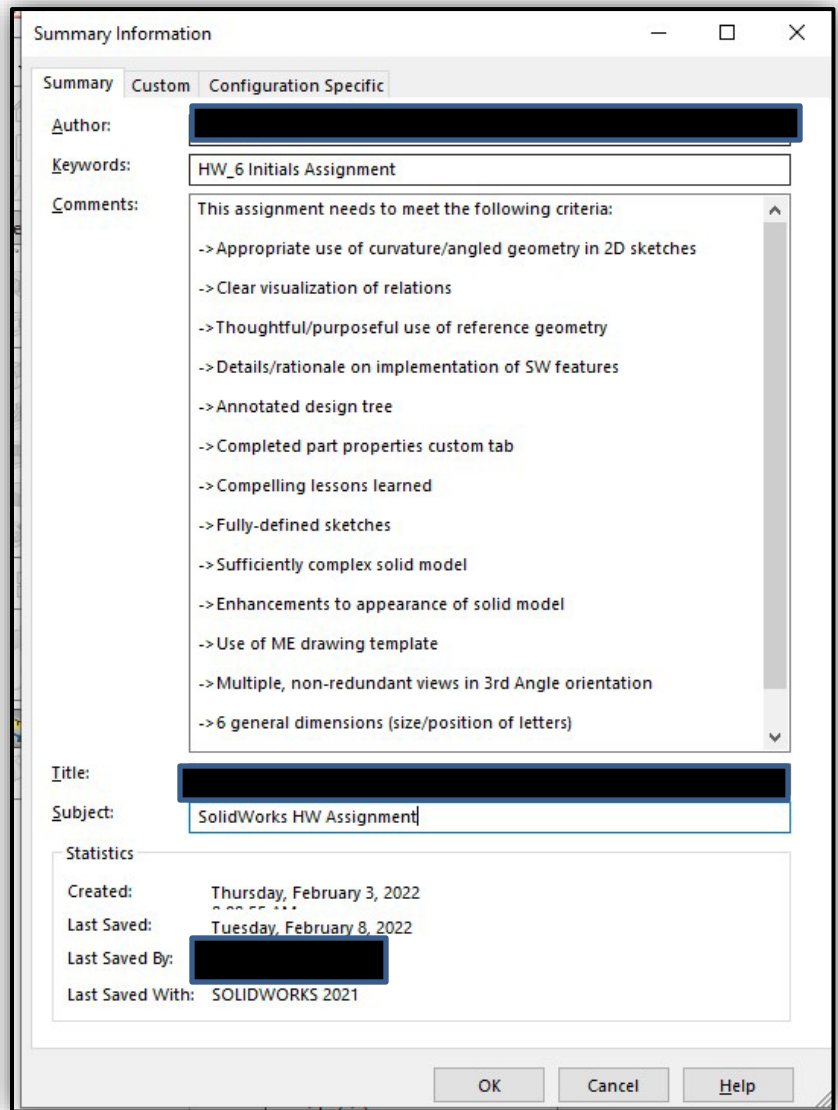
- I used Extrude boss to create the boxy shape of my dice
- I then used fillet to give my dice nice, curved corners/edges
- I then wanted to create the dimples that you see on a dice and that was done by using the dome feature
  - However, to use the dome feature you must first do a extrude cut of 0.01in (at least that is the only way it would work for me) and then used the dome tool to make the concave feature to each dot.
- I lastly used extrude cut and fillet to engrave my initials and create a rounded edge as they met the face.

## Annotated design tree



**Completed part properties  
custom tab**

Summary to the right and custom  
below



	Property Name	Type	Value / Text Expression	Evaluated Value	<input type="checkbox"/>	
1	Material	Text	"SW-Material@Dice + Initials Assignment.SLDPRT"	PMMA	<input type="checkbox"/>	
2	Quantity	Text	1	1	<input type="checkbox"/>	
3	Part No.	Text	01-00	01-00	<input type="checkbox"/>	
4	ModelDate	Date	2/9/2022	2/9/2022	<input type="checkbox"/>	
5	Description	Text	[REDACTED]		<input type="checkbox"/>	
6	DrawnBy	Text	[REDACTED]		<input type="checkbox"/>	
7	CheckedBy	Text	D.S	D.S	<input type="checkbox"/>	
8	Revision	Text	A	A	<input type="checkbox"/>	
9	Date	Text	2/9/2022	2/9/2022	<input type="checkbox"/>	
10	<Type a new property>				<input type="checkbox"/>	

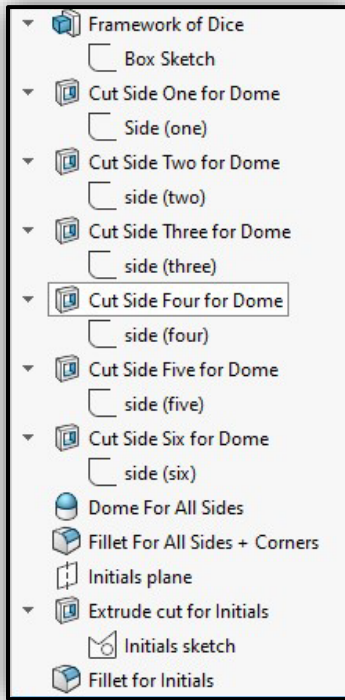


## lessons learned

1. When attempting to draw a sketch that contains many curves, I need to ensure that connecting arcs are tangent to one another. This is a great way to assure that your curves are “smooth”.
2. Using the spline feature is not a great option when you are trying to create a complex curved shape as it will sometimes make a “wonky” or not a “smooth” sketch.
3. When filleting a very small sketch I need to ensure that I make sure that I have a closed loop and that the sizing does not make it the fillets overlap each other and break the sketch.
4. Using the fixed relationship helps a lot when trouble shooting what is wrong or when making something tangent to another curve, but you don’t want to affect a certain curve. By setting a fixed relation it will ensure it does not get altered because of other curves relations
5. How to change the appearance of certain aspects of the part. For instance, my dots are black, and the initials are red.
6. Not a lesson about drawing or features, but I learned that not all graphic cards support Real View Graphics so that was good to find out.

## Final Products

**Fully defined sketches** (also shown above but no (-) by any sketches)



**Sufficiently complex solid model & Enhancements to appearance of solid model**



**Use of ME drawing template & Multiple, non-redundant views in 3rd Angle orientation with at least 6 general dimensions (size/position of letters)**

