MECH 311: Design Intent Exercise 2

Create a rectangular, flat "mounting plate" with additional features per the following instructions:

- Name your document **FerrisID M19 Design Intent 2 with Variables**, i.e. "bradyb M19 Design Intent 2 with Variables"
- Create variables with the following starting values and use the variables when dimensioning sketches to meet design intent:
  - Width = 200mm
  - Height = 150mm
  - Thickness = 20mm
- Orient the part such that the 200mm by 150mm face of the plate faces forward with the 200mm long edge horizontal
- Place the origin of the part at the center, front of the plate
- Make the 200mm and 150mm dimensions symmetric about the center of the rectangle
- Create a length variable named "hex_size" and set the value to 50mm
- Add an extruded hexagon that is #hex_size across the flats that is located at the center of the front face of the plate. The hexagon must project forward from the plate 1.5 times the plate thickness (use variables). Orient the hexagon such that two of the flats are parallel to the 200mm edges.
- Add an M20x2.0 tapped hole completely thru the hex and plate (starting at the end of the hexagon) that is centered on the hexagon
- Add a 5mm by 5mm chamfer around the base of the hexagon (where it meets the flat plate) so that it looks like the hexagon is welded to the plate
- Add four round bosses (protrusions) on the back of the plate (opposite side of the hexagon) whose diameters are equal to 1.5 times the plate thickness (use variable). The thickness of each boss should be half the plate thickness (use variables).
  - Locate the first boss relative to the upper, left corner (as seen from the front of the part)
  - Location should be equal to the plate thickness from the corner in each direction to the center of the boss (use variables)
  - Use a feature pattern for the remaining bosses
    - Plate width minus 2 times plate thickness in the horizontal direction (use variables)
    - Plate height minus 2 times plate thickness in the vertical direction (use variables)
  - Include the following features in your pattern so that they appear with every boss:
    - A countersunk clearance hole from the front of the plate for an M10 fastener. The hole and thread must go completely thru the part. The center of the holes should coincide with the center of the first boss (use existing geometry)

- - Add a 3mm radius fillets around the base of the round boss where the boss meets the surface of the plate
    - Add a 2mm by 2mm chamfer on the outer edge of the free end of the boss
- Round the four 20mm long edges of the plate with a radius that is equal to ¾ the plate thickness (use variables)
- Add an M8x1.25 threaded hole completely thru the hexagon starting from the surface that faces up
  - Locate the hole from the free end of the hexagon ¾ of the plate thickness (use variables) and center it across the width of the flat
  - The hole axis must be vertically oriented
- Rename the part studio and part as "Mounting Plate"
- Assign the material as Steel
- Check mass/volume properties of the initial design: 5.208kg, 663,390mm^3
- Create a configuration table that includes the as-designed part as the default and two others with different widths, heights, thicknesses, and hex sizes.
  - Rename the default configuration as "200x150x20 with 50 hex"
  - Use the same naming pattern for your additional two parts
  - Make sure other features such as fillets and chamfers don't break. If they do, use different values for the variables
  - Set each configured part have to a different appearance using the "Configured part properties" tab in the configuration panel
- Insert one of each configured part into the Assembly tab

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