

# AIM Thermal Stresses in a Bar - Geometry

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## Problem Specification

1. Pre-Analysis & Start-Up
2. Geometry
3. Mesh
4. Physics Setup
5. Results
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## Geometry

### Draw Geometry

Click on the **Z-axis** on the compass in the bottom left corner of the screen to look at only the XY-plane. Right click in the empty white space, choose **Select New Sketch Plane**, and left click on the grid that appears, so that the plane we are sketching on will be on the XY-plane. Choose the **Rectangle** drawing tool in the **Sketch** subgroup of the **Design** Tab and click on **Define rectangle from center** at the left. Select the origin and drag out the rectangle until it is the correct size, or dimension the rectangle using the highlighted boxes, pictured below, that appear as you are making the rectangle.

### Create Bar

Once the correct bar height and width are inputted as 0.1m, use the **Pull** feature in the **Edit** subgroup and extrude the bar to 5 meters.

### Edit for 3D Accuracy

Because the problem is symmetric, we can save computation time and memory by simulation a quarter cross-section. The easiest way to do this is to cut the bar into a quarter and further down the line set constraints on the cut sides. Select the top and bottom faces of the bar and press **Plane** in the **Create** section of the toolbar. Repeat with the sides of the bar.

Use the **Split Body** tool to get rid of the the unwanted portions of the bar until we have a quarter. When using the **Split Body** tool, select the body in question, then the plane to split the body, then one side of the body to be deleted. Repeat this until there is only a quarter bar left.

### Go to Step 3: Mesh

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