EGR 140 - Statics
File: N140T4C
Summer 2009

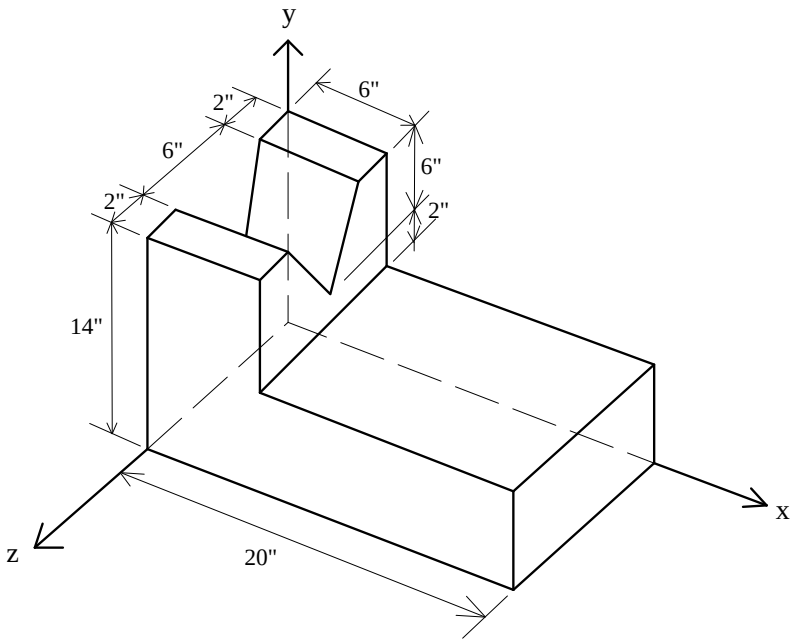
TEST #4

(Take-home Test)

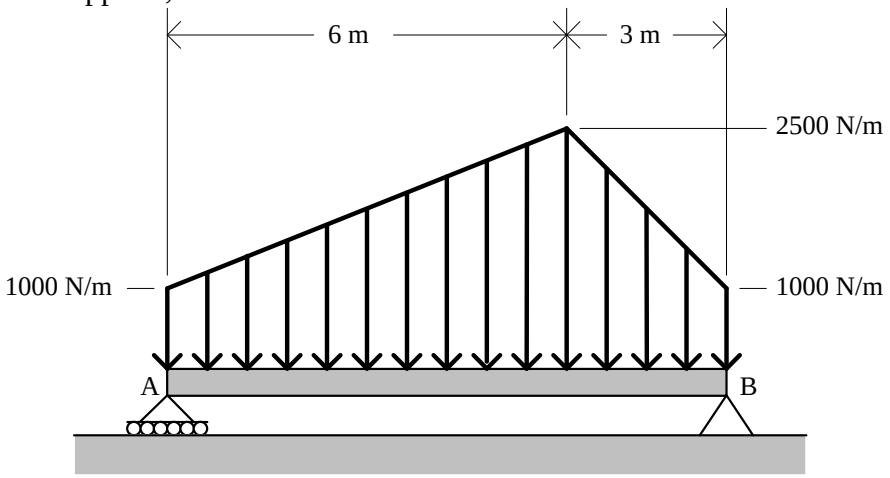
Instructions:

1. This is an open-book, open-notes test. Any books are allowable.
2. Problems should be presented neatly on separate paper with clear solutions.
3. The test must be your own work. You may neither give nor receive help of any kind from any person. Include a final page with a signed pledge stating the following:
   "I pledge that I have neither given help to any other person nor received help on the test from any other person."
4. The test will not be accepted late except in case of emergency (and timely notification).

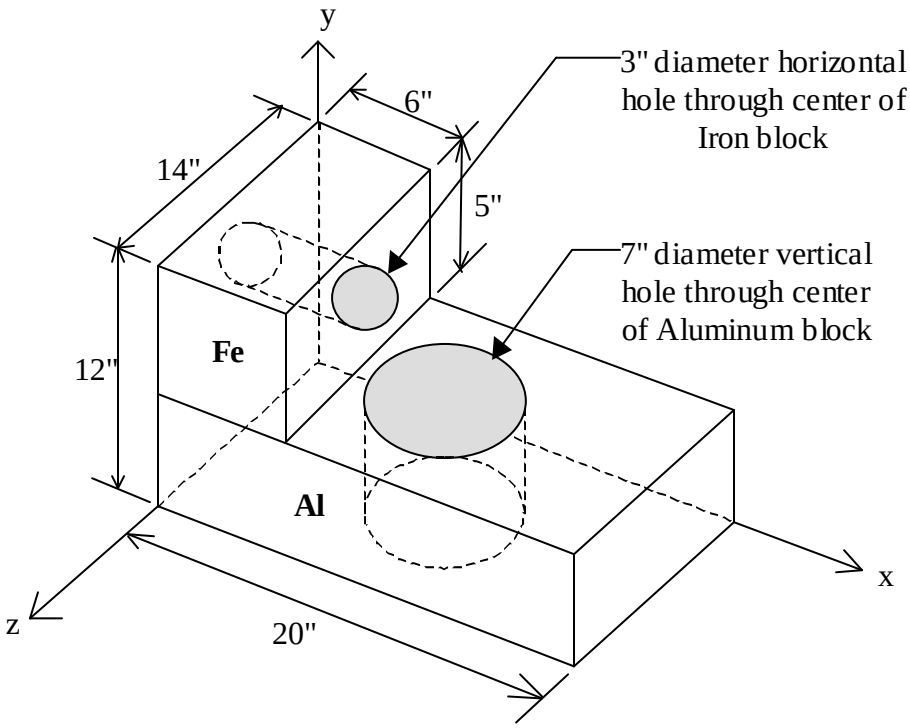
1. (17 points) Find the centroid of the volume shown below.



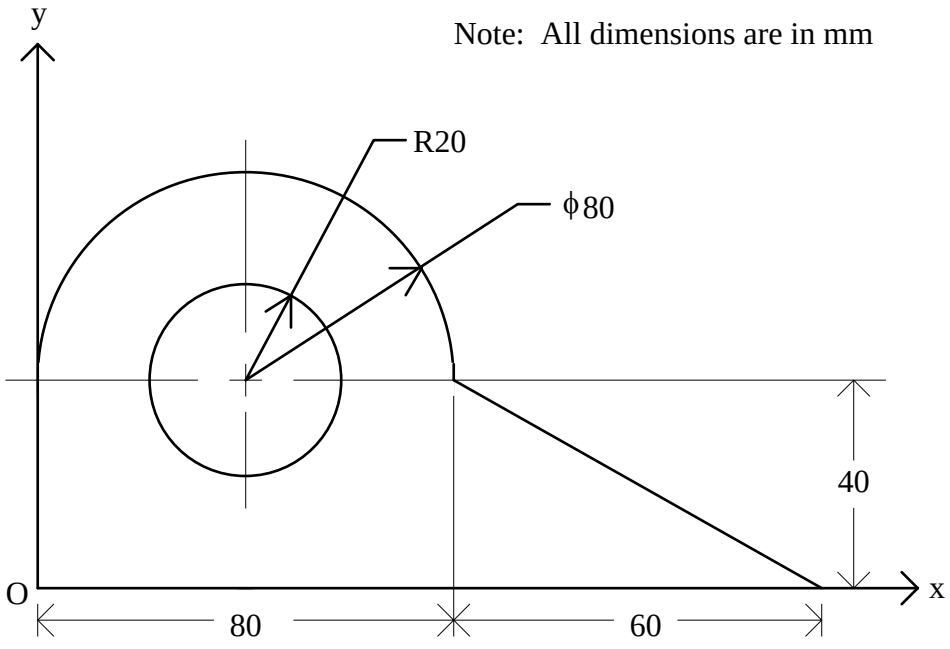
2. (15 points) The beam shown below bears a distributed load as indicated. Determine the reactions at the supports, A and B.



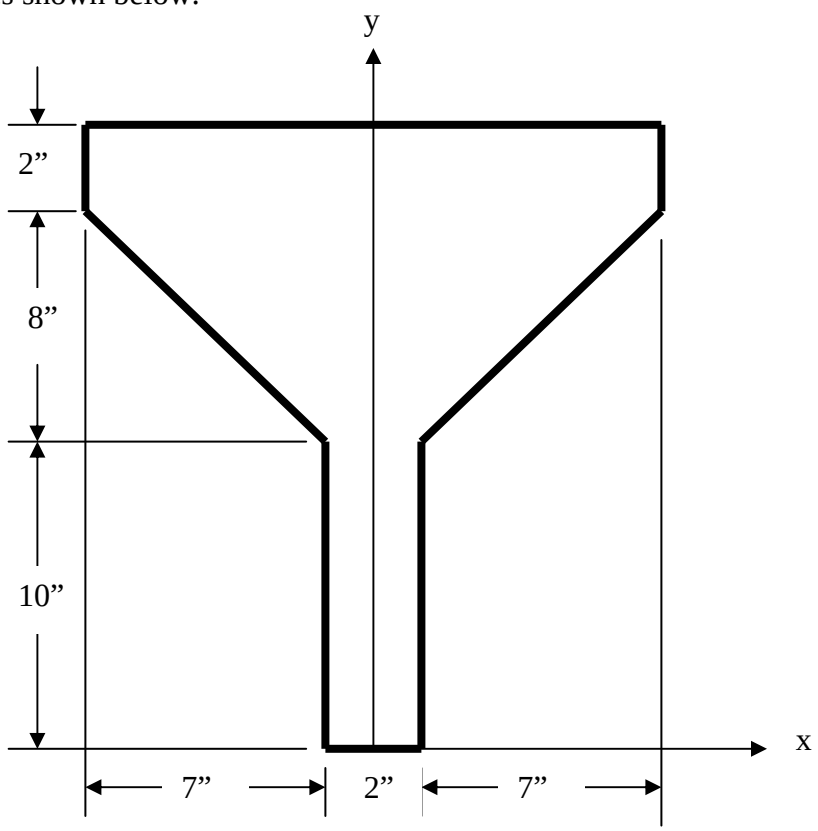
3. (17 points) The object below consists of an aluminum base supporting a block of iron. Locate the **<u>center of mass</u>** , $(\bar{x}, \bar{y}, \bar{z})$, of the object shown below (in inches). Assume that the mass density of iron is 7860 kg/m^3 and the mass density of aluminum is 2700 kg/m^3 (convert these quantities to slugs/in^3).



4. (17 points) Determine I_x and I_y for the object shown below with respect to the <u>centroidal axes</u> (i.e., find the centroid of the object first).



5. (17 points) Find the moments of inertia, I_x and I_y , for the area shown below with respect to the x and y axes shown below.



6. (17 points) Determine $\bar{x}$, $\bar{y}$, I_x, I_y, k_x, and k_y using integration techniques for the area under the curve indicated below.