

# Worksheet 4

February 4, 2008

1. You are going to make a 1-foot by 12-foot piece of metal into a gutter by folding  $x$  inches from each side up to an angle  $\theta$ .
  - (a) Draw a picture.
  - (b) Express the volume of the gutter as a function of  $x$  and  $\theta$ .
2. For each of the following surfaces, draw 3 cross-sections parallel to the  $xy$ -plane, 3 parallel to the  $xz$ -plane, and 3 parallel to the  $yz$ -plane. Describe the cross-sections. Then sketch the surface.
  - (a)  $z = x^2 + y^2$
  - (b)  $z = \sqrt{x^2 + y^2}$
  - (c)  $z = y^2 - x^2$
  - (d)  $z = 2xy$

How are (c) and (d) related?