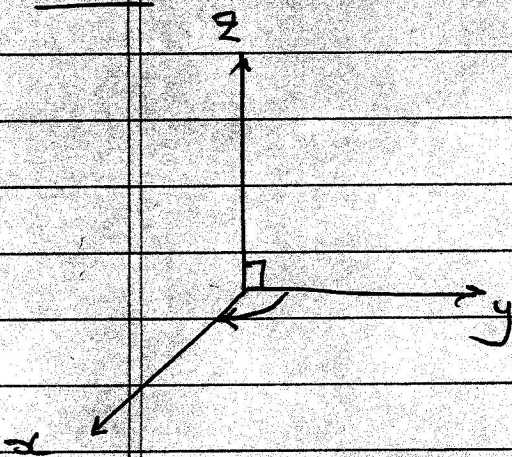


SURFACE SKETCHING PRIMER

HOW TO REPRESENT 3D OBJECTS ON A 2D PAGE

① AXES

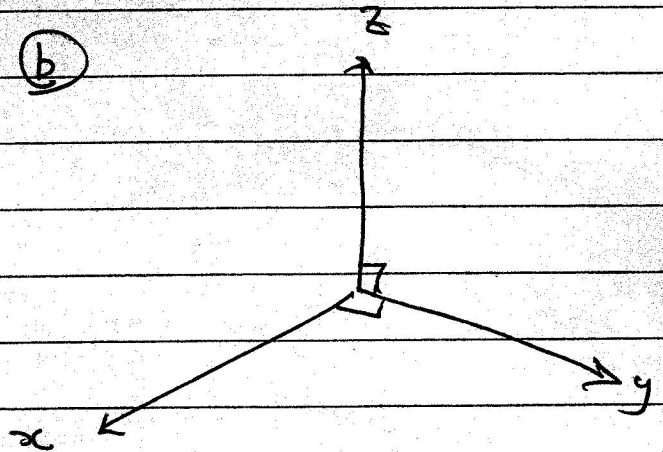
①



yz - PLANE in plane of page
 x - AXIS ROTATED left of outward perpendicular to page

OR

②



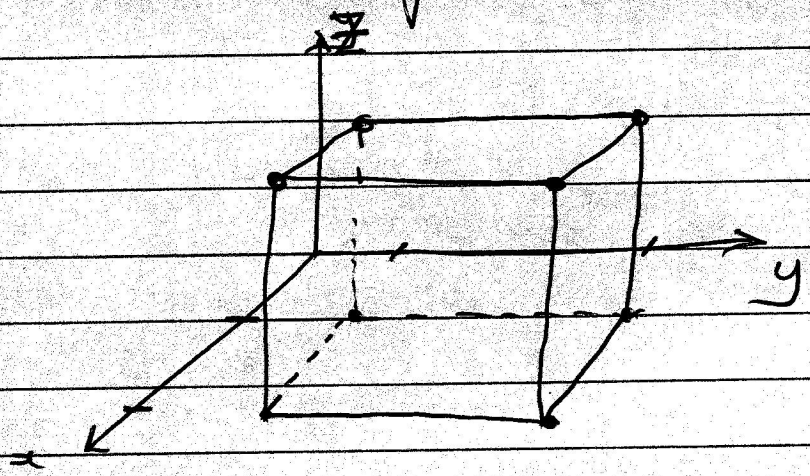
yz - PLANE rotated CLOCKWISE out of page.
 90° angle between x, y axes

② PRINCIPLES

* COMPARE TO ALEXANDER CALDER'S WIRE-FRAME SCULPTURES <http://calder.org/work/category/wiresculpture.html>

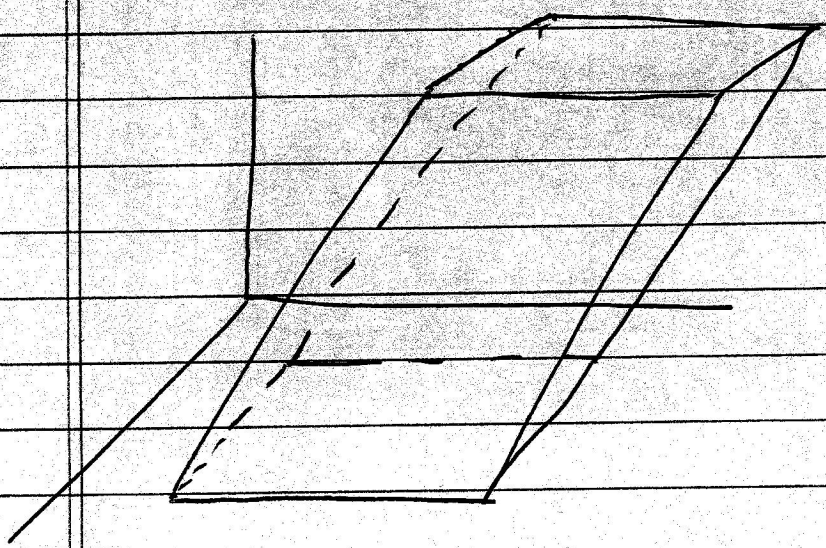
- * Visualize a surface by sketching well-chosen lines or curves that lie on its surface
- Parallel lines on surface should appear parallel in the sketch (This is different from perspective drawing)
- In many cases, 2 line segments with the same length on the surface should appear to have same length in the sketch
- Pick a viewing direction at about 30° from x to y axis and about 30° above the horizontal ($z=0$) plane
- After depths are shortened compared to heights and breadth
- Ocluded (Hidden) curves are drawn with dashes

3) Box with sides parallel to coordinate planes



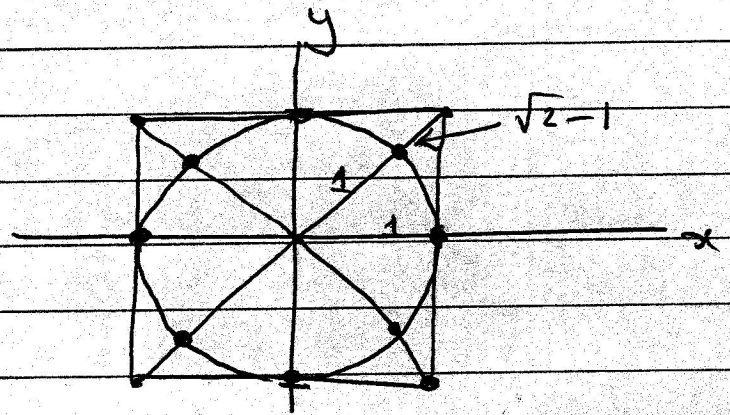
Rectangular Faces

4) PARALLELEPIPED (SKEWED BOX)



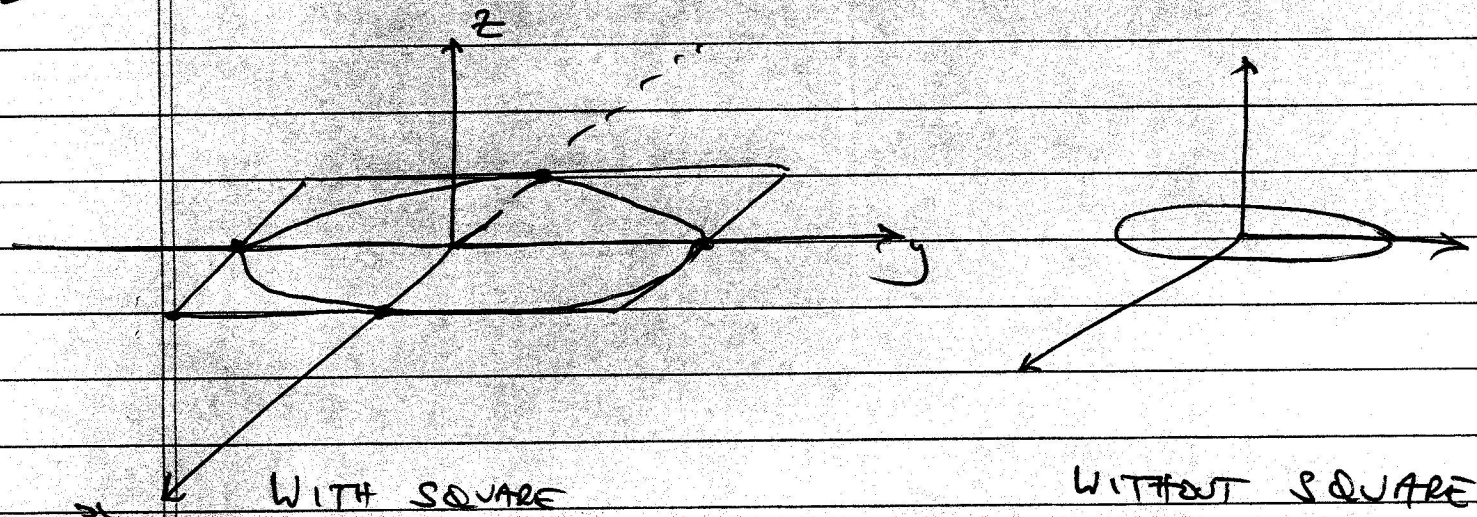
Rectangular top + bottom.
Sides are parallelogram

5) CIRCLE IN SQUARE IN \mathbb{R}^2



LOOKING
STRAIGHT DOWN
+ Z AXIS

6) CIRCLE IN SQUARE IN xy-PLANE OF \mathbb{R}^3 .



SINCE VIEWPOINT IS FRONT + ABOVE + RIGHT OF ORIGIN
 DEPTH IS SHORTENED, SQUARE BECOMES A RECTANGLE WHICH
 APPEARS AS ~~RECTANGLE~~ PARALLELOGRAM (SINCE ANGLE
 BETWEEN x, y AXES APPEARS $> 90^\circ$).
 SO CIRCLE BECOMES ELLIPSE.

7) SPHERE depicted using 2 or 3 great circles in coordinate planes.

