Lab 1 60 pts total

1 Measure the strikes and dips of **4** of the planes in the HIG courtyard, and write them in the table below. Use degrees, not quadrants, for the strikes, and use a right-hand rule. (**20 points total for 4 planes**)

Scoring: Strikes: 2 pts/plane if within 3°, 1 pt if within 8°

Dips: 2 pts/plane if within 3°, 1 pt if within 8°

2 Determine the trend and plunge of the pole to each of the four planes in step 1, and write them in the table below. (**8 points total for 4 poles**)

Plane ID#	Strike (°) **(2 pts/box)**	Dip (°) **(2 pts/box)**	Dip Direction (N,E,S,W) **(1 pt/box)**	Pole trend (°) **(1 pt/box)**	Pole plunge (°) **(1 pts/box)**

3 Plot the attitudes of the planes on the courtyard map. (**8 pts total for 4 symbols**)

Scoring: 1 pt/plane for correct symbol and orientation

1 pt/plane for correct location (± 1/2 box)

4 Measure the trends and plunges of **4** of the lines in the HIG courtyard, and write them in the table below. (**16 points total for 4 lines**)

Scoring: Trends: 2 pts/line if within 3°, 1 pt if within 8°; 1 pt for syntax

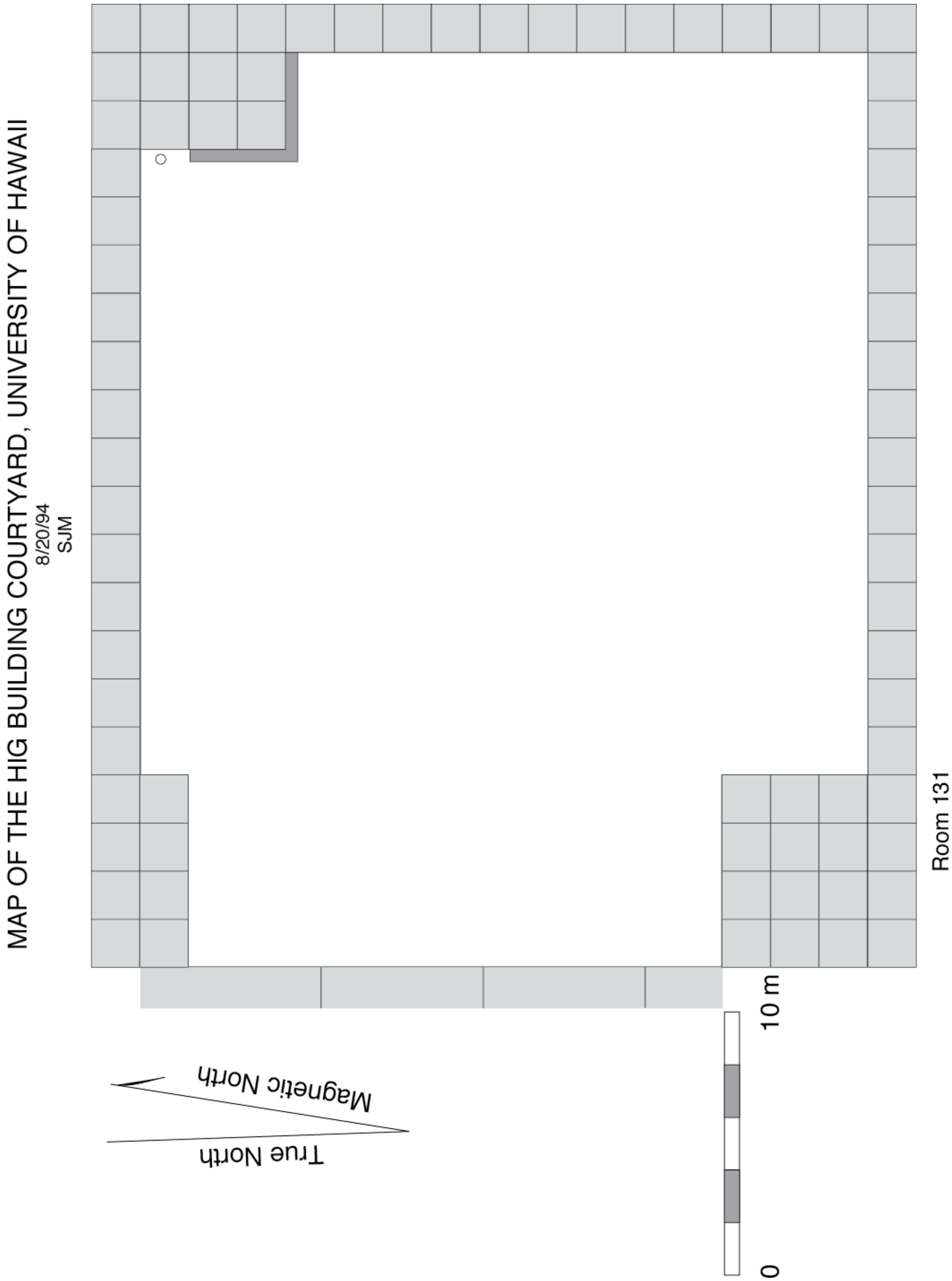
Plunges: 2 pts/line if within 3°, 1 pt if within 8°

Line ID #	Trend (°) **(2 pts/box)**	Plunge (°) **(2 pts/box)**

5 Plot the attitudes of the lines on the courtyard map. (**8 pts total for 4 symbols**)

Scoring: 1 pt/line for correct symbol and orientation

1 pt/line for correct location (± 1/2 box)


MAP OF THE HIG BUILDING COURTYARD, UNIVERSITY OF HAWAII
8/20/94
SJM
Room 131
Magnetic North
True North
0
10 m

Intersection of two lines (22 pts total)

1 Plot and label the following two lines on engineering paper, with 1 unit = 1cm **(2 pts)**

Line 1 $0x + 1y = 10$
Line 2 $1x + 1y = 15$

2 Circle and label the coordinates of the point where the lines intersect. **(2 pts)**

* Note that the point of intersection is the same as where the following three planes intersect:
Plane A $0x + 1y + 0z = 10$
Plane B $1x + 1y + 0z = 15$
Plane C $0x + 0y + 1z = 0$

3 Draw a normal from the origin to each line. Draw a right angle symbol where the normal to line 1 intersects line 1 and where the normal to line 2 intersects line 2. **(2 pts)**

4 Draw and label a unit normal vector that points from the origin to each line (the unit normal will have a length here of 1 cm). Put a neat arrowhead on each unit normal. Label the unit normal to line 1 as "n_1" and the normal to line 2 as "n_2". **(2 pts)**

5 Measure the distance in cm from the origin to each line (measure to the nearest 0.01 cm). The distance is positive if the normal points from the origin to the line. Label the distance from the origin to line 1 as "d_1". Label the distance from the origin to line 2 as "d_2". For a refresher on significant figures, see **http://lectureonline.cl.msu.edu/~mmp/applist/sigfig/sig.htm.** **(2 pts)**

Measured distance from origin to line 1 (d_1), in cm (to nearest 0.01 cm):

Measured distance from origin to line 2 (d_2), in cm (to nearest 0.01 cm):

6 Label and measure the angles between the normal to each line and the x- and y-axes (this is a total of four angles). For example, the angle between "the normal to line 1" and the x-axis is θ_{1x}. **(4 pts)**

$\boldsymbol{\theta}_{1x}$ $\boldsymbol{\theta}_{1y}$

$\boldsymbol{\theta}_{2x}$ $\boldsymbol{\theta}_{2y}$

7 Find the cosines of the angles between each line and the x- and y-axes (this is a total of four cosines). For example, the cosine of $\boldsymbol{\theta}_{1x}$ is n_{1x}. The x-component of n_1 equals n_{1x}, etc. **(4 pts)**

n_{1x} n_{1y}

n_{2x} n_{2y}

8 Write the equation of each line in the form below, filling in the values for the cosine terms and the distances d1 and d2 that you measured in step (5). **(2 pts)**

$n_{1x}\, x + n_{1y}\, y = d_1$

$n_{2x}\, x + n_{2y}\, y = d_2$

9 Using your answer for equations (8), solve for the coordinates of the point of where the lines intersect. **(2 pts)**

x = y =