Selected Problem Set 2

1. Give the explicit form of the 3 by 3 matrix representing the following transformation: Scaling by a factor of 2 in the $x$-direction and then rotating about $(2,1)$ by 30 degrees.

2. Find the affine transformation that maps the box with corners $(0,0), (2,1), (0,5)$ and $(-2,4)$ into the square with corners $(0,0), (1,0), (1,1)$ and $(0,1)$.

3. Build a transformation that rotates through 45 degrees, then scales in $x$ by 1.5 and in $y$ by -2, and then translates by $(3,5)$.

4. Show that two successive rotations by $\theta$ is the essentially the same as a rotation by $2\theta$.

5. Is the inverse of a shear transformation also a shear? Explain.