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### 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.