CS 418: Interactive Computer Graphics
In-class Worksheet 1: Affine Transformations (and other math...)

2D Geometry

For the following questions, assume we are working in 2D using homogenous coordinates.

1. Which of the following sets of transformations commute?
    a. A rotation and a uniform scaling
    b. A rotation and a squash (non-uniform scaling)
    c. A rotation and a translation
    d. Two translations

2. Create a single matrix that encodes the following transformations:
    a. Translate by +2 in X
    b. Scale by a factor of 4 uniformly

3. Imagine you had a line segment with endpoints (2,1) and (4,1). Can you construct a transformation matrix that will rotate the segment by 90 degrees around its midpoint?

4. Suppose a line is defined by the points (2,4) and (10,6). Write the equation in a parametric form.