## 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.