

## CS 230, Quiz 3

Name: \_\_\_\_\_ ID: \_\_\_\_\_

You will have 10 minutes to complete this quiz. No books, notes, or other aids are permitted.

### Problem 1 (3 points)

Clip the segment (in homogeneous coordinates) with endpoints  $A = (-4, 1, 3, 5)$  and  $B = (-2, 5, 3, 3)$ .

### Problem 2 (6 points)

Construct a  $3 \times 3$  matrix that performs each of the following 2D operations (in homogeneous coordinates). If no such matrix exists, explain why.

(a)  $(x, y) \rightarrow (y, x)$

$$(b) \ (x, y) \rightarrow (1 + \frac{1}{x}, \frac{y}{x})$$

$$(c) \ (x, y) \rightarrow (\frac{1}{x}, \frac{1}{y})$$

$$(d) \ (x, y) \rightarrow (\frac{y+1}{x+1}, 2)$$

$$(e) \ (x, y) \rightarrow (\frac{x}{x+y}, \frac{y}{x+y})$$

(f)  $(x, y) \rightarrow \left( \frac{ax+by+c}{rx+sy+t}, \frac{dx+ey+f}{rx+sy+t} \right)$ , for given constants  $a, b, c, d, e, f, r, s, t$ .