

Quiz #2 (CSE4190.410)

October 5, 2015 (Monday)

Name: _____ Dept: _____ ID No: _____

1. (10 points) A transformation from R^1 to R^1 sends 1 to 1; 2 to 2; and 3 to 7.
- (a) (5 points) What is the matrix representation of this transformation?
- (b) (3 points) This transformation sends t to $f(t)$. What is the representation of $f(t)$ as a linear rational function of t ?
- (c) (2 points) Which value of t goes to infinity under this transformation?

$$(a) \begin{bmatrix} A & B \\ C & 1 \end{bmatrix} \begin{bmatrix} t_i \\ 1 \end{bmatrix} = \begin{bmatrix} f_i \\ 1 \end{bmatrix}, \quad i=1, 2, 3$$

$$At_i + B = f_i (Ct_i + 1)$$

$$\begin{cases} A + B - C = 1 \\ 2A + B - 4C = 2 \\ 3A + B - 2C = 7 \end{cases} \Rightarrow \begin{cases} A - 3C = 1 \\ A - 11C = 5 \end{cases}$$

$$\therefore A = \frac{1}{7}, \quad C = -\frac{2}{7}, \quad B = \frac{4}{7}$$

$$\begin{bmatrix} 1 & 4 \\ -2 & 7 \end{bmatrix}$$

$$(b) f(t) = \frac{t+4}{-2t+7}$$

$$(c) t = \frac{7}{2}$$