

Score:

Name: Solutions
Period (circle one): 1 2 3 4 5 6
Team (circle one): a b c d e f

**SM365 – Numerical Computing – Quiz 5 – Section 3.4
Condition Numbers**

1. Find $\kappa(A)$ for $A = \begin{bmatrix} 1 & 3 & -1 & 2 \\ 4 & -2 & 0 & 1 \\ 2 & 1 & 1 & 1 \\ 1 & -1 & 3 & 0 \end{bmatrix}$. Use $\|\cdot\|_\infty$ in your calculations. You may most definitely use your TI200.

$$\|A\|_\infty = \max(7, 7, 6, 5) = 7$$

$$A^{-1} = \begin{bmatrix} -1/2 & 0 & 1 & -1/2 \\ -7/20 & -3/10 & 0 & -9/20 \\ 1/20 & -1/10 & 0 & -7/20 \\ 13/10 & 2/5 & -2 & 11/10 \end{bmatrix}$$

← TI 200!

$$\|A^{-1}\|_\infty = \max(2, 11/10, 1/2, 24/5) = 24/5$$

$$\kappa(A) = \|A\|_\infty \|A^{-1}\|_\infty = 7 \left(\frac{24}{5}\right) = \frac{168}{5} = \underline{33.6}$$