Name: Solutions

Period (circle one): 1 2 3 4 5 6

Team (circle one): a b c d e f

SM365 – Numerical Computing – Quiz 3– Section 3.2
Pivoting Strategies

Consider the linear system given by the augmented matrix:
$$\begin{bmatrix} 1 & -1 & 3 & | & 7 \\ -3 & 6 & 9 & | & 9 \\ 2 & 2 & -2 & | & 10 \end{bmatrix}$$

1. Using a partial pivoting strategy complete the 1st set of row reductions for the initial pivot. Afterwards, identify the next pivot.

$$\max |a_{i1}| = 3$$

$R1 + \tfrac{1}{3}R_2$

$R3 + \tfrac{2}{3}R2$
$\Rightarrow$
$$\begin{bmatrix} 0 & 1 & 6 & 10 \\ -3 & \boxed{6} & 9 & 9 \\ 0 & \boxed{6} & 4 & 16 \end{bmatrix}$$

↑ next pivot
(either one)

2. Using a scaled pivoting strategy complete the 1st set of row reductions for the initial pivot. Afterwards, identify the next pivot.

← largest scaled pivot

$$\frac{|1|}{|3|} , \frac{|3|}{|9|} , \boxed{\frac{|2|}{|2|}}$$

$R1 - \tfrac{1}{2}R_3$

$R2 + \tfrac{3}{2}R_3$
$\longrightarrow$
$$\begin{bmatrix} 0 & \boxed{-2} & 4 & 2 \\ 0 & \boxed{9} & 6 & 24 \\ 2 & 2 & -2 & 10 \end{bmatrix}$$

$$\frac{|-2|}{|4|} , \boxed{\frac{|9|}{|6|}} \leftarrow \text{largest scale}$$

new pivot