

# Quiz 2 solutions

$$1) \quad \underline{e_1} \xrightarrow[\text{stretch 2 horiz}]{\quad} \begin{bmatrix} 2 \\ 0 \end{bmatrix} \xrightarrow[90^\circ \text{ ccw}]{\quad} \begin{bmatrix} 0 \\ 2 \end{bmatrix}$$

$$\underline{e_2} \xrightarrow[\text{stretch 2 horiz}]{\quad} \begin{bmatrix} 0 \\ 1 \end{bmatrix} \xrightarrow[90^\circ \text{ ccw}]{\quad} \begin{bmatrix} -1 \\ 0 \end{bmatrix}.$$

$$\leadsto \begin{bmatrix} 0 & -1 \\ 2 & 0 \end{bmatrix}$$

Alternatively

$$\text{stretch 2 horiz} \xrightarrow[\text{standard matrix}]{\quad} \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\text{rotate } 90^\circ \text{ ccw} \xrightarrow[\text{standard matrix}]{\quad} \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 0 & -1 \\ 2 & 0 \end{bmatrix}$$

2. AB no, no size

BA yes;  $5 \times 5$

3. 1 point (just the origin)  
line through origin  
plane through origin

4. 1) infinitely many solutions  
2) is an element  
3) linearly dependent  
4) linearly independent

5) are NOT

6) are NOT

5. 2) definitely invertible  
2) definitely not invertible  
3) not enough information  
4) definitely not invertible