5.18) a) $A = \begin{bmatrix} -3 & 0 \\ 0 & 0 \end{bmatrix}$

La SVS es:

$$A = \underbrace{\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}}_{U} \underbrace{\begin{bmatrix} 3 & 0 \\ 0 & 0 \end{bmatrix}}_{\Sigma} \underbrace{\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}}_{V^T}$$

Quiero una descomp. polar $A = W|A|$

$$W = UV^T = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$|A| = V\Sigma V^T = \begin{bmatrix} 3 & 0 \\ 0 & 0 \end{bmatrix}$$

Entonces

$$\boxed{A = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 3 & 0 \\ 0 & 0 \end{bmatrix}}$$

c) $A = \begin{bmatrix} 2 & -1 \\ 2 & 2 \end{bmatrix}$

La Svs ena:

$$A = \underbrace{\begin{bmatrix} 1/\sqrt{5} & 2/\sqrt{5} \\ 2/\sqrt{5} & -1/\sqrt{5} \end{bmatrix}}_{U} \underbrace{\begin{bmatrix} 3 & 0 \\ 0 & 2 \end{bmatrix}}_{\Sigma} \underbrace{\begin{bmatrix} 2/\sqrt{5} & 1/\sqrt{5} \\ 1/\sqrt{5} & -2/\sqrt{5} \end{bmatrix}}_{V^T}$$

igual que en a):

$$W = \begin{bmatrix} 4/5 & -3/5 \\ 3/5 & 4/5 \end{bmatrix}$$

$$|A| = \begin{bmatrix} 14/5 & 2/5 \\ 2/5 & 11/5 \end{bmatrix}$$

$$\rightarrow \boxed{A = \begin{bmatrix} 4/5 & -3/5 \\ 3/5 & 4/5 \end{bmatrix} \begin{bmatrix} 14/5 & 2/5 \\ 2/5 & 11/5 \end{bmatrix}}$$