



$$\begin{aligned}
 f(\vec{x}) &= f(x_1 \vec{e}_1 + x_2 \vec{e}_2) \\
 &= x_1 f(\vec{e}_1) + x_2 f(\vec{e}_2) \\
 &\hat{=} x_1 r \begin{pmatrix} \cos \varphi \\ \sin \varphi \end{pmatrix} + x_2 r \begin{pmatrix} -\sin \varphi \\ \cos \varphi \end{pmatrix} = A \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} \\
 &= f(z) = \alpha z = f(1) z
 \end{aligned}$$