First of all, $\mathbf{M}$ is unitary since $\mathbf{M}^2 = \mathbf{I}$, so that $\mathbf{M}^n = \mathbf{I}$ if n is even and $\mathbf{M}$ if n is odd. So if $f(\mathbf{M}) = \sum_{n=0}^{\infty} f_n \mathbf{M}^n$ then this simplifies to $f(\mathbf{M}) = \sum_{l=0}^{\infty} f_{2l}\mathbf{I} + \sum_{l=0}^{\infty} f_{2l+1}\mathbf{M}$.

Now we expand the Taylor series of $e^{i\mathbf{M}\theta}$: $e^{i\mathbf{M}\theta} = \sum_{n=0}^{\infty}(i\mathbf{M}\theta)^n/n!$, this expansion will suffer a similar fate as any $f(\mathbf{M})$. so that

$$e^{i\mathbf{M}\theta} = \sum_{m=0}^{\infty} \frac{i^{2m}\mathbf{M}^{2m}\theta^{2m}}{(2m)!} + \sum_{m=0}^{\infty} \frac{i^{2m+1}\mathbf{M}^{2m+1}\theta^{2m+1}}{(2m+1)!} \tag{1}$$

$$e^{i\mathbf{M}\theta} = \sum_{m=0}^{\infty} \frac{(-1)^m\mathbf{I}\theta^{2m}}{(2m)!} + i\sum_{m=0}^{\infty} \frac{(-1)^m\mathbf{M}\theta^{2m+1}}{(2m+1)!} \tag{2}$$

We recognise the first term as expansion of $\cos\theta$ and second as $i\sin\theta$, thus

$$e^{i\mathbf{M}\theta} = \mathbf{I}\cos\theta + i\mathbf{M}\sin\theta \tag{3}$$

So that $A(\theta) = \cos\theta$ and $B(\theta) = i\sin\theta$ thus.