When \( f(x) = a \cos x + b \sin x \), we can use our trigonometric identities to further simplify this equation.

First, we let \( R^2 = a^2 + b^2 \).

Next, we can substitute \( a = R \cos \alpha \) and \( b = R \sin \alpha \), which holds true for our original designation of \( R \). Recall the trigonometric identity \( \sin^2 \alpha + \cos^2 \alpha = 1 \) and we can separate \( R^2 \).

Now, we need to define \( \alpha \) in terms of \( a \) and \( b \). Let us eliminate \( R \) by dividing \( b \) by \( a \). We now have \( \frac{b}{a} = \tan \alpha \), hence \( \alpha = \tan^{-1} \left( \frac{b}{a} \right) \).

We now want to redefine the original \( f(x) \) in terms of a single trigonometric term, using another trigonometric identity.

\[
\cos(A - B) = \cos A \cos B + \sin A \sin B
\]

\[
f(x) = R \cos \alpha \cos x + R \sin \alpha \sin x = R[\cos \alpha \cos x + \sin \alpha \sin x]
\]

\[
\rightarrow f(x) = R \cos(\alpha - x)
\]

If you want to substitute our definitions of \( R \) and \( \alpha \) back into the equation, then we have:

\[
f(x) = (\sqrt{a^2 + b^2}) \cos(\tan^{-1} \left( \frac{b}{a} \right) - x)
\]

We can then use this simplified equation to easily define the amplitude, maximum, and minimum values of the original equation.