# Problem 1

In each of Problems 1 through 6, use Euler's formula to write the given expression in the form $a + ib$.

$$\exp(1 + 2i)$$

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**Solution**

Euler's formula states that $e^{ix} = \cos x + i \sin x$. Split up the exponential function first and then use the formula.

$$\begin{aligned}
\exp(1 + 2i) &= e^{1+2i} \\
&= e^1 e^{2i} \\
&= e(\cos 2 + i \sin 2) \\
&= e \cos 2 + ie \sin 2 \\
&\approx -1.13 + 2.47i
\end{aligned}$$