

Exercise 57

For the following exercises, evaluate the expressions, writing the result as a simplified complex number.

$$\frac{4+i}{i} + \frac{3-4i}{1-i}$$

Solution

Simplify the given expression.

$$\begin{aligned}\frac{4+i}{i} + \frac{3-4i}{1-i} &= \frac{i}{i} \times \frac{4+i}{i} + \frac{3-4i}{1-i} \times \frac{1+i}{1+i} \\ &= \frac{i(4+i)}{i^2} + \frac{(3-4i)(1+i)}{(1-i)(1+i)} \\ &= \frac{4i+i^2}{i^2} + \frac{3+3i-4i-4i^2}{1+i-i-i^2} \\ &= \frac{4i-1}{-1} + \frac{3-i+4}{1+1} \\ &= -4i+1 + \frac{7-i}{2} \\ &= -4i+1 + \frac{7}{2} - \frac{1}{2}i \\ &= \frac{9}{2} - \frac{9}{2}i\end{aligned}$$