

Exercise 53

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

$$\frac{(2+i)(4-2i)}{(1+i)}$$

Solution

Simplify the given expression.

$$\begin{aligned}\frac{(2+i)(4-2i)}{(1+i)} &= \frac{2(2+i)(2-i)}{1+i} \\ &= \frac{2(4-2i+2i-i^2)}{1+i} \\ &= \frac{2(4+1)}{1+i} \\ &= \frac{10}{1+i} \\ &= \frac{10}{1+i} \times \frac{1-i}{1-i} \\ &= \frac{10(1-i)}{(1+i)(1-i)} \\ &= \frac{10-10i}{1-i+i-i^2} \\ &= \frac{10-10i}{1-(-1)} \\ &= \frac{10-10i}{2} \\ &= \frac{1}{2}(10-10i) \\ &= 5-5i\end{aligned}$$