

Exercise 9

If $f(x) = \frac{x+1}{2-x}$, evaluate $f(5i)$.

Solution

Plug in $5i$ wherever x is.

$$\begin{aligned} f(5i) &= \frac{5i + 1}{2 - 5i} \\ &= \frac{5i + 1}{2 - 5i} \times \frac{2 + 5i}{2 + 5i} \\ &= \frac{(5i + 1)(2 + 5i)}{(2 - 5i)(2 + 5i)} \\ &= \frac{10i + 25i^2 + 2 + 5i}{4 + 10i - 10i - 25i^2} \\ &= \frac{10i - 25 + 2 + 5i}{4 + 25} \\ &= \frac{-23 + 15i}{29} \\ &= -\frac{23}{29} + \frac{15}{29}i \end{aligned}$$