

Problem 15: Evaluate  $\frac{(1-i)^4}{(1+i)^3}$ . (Source: AoPS Precalculus)

We have  $1-i = -i(1+i)$ . Making this substitution, we get

$$\frac{(1-i)^4}{(1+i)^3} = \frac{(-i(1+i))^4}{(1+i)^3} = \frac{(-i)^4(1+i)^4}{(1+i)^3} = \boxed{1+i}$$