What is the probability that an electron state at $E_F+0.20$ eV is occupied by an electron?

$$f(E) = \frac{1}{1 + e^{\frac{E-E_F}{kT}}}$$

$$f(E) = \frac{1}{1 + e^{\frac{E+0.2-E_F}{kT}}}$$

**MKs units**

$$= \frac{1}{1 + e^{\frac{0.2 \times 1.6 \times 10^{-19}}{1.38 \times 10^{-23} \times 300}}} = 4.39 \times 10^{-4}$$

Typically:

- $E > E_F$: $f < 0.5$
- $E < E_F$: $f > 0.5$

$0 \leq f \leq 1$