The FD energy can be defined as the energy at which $F_{FD} = 0.5$. Using this, show that $B$, in

$$F_{FD} = \frac{1}{B, e^{E_F/RT} + 1} \quad (9.30)$$

is $e^{E_F/RT}$ and re-write 9.30 to 9.39.

Setting $F_{FD}(E_F) = \frac{1}{2}$

$$\frac{1}{B, e^{E_F/RT} + 1} = \frac{1}{2}$$

$$B, e^{E_F/RT} + 1 = 2$$

$$B, e^{E_F/RT} = 1$$

$$\Rightarrow B = e^{-E_F/RT}$$

Substituting back into 9.30

$$F_{FD} = e^{E_F/RT} e^{E/RT}$$

$$F_{FD} = \frac{1}{(e^{E_F/RT} - e^{E/RT}) + 1} \quad (9.39)$$