Proof of Prop 2.44 | Ex 2.45 ①

B_1, B_2 open $\Rightarrow$ $B_1 \cap B_2$ open.

$\boxed{3\frac{1}{2}}$

so apply Ex 2.40

~~$\mathcal{B} \supseteq \mathcal{B}_p \Rightarrow \mathcal{B}_p$, $\mathcal{B}$, $\mathcal{B}$, $\mathcal{B}$, $\mathcal{D}$, $\mathcal{D}$~~

Lem 2.47 I guess a finite nbourhood basis can exist if for instance the space is finite.

X ~~first countable~~, $A \subseteq X$, $x \in X$

Lem 2.48. (a) x lim
$\Rightarrow$ Given open U, s.t $U \ni x$, $\exists N$ s.t $x_i \in U$ $\forall i \geq N$.

~~So~~ ($\Leftarrow$) Suppose $x \in \overline{A}^c \to$ open then. get a contradict (as $\overline{A}^c$ contains no points of A)
(don't need first countable for this ~~bit~~)

($\Rightarrow$)

Given open $U \ni x$,

$\mathbb{Q}$? ask Tom for thoughts on this.

~~$x \in \overline{A}$ then~~

~~(b) $x \in \mathrm{Int}(A)$~~ $x \in \overline{A}$, $x \in U$ open

Then $U \cap A \neq \emptyset$ as if it were then.

$\overline{A} \cap U^c$ would be a smaller (than $\overline{A}$) closed set containing A which is a contradiction. (of def^n of $\overline{A}$)