Math 3385

Homework #3

2.1 #4

2.2 #15

2.3 #26abc

3.1 #4abi

2.1 #4

In PPX_p, A is open when $p \in A$, closed when $p \notin A$

For A containing p: Then A is open, so $\text{Int}(A) = A$.

For $Cl(A)$, to enlarge A to a closed set, we must go all the way to X, since no smaller closed set includes p. So $Cl(A) = X$.

For A not containing p: A is closed, so $Cl(A) = A$.

No nonempty subset of A is open, since $p \in A$. So $\text{Int}(A) = \emptyset$.

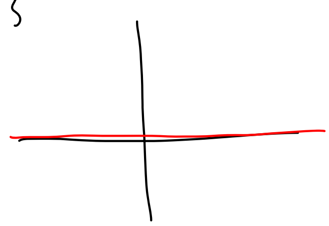
2.2 #15

Limit pts of $[0,1]$ in $\mathbb{R}_{fc}$.

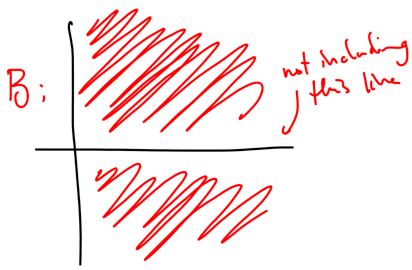
All real #s are limit pts of $[0,1]$, since any nbhd of any pt in $\mathbb{R}_{fc}$ must intersect with $[0,1]$.

2.3 #26abc

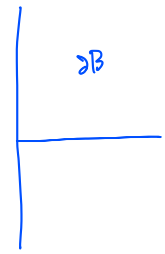
$A = \{(x,0) \in \mathbb{R}^2\}$ $\partial A = A$



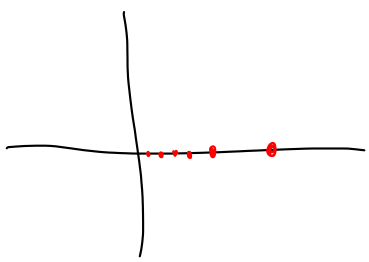
$B = \{(x,y) \in \mathbb{R}^2 \mid x > 0,\ y \neq 0\}$



∂B is the y-axis, plus the positive x-axis and the origin.



$C = \{(\frac{1}{n}, 0) \mid n \in \mathbb{Z}^+\}$



$\partial C = C \cup \{(0,0)\}$

3.1 #4abi $\quad Y = [0,5]$, subspace top from standard $\mathbb{R}$.

a $\quad (0,1)$ is open in Y, since $(0,1) = (0,1) \cap Y$

not closed since $Y - (0,1) = [1,5]$ which is not open.

b $\quad (0,1]$ is not open in Y, but it is closed

since $Y - (0,1] = (1,5]$ which is open in Y

since $(1,5] = (1,6) \cap Y$

i $\quad (4,5]$ is open in Y since $(4,5] = (4,6) \cap Y$

it's not closed since $Y - (4,5] = (1,4]$ which

is not open.