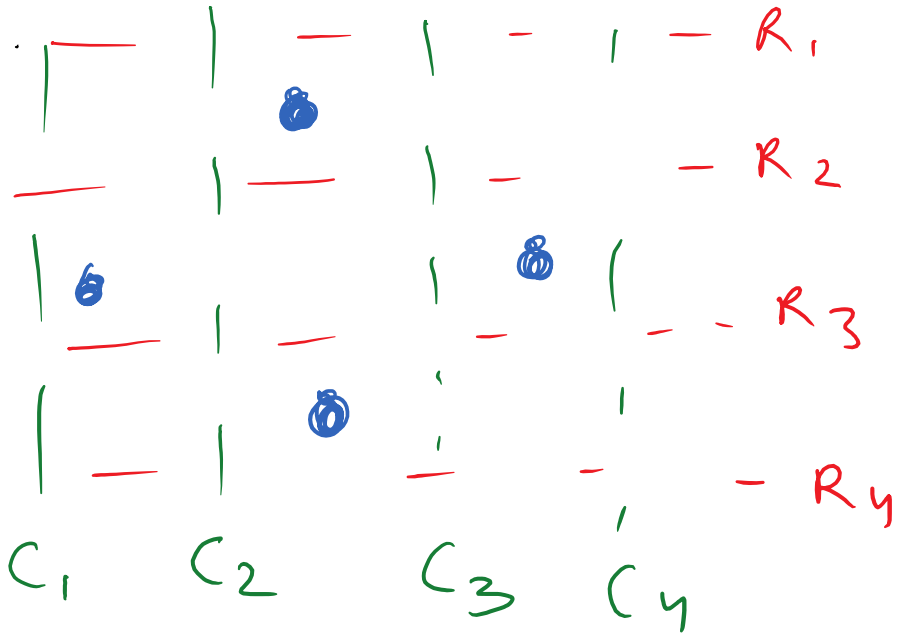
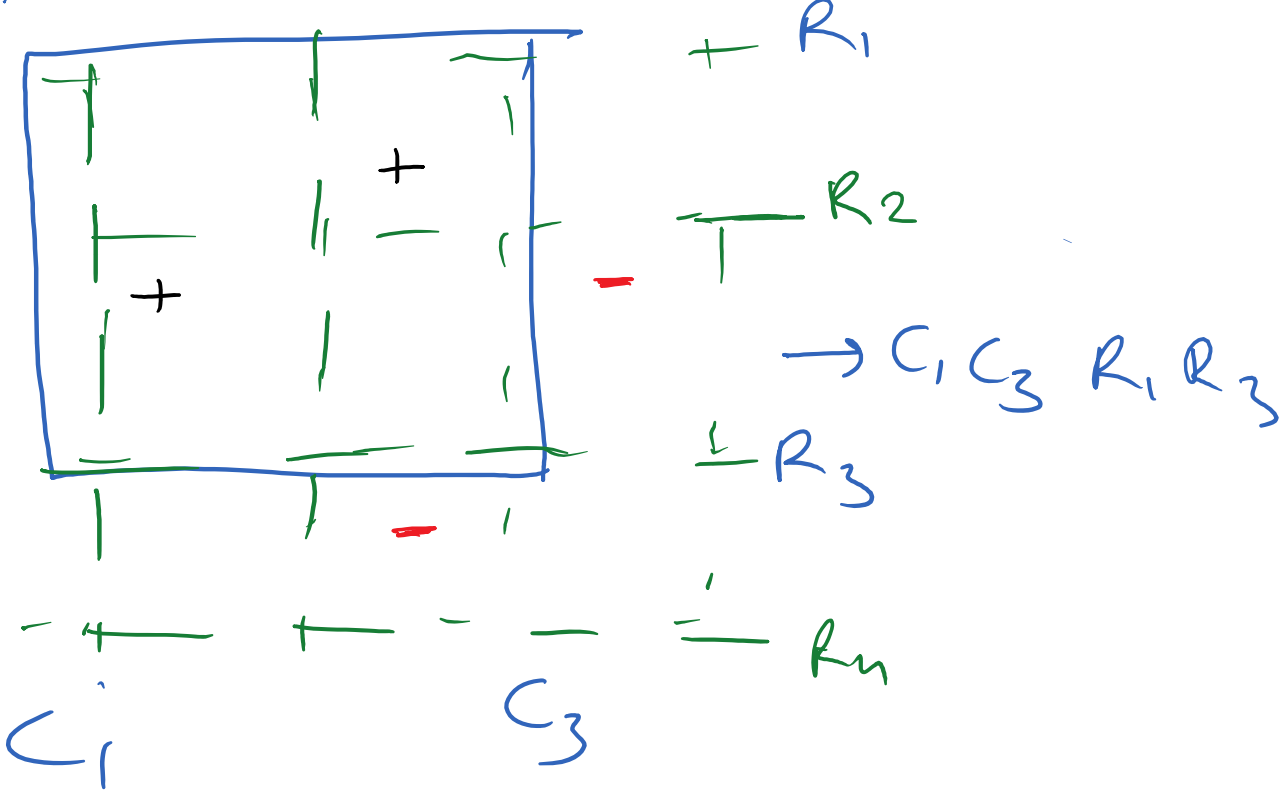
Pl. & 2.

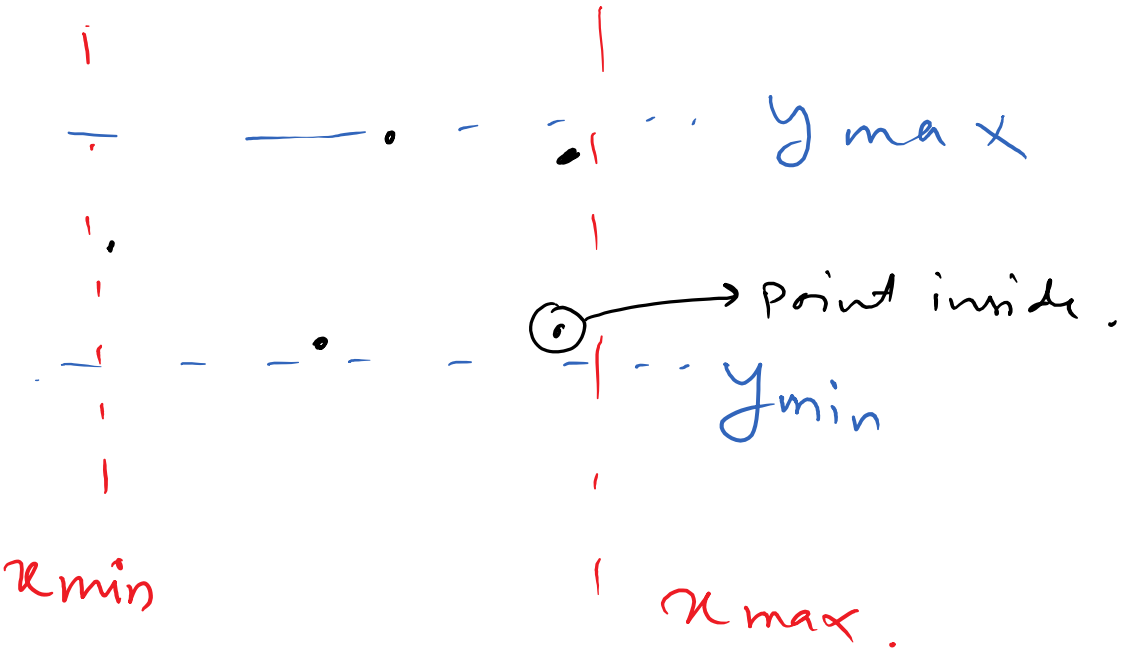
- four point



Combination of 2 C_s & 2 R_s & group points inside a box.



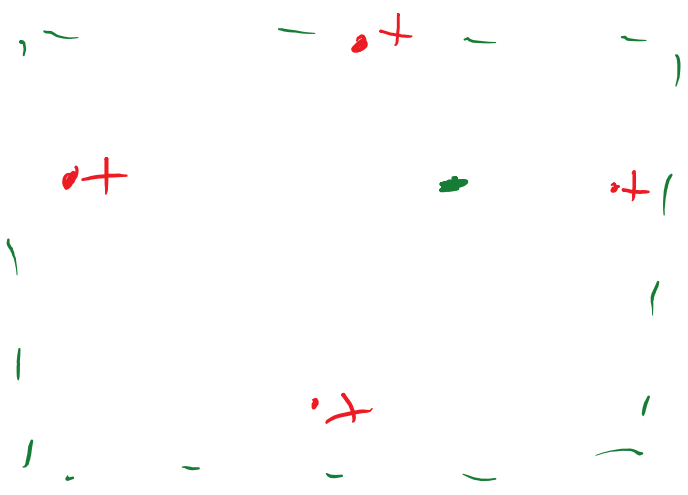
- $n = 5$



By choosing x_{min} x_{max} y_{min} y_{max}

$\exists$ point inside it.

in that case



→ $maxVC = 4$

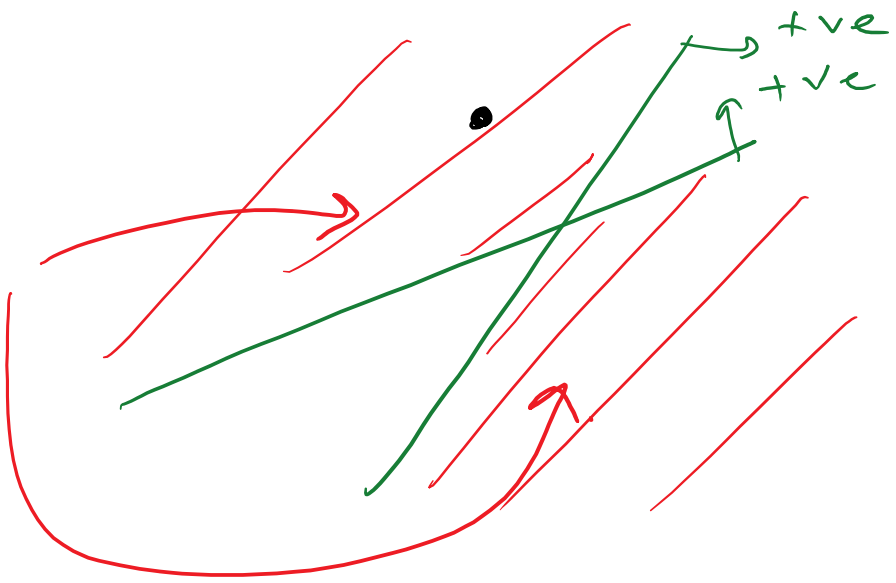
// since it can shatter 4. → it can

shatter 3 → take img. point.

Q3. → K = 1 → VC = 0

K = 2

Point in this region.



VC at least 1

// since → distinct linear

∃ → region where $y_1 \cdot y_2 < 0$

So min = 1

max = 1 as.

any 2 points can have 4 cases

+	+	−	−
+	−	+	−

★ 2 linear classifiers AND gives only convex 2 disj

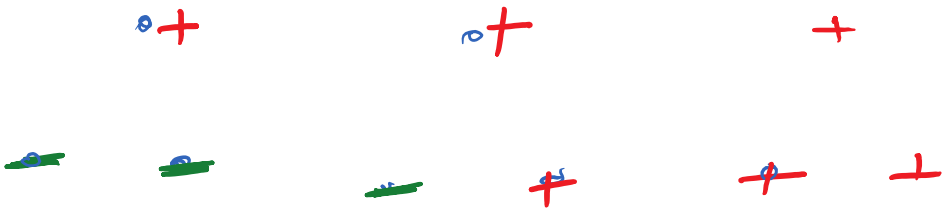
* 2 linear separator has only cover 2 diff cases.

- $K = 3$.

linear separator → 2 region.

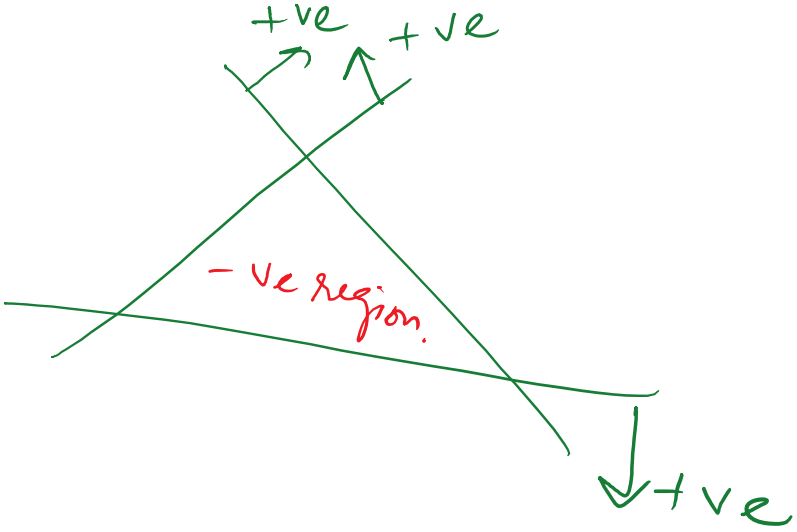
max VC = 1 only as.

can cover only 2 case.



8 cases.

- min VC = 1 , max VC = 1



Q. P1.
1.

(a) if VC dim is V

$$M \geq \frac{1}{\epsilon}\sqrt{4\ln\frac{2}{\delta} + 8 \cdot VC(H)\ln\frac{13}{\epsilon}}$$

$\epsilon = .2 \quad \delta = .05$

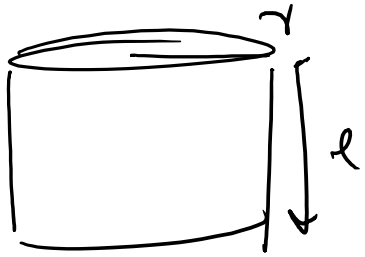
$$M \geq \frac{1}{.2}\sqrt{4\times\ln\frac{2}{0.05} + 8\, VC(H)\ln\frac{13}{.2}}$$

$VC = 5$ // for cylinder.

$M \geq 67.\nu$

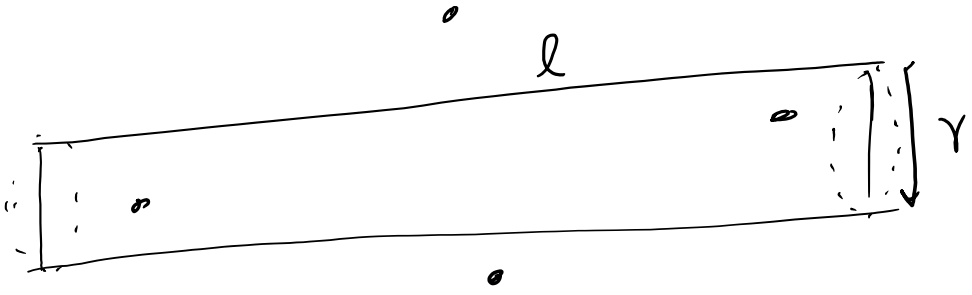
$\boxed{M \geq 68}$

Q1.



- VC dimension

In 2D it can shatter 4 points as. if forms a rectangle

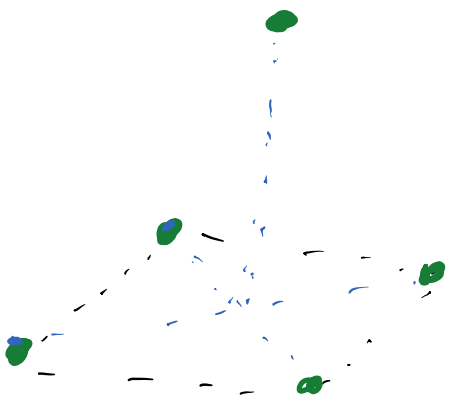


l = max distance b/w 2 points

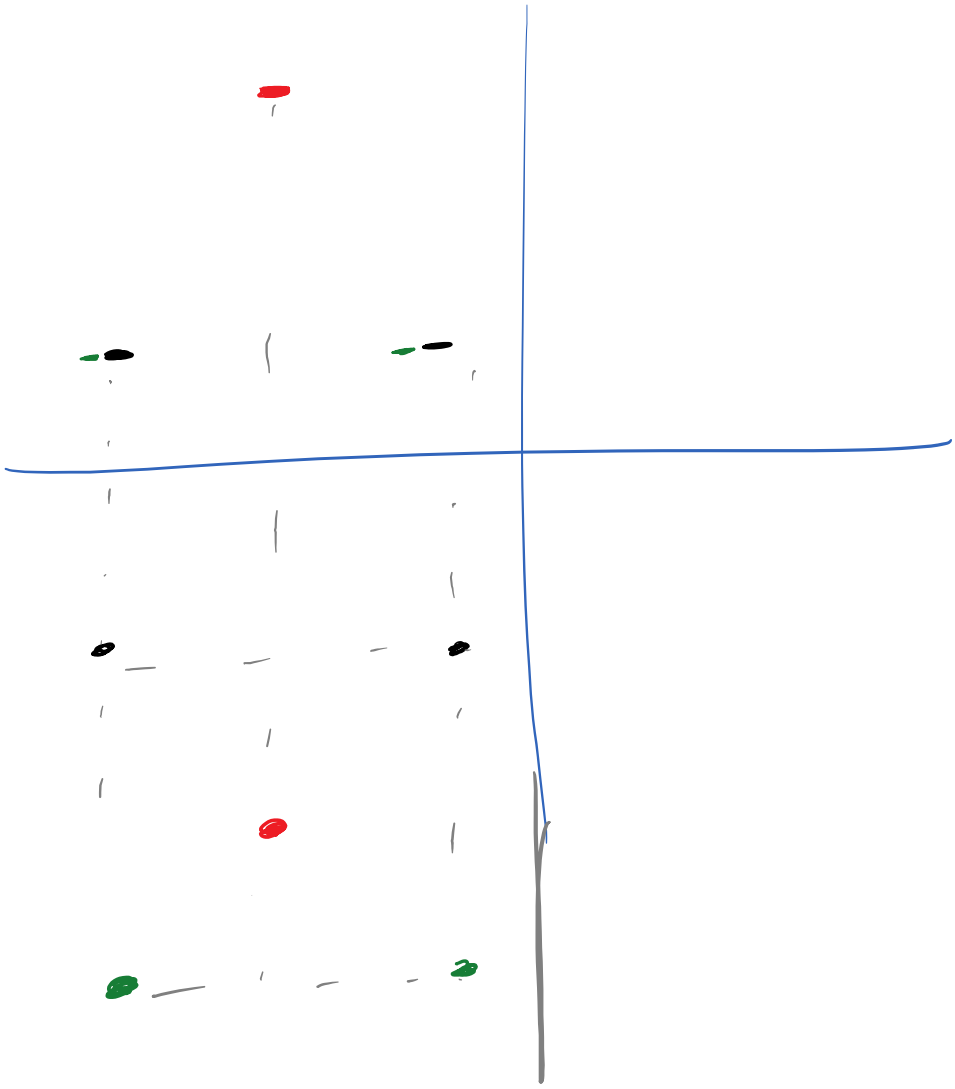
$r <$ min distance b/w ~~any~~ 2 points.

for $n = 5$

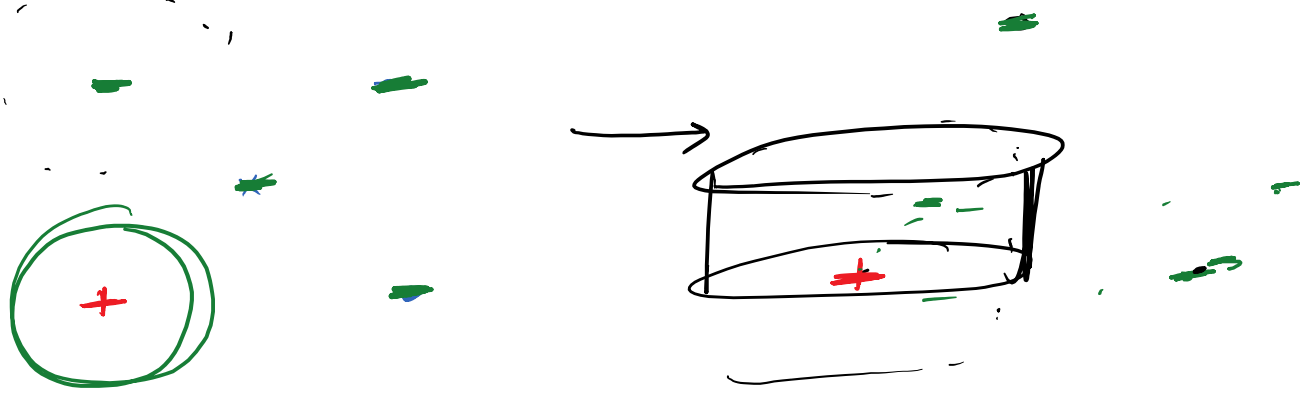
Consider space 4 points on square & one at the centre above height h.

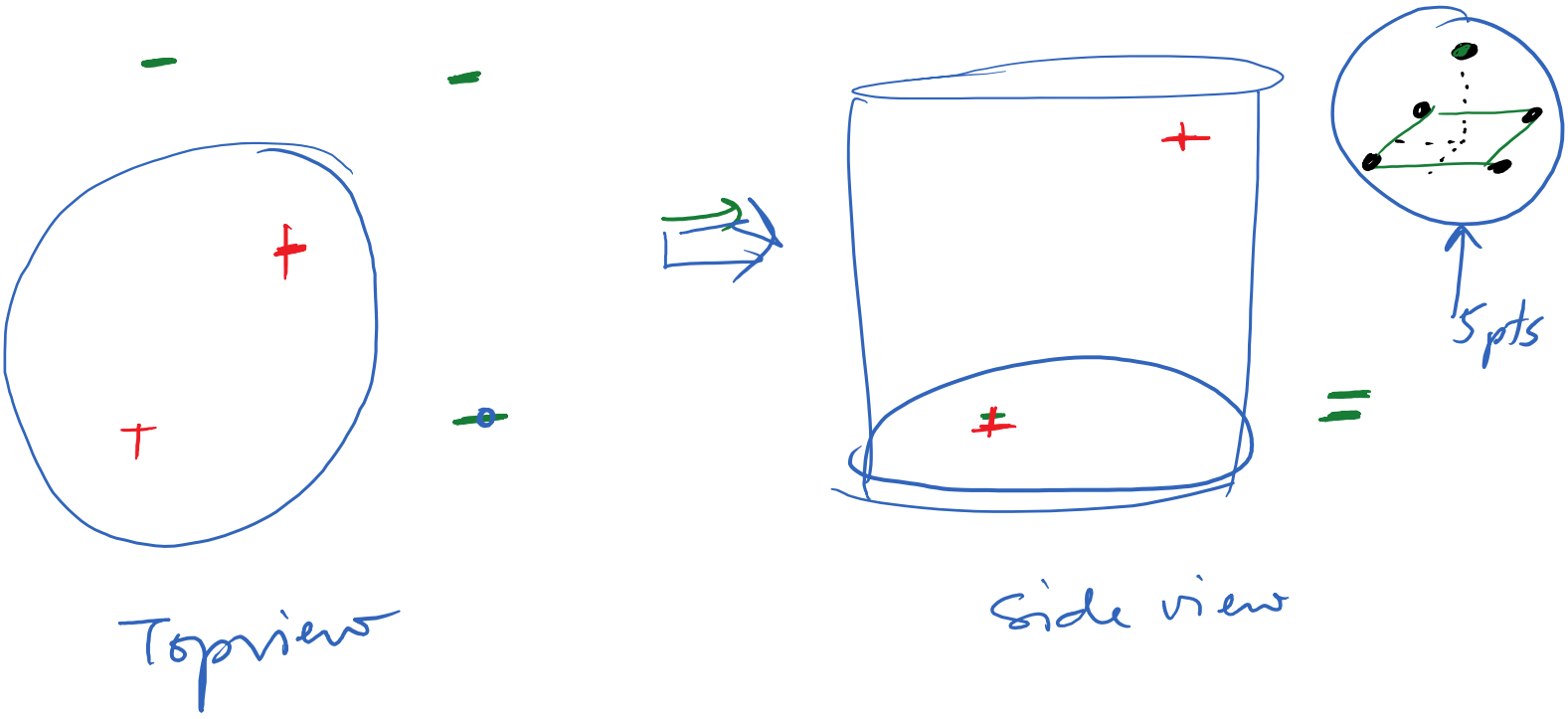


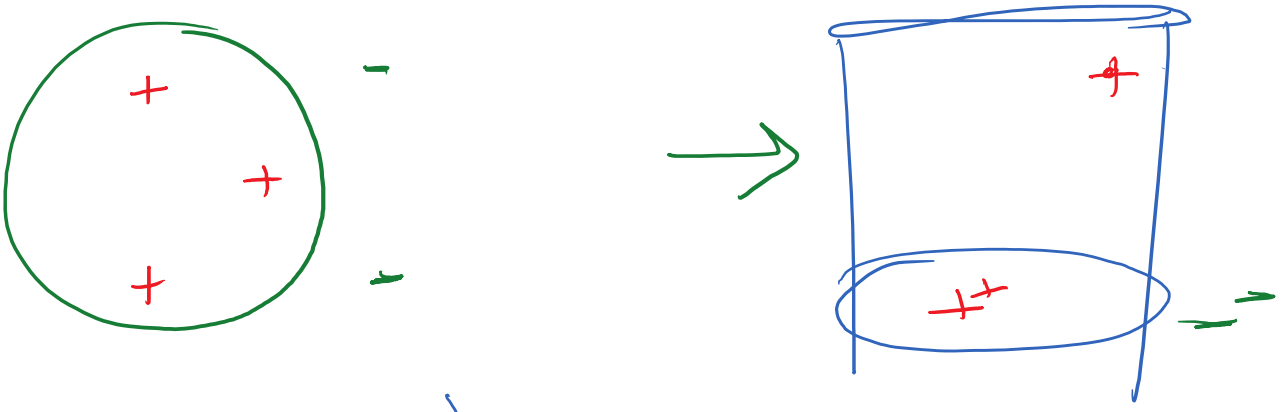
Side view



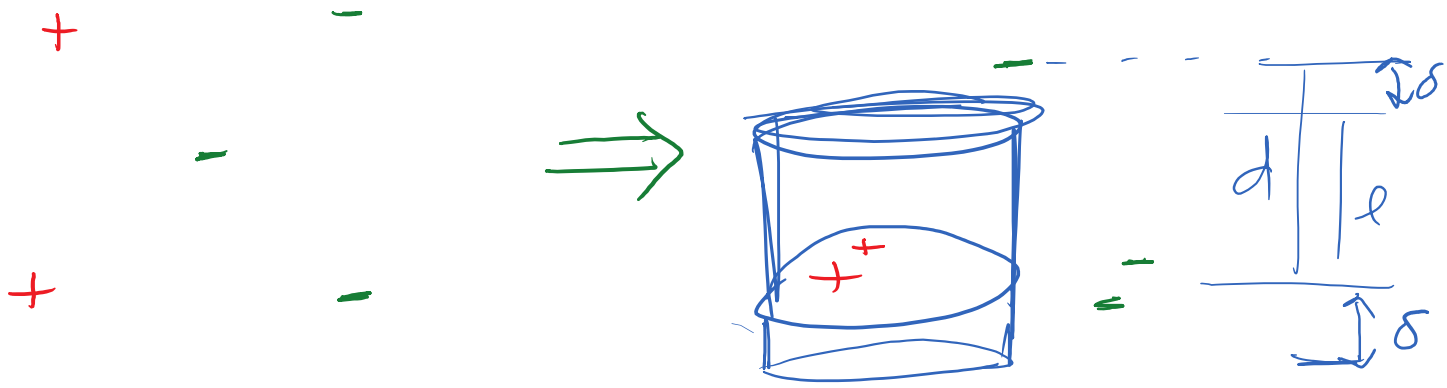
Topview





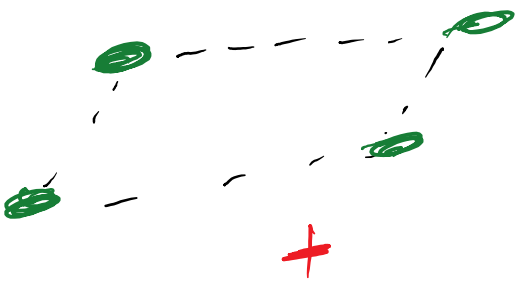


→ bring δ down if top one not

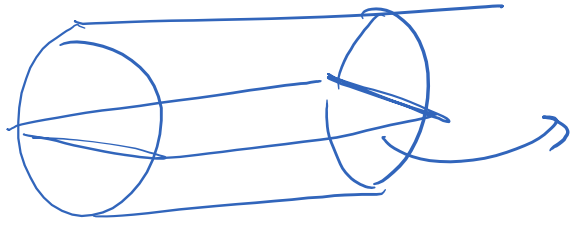


⇒ similarly 5 points in 3D can be shattered.

6 points



Q. 1.a VC changes when you add new cylinders.



→ Rectangle in 2D.

Sol → In 2D. 4pt can only be shattered by rectangle.