I. Summary

3.17 3.19 10:22

upper bound
lower bound
supremum
infimum
bounded (from above & below)

neighbourhood (* ★ δ-neighbourhood (important in the future) . * deleted neighbourhood)
open & closed.
interior points & * exterior points
boundary point
limit point
isolated point

* deleted neighbourhood . "去心"
$(x-\delta, x) \cup (x, x+\delta)$

* exterior points
the ~~limit~~ point of set A's complement (interior) is A's exterior point.

II. Concept involves ... ?

i) every

upper bound & lower bound.	"every element"
supremum & infimum	"every upper/lower bound"
open	"every ~~interior point~~ element" is interior point.
boundary point	"every neighbourhood"
limit point	"every neighbourhood"

ii) "one", exists", "some"

neighbourhood.	exists "some δ"
interior points	exists a δ .
isolated. points	exists a δ

① for neighbourhood.

if there exists one δ. , it is obvious that for all $\varepsilon < \delta$

$(x-\varepsilon, x+\varepsilon) \subset (x-\delta, x+\delta) \subset S$

✓ ② Why do we need to remember "every" & "exists" , denoted as $\forall$ and $\exists$

to have a sense what to prove

i) concept in "every"

✓ ⇒ every satisfies

X ⇒ pick one contradiction.

ii) concept in "exists"

✓ ⇒ pick one example

X ⇒ show that all don't satisfy

III What must belong to the set ?

isolated point.
interior point.
neighbourhood. not "ε" but "C"

/ what not.

limit point.	$\sqrt{2}$ is the ~ of $(\sqrt{2}, 10)$
boundary point	same example.
infimum & sup	same example.
upper & lower bo	same example.

IV Questions.

See Worksheet & sol.

V Format

① Mathematical Induction

~~Beggg~~

Principle of induction

(a) for $n=1$, ... is valid.

(b) for $n=k$, ... is valid, then we have ... (type A)

Assume

* Assume for $n=1,2,\dots k$, ... is valid. then we have ... (type B)

by the Principle of Induction, the result is true for all $n \in N$

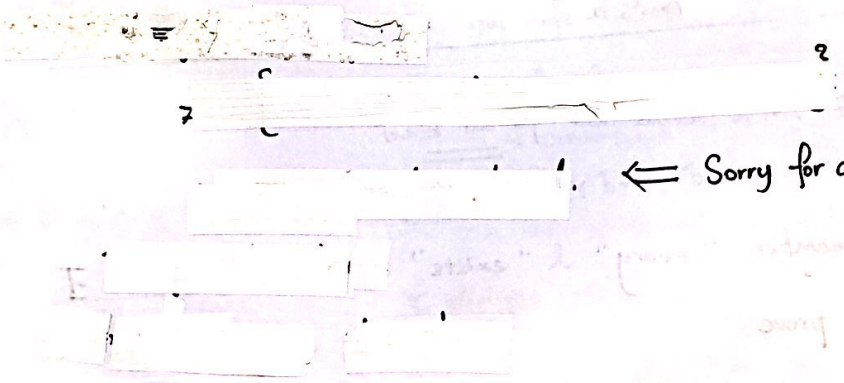
e.g $1^3+2^3+\dots+n^3 = \frac{1}{6}n(n+1)(2n+1)$

$1^3+2^3+\dots+n^3 = (1+2+\dots+n)^2$

Since these are simple questions, I'll leave them to you.

Btw, the conclusions will be helpful when you use the definition to evaluate an integral.

(which will probably appear as λ.w in Week 9. Get prepared)



⇐ Sorry for accident.

~~Proof~~

② Reduction to Absurdity.

Proof by contradiction

Assume $\neg P$ is valid, then we have

⋮

which contradicts with ... (or Find a contradiction here)

∴ Statement P is true/valid

* sometimes useful when proving that "every ~ is ~"

$\neg P$: "suppose there exists one ~ that doesn't satisfy ..."

③ Sufficient & Necessary (if and only if)
充分 必要.

Other tips.

About the use of reference book. to be more specific. Tong Ji.

there are many ways to use it. Preview. review. or as a source of your exercise.

but I think it is important to point out that some chapters are

1° useful for your study

2° won't be covered in the lecture.

I'll list the name of them. and the time that you can read & understand them without much effort.

第一章. 七节. 无穷小的比较. . after you have finished. Midterm 1.
this is useful for you to check if a series is convergent (in week 12)

第六章. 定积分的几条法 after you have understood the meaning of definite integral.
this will help you write down the correct integral

There are also some chapters that you can skip

第三章 第七节. 曲率 Since there will be a better explanation in V0 257 and the exam in 156 doesn't involve it.

第四章 第五节. 积分表 learn to live without the formula sheet will help you perform better in V0156. as well as many other courses.

About Homework.

hardcopy + pdf

take advantage of apps 迅捷pdf转换器. "其他文件转pdf"

扫描全能王.

wrong format of "pdf" may cause deduction.