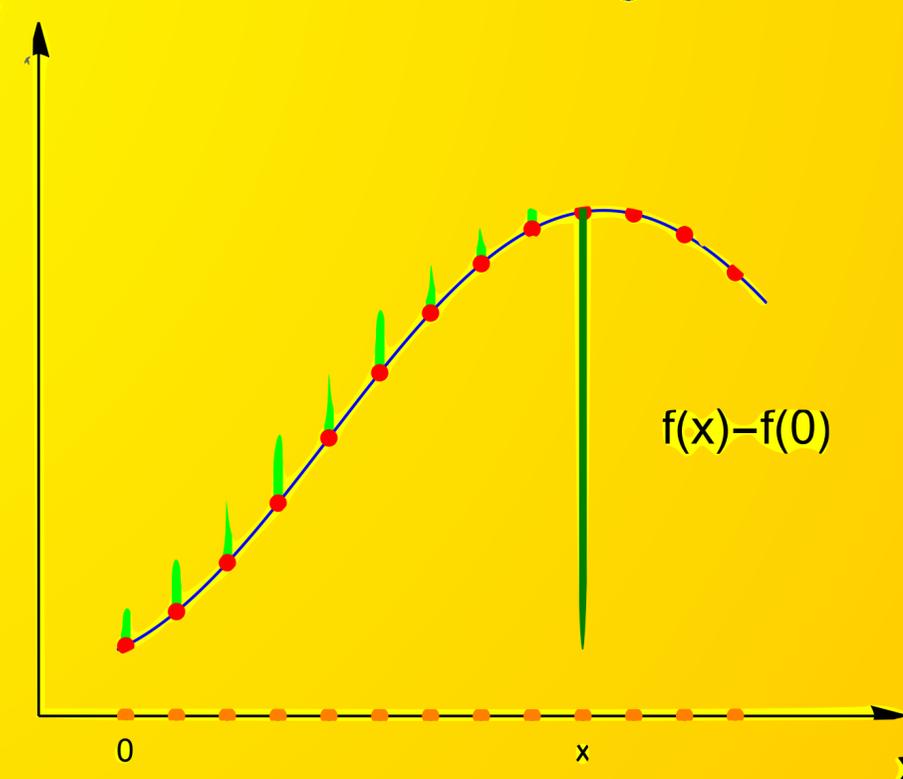
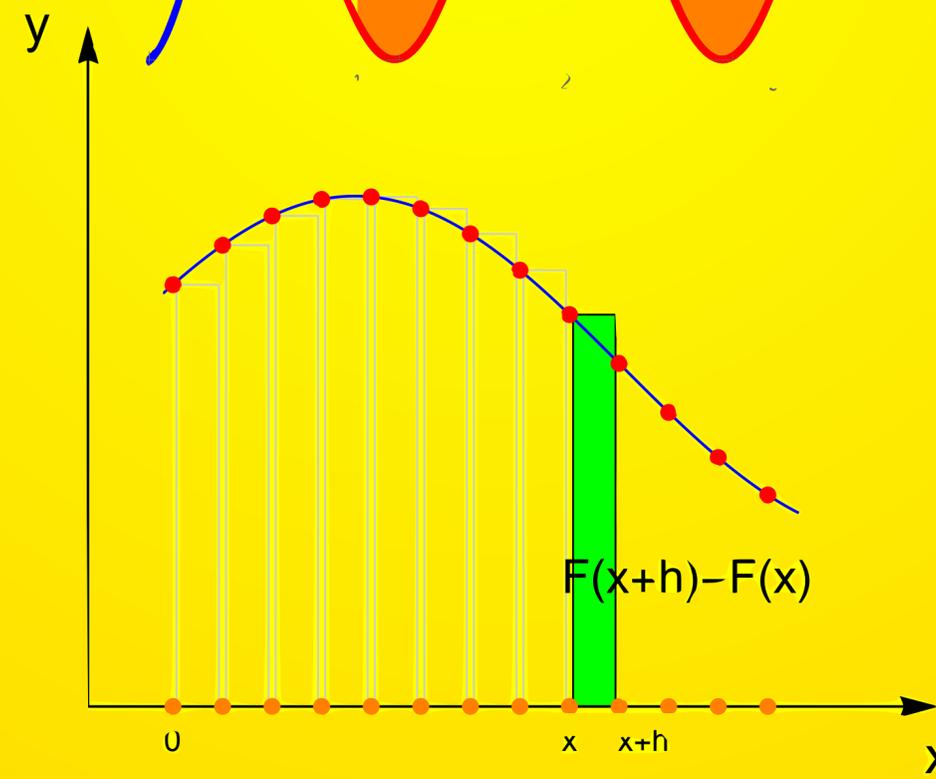
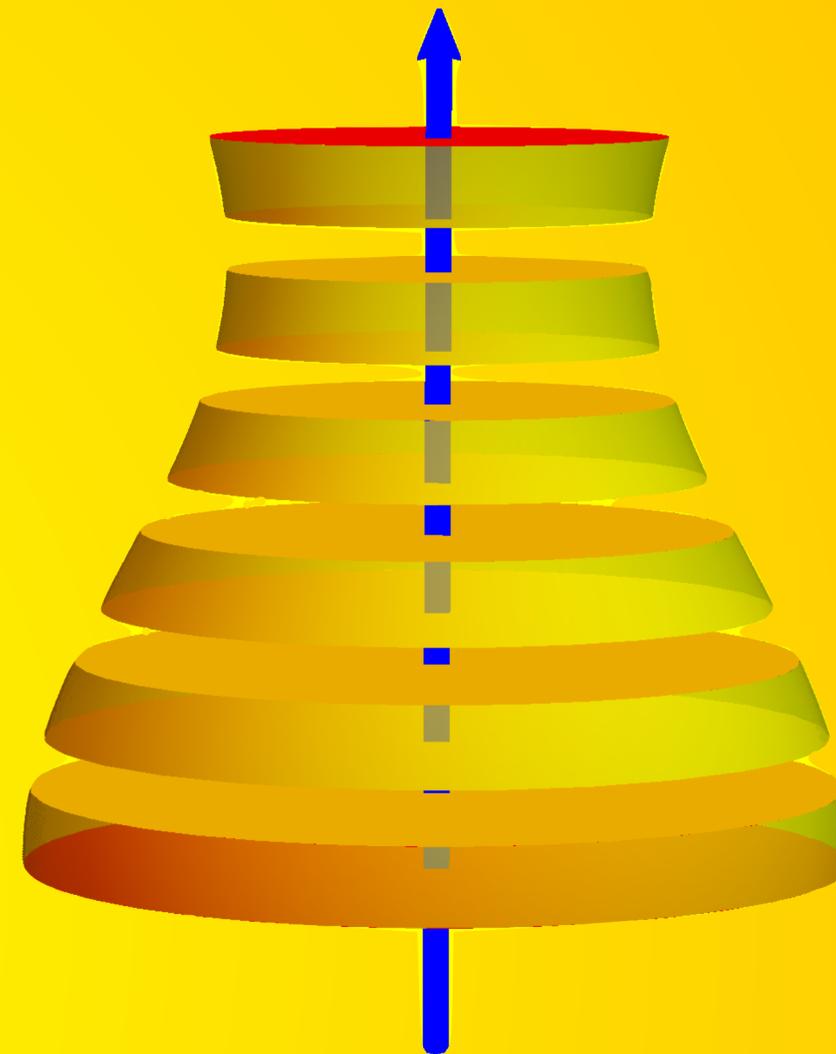
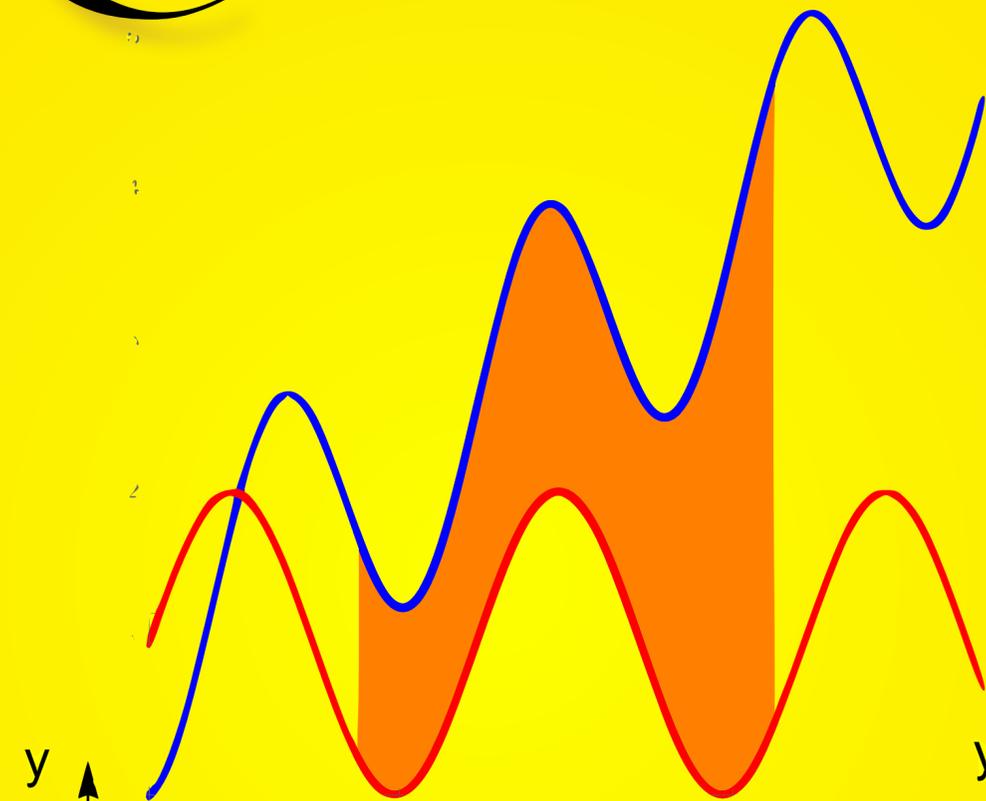


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Review



PLAN

1. Poll

2. Mindmaps

3. A partial integration example

4. A substitution example

5. A partial fraction example

5. TF-problems

6. A catastrophic example

7. Which integration technique?

REMINNDERS

Exam on Friday!

Same deal as last exam

No MQC Thu and Sun

Work on practice exams!

Don't hesitate to email us.

Poll

Do you remember the definition of a catastrophe?

A

Yes

B

No

C

Maybe so

Topics

Catastrophes

Newton Method

Fundamental theorem

Integration techniques

Statistics

Improper integrals

Areas and Volumes

Is this just fantasy?
No escape from reality.



Is this the real line? Is this just fantasy?

Mind maps!

how defined

parameter

Root

Catastrophes

Newton method

Bifurcation
diagram

Example

Convergence
rate

PDF definition

normal
distribution

uniform distribution

PDF and CDF

CDF definition

Cauchy

Archimedes

Thom

People who
appeared

Leibniz

Newton

Infinite region

Unbounded
function

p-functions

Improper
integrals

convergent or
divergent

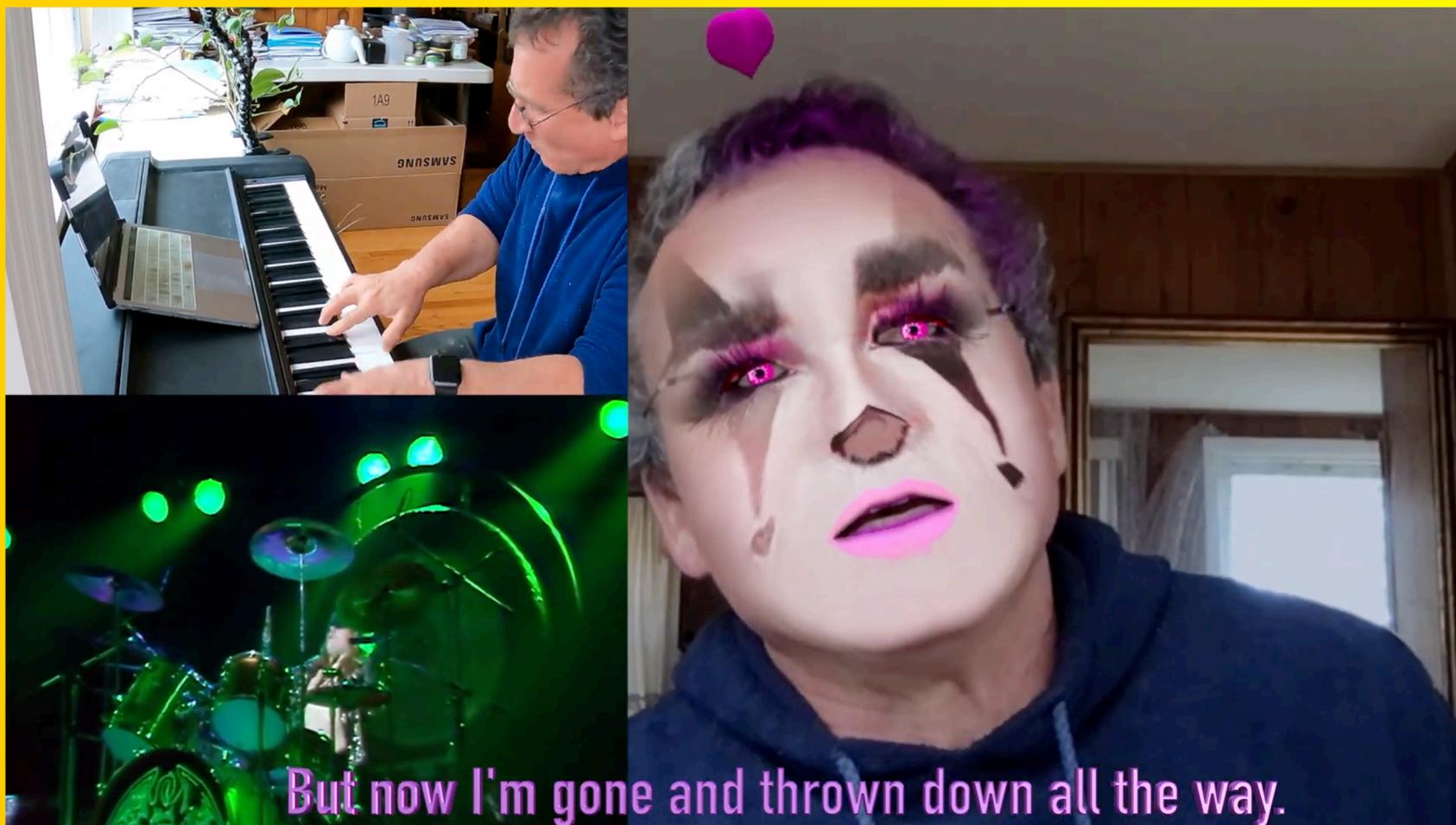
Let's do the next mindmap in
breakout rooms.

Integration techniques

Partial integration

Find

$$\int \log^2(x) dx$$



But now I'm gone and thrown down all the way.

Tic Tac Toe



Find

$$\int (x - 1)^5 e^{x/3} dx$$

Substitution



Find

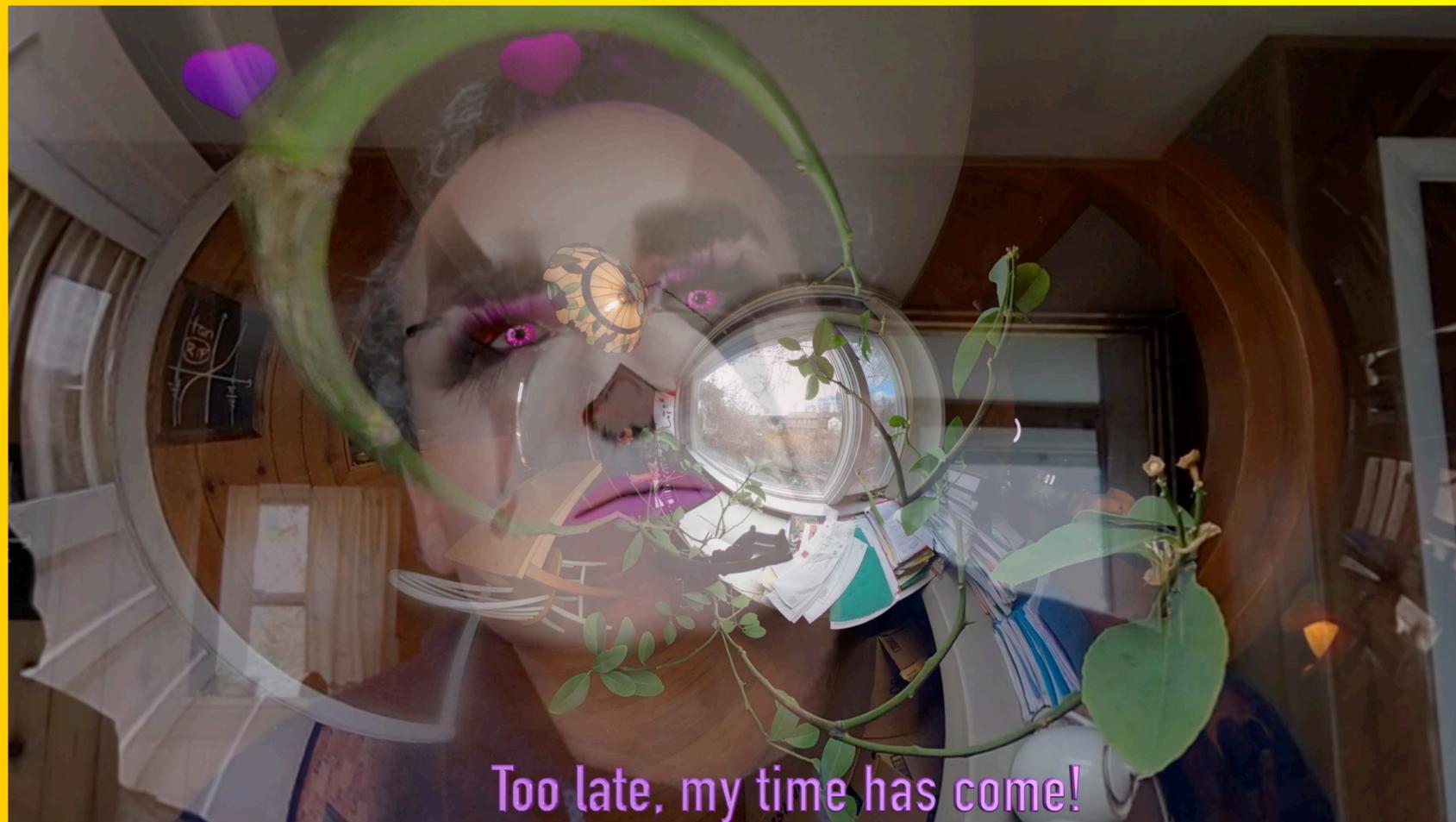
$$\int \tan(x) dx$$

``substitute its head
and now, it's dead''

Substitution

Find

$$\int \sin(\log(x))/x \, dx$$



Partial fractions

Find

$$\int \frac{1}{x^2 - 5x + 6} dx$$

Some TF problems

A

There is a p such that $\int_0^{\infty} \frac{1}{x^p} dx$ is finite.

Some TF problems

B

There is a family of functions $f_c(x)$ which does not have any catastrophes.

Some TF problems

C

The map $T(x) = x - f(x)/f'(x)$ is called the Newton step.

Some TF problems

D

If a function $f(x)$ has the property that

$F(x) = \int_{-\infty}^x f(t) dt$ is monotonically increasing

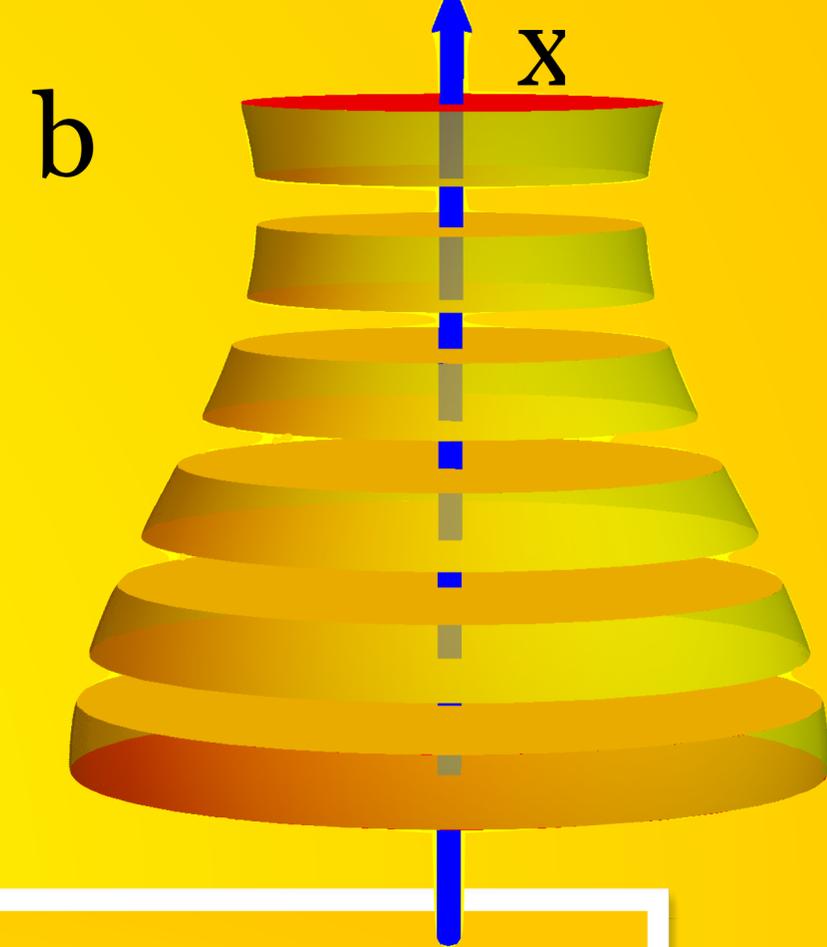
and $\lim_{x \rightarrow \infty} F(x) = 1$, then f is a PDF.

Some TF problems

E

If a finite Gabriel's trumped has the surface area of a piece of paper, then the trumped does not fit in our universe.

Some TF problems



F

If $A(x)$ is the crosssection area of a body at height x , then $\int_a^b A(x)\pi dx$ is the volume of the solid

Some TF problems

G

If f is a function for which $\int_1^{\infty} f(x) dx$ does not exist,

we can find a small constant c , such that

$\int_1^{\infty} cf(x) dx$ is finite.

Some TF problems

H

There are continuous functions f ,
for which the anti derivative $F(x)$ can not
be expressed using known functions.

2 actual problems

1)

Consider the family of functions $f(x) = x^3 + cx$ on the real line.

- a) (5 points) Find all critical points of f , depending on c .
 - b) (2 points) Using the second derivative test, determine which are minima and which are maxima.
 - b) (3 points) For which value of c does a catastrophe occur?
-

2)

a) $\int (x - 3) \sin(5x) \, dx$

b) $\int \log(5x) \, dx$

c) $\int \frac{e^x}{1+e^{2x}} \, dx$

d) $\int (x - 1)^4 \sin(3x) \, dx$

e) $\int \frac{1}{\sqrt{1-x^2}} \, dx$



Goodbye, everybody, I have got to work!

The end