Berfikir Matematis

Dr. Rizky Rosjanuardi, M.Si.

Matematika?

Matematika: apa yang dipelajari?

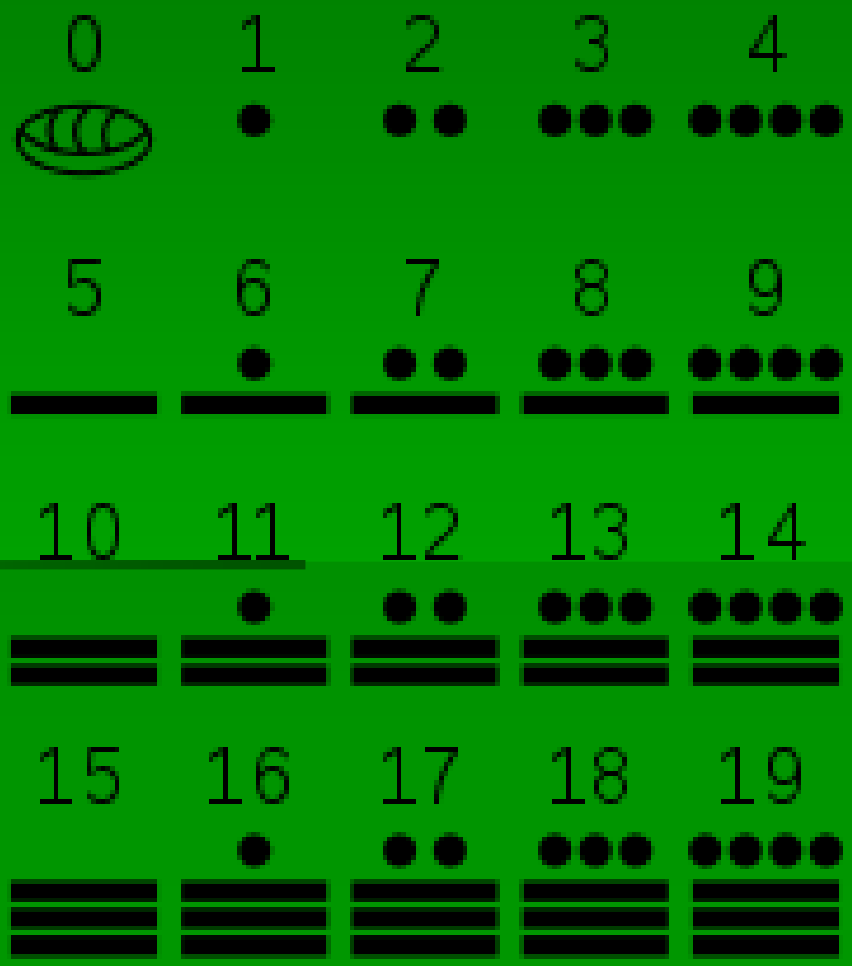
Bilangan

European	0	1	2	3	4	5	6	7	8	9
Arabic-Indic	٠	١	٢	٣	٤	٥	٦	٧	٨	٩
Eastern Arabic-Indic (Persian and Urdu)	٠	١	٢	٣	۴	۵	۶	٧	٨	٩
Devanagari (Hindi)	०	१	२	३	४	५	६	७	८	९
Tamil		க	உ	ங	ச	ஞ	ண	எ	அ	ஃ

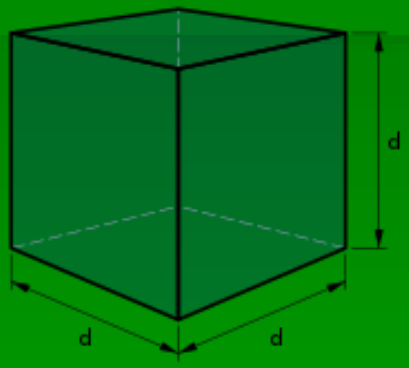
Bilangan

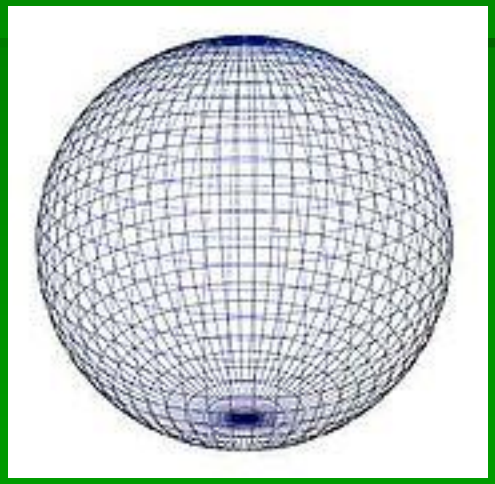
0	__ / *	rei /
1	__	ichi /
2	__	ni, ji / ,
3	__	san /
4	__	shi /
5	__	go /
6	__	roku /
7	__	shichi /
8	__	hachi /
9	__	kyū, ku / ,
10	__	jū /
20		ni-jū /

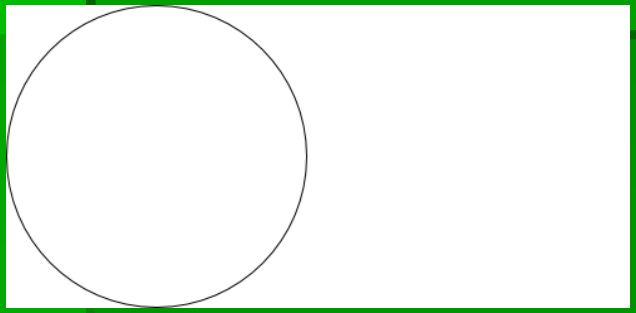
Bilangan

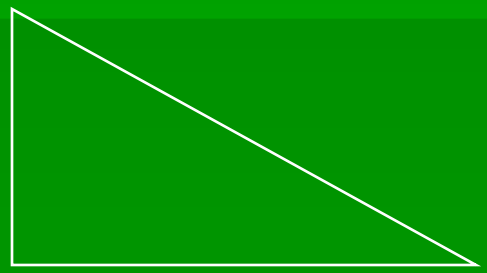


Bentuk

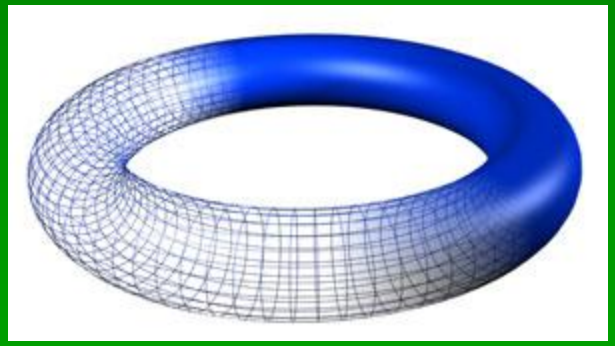


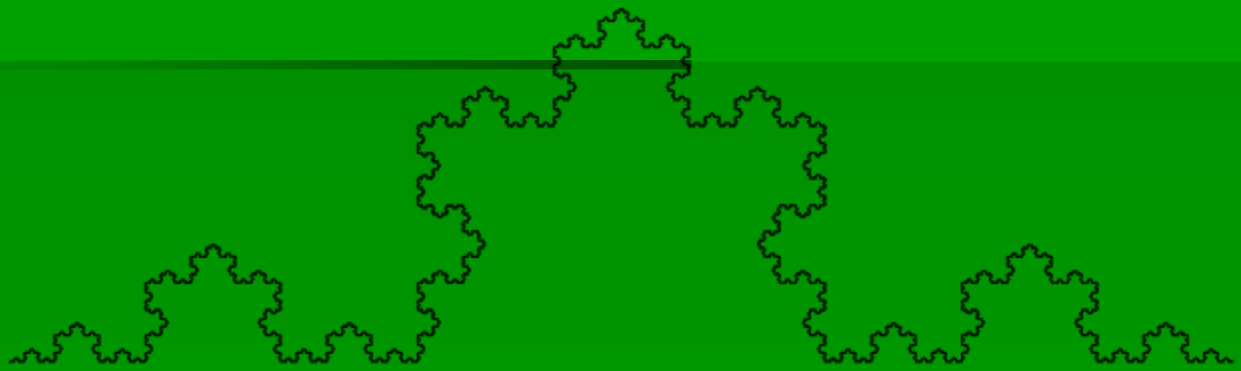




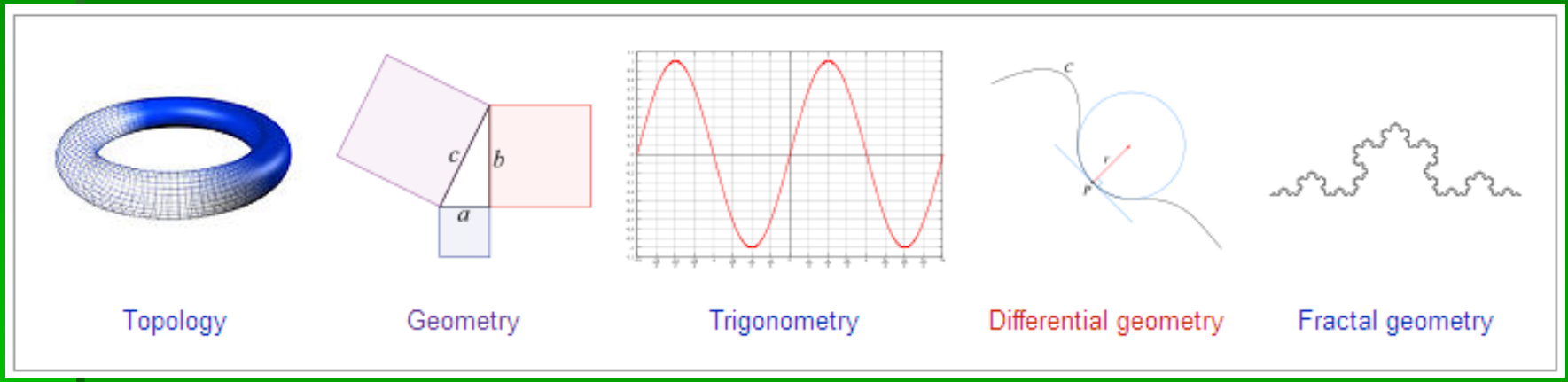


Bentuk

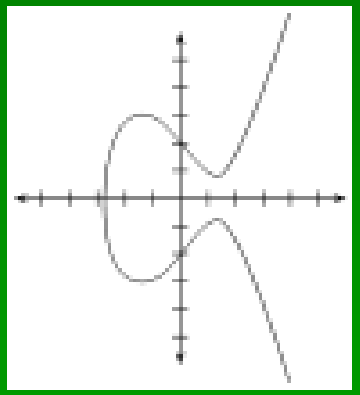


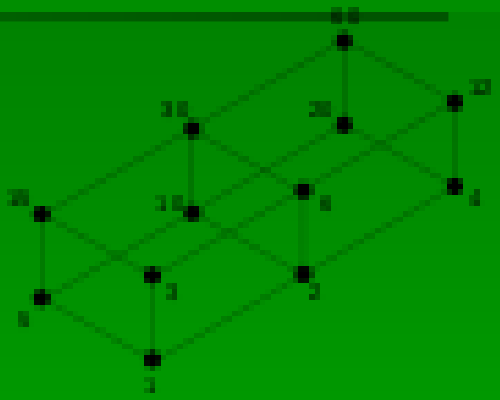


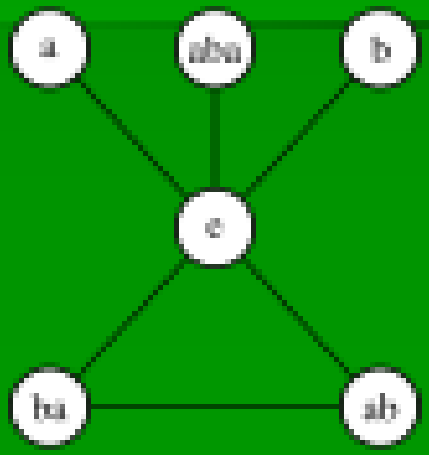
Kajian yang terkait:

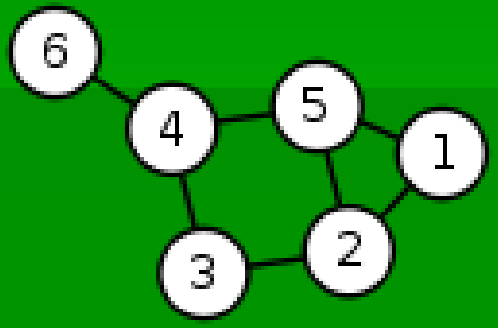


Struktur





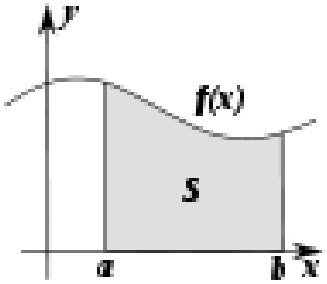




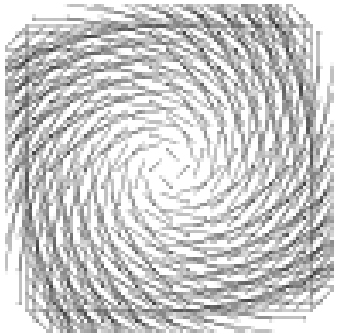
Kajian yang terkait:

- Struktur aljabar.
- Aljabar linier.
- Teori bilangan.
- Teori urutan.
- Teori graf.

Perubahan



Calculus



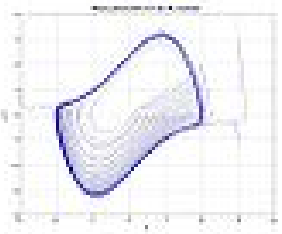
Vector calculus

$$\int 1_S \, d\mu = \mu(S)$$

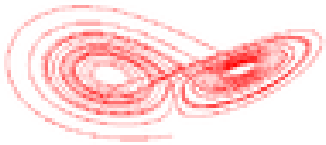
Analysis

$$\frac{d^2}{dx^2}y = \frac{d}{dx}y + c$$

Differential equations



Dynamical systems



Chaos theory

Apa yang seharusnya dilakukan oleh matematikawan?

- Mencari pola.
- Merumuskan konjektur baru.
- Membuktikan kebenaran secara deduktif berdasarkan aksioma-aksioma dan definisi.

Deduksi

- Seorang matematikawan akan menyelesaikan masalah dengan menggunakan logika dan deduksi. Deduksi adalah sebuah cara sebuah khusus dalam berfikir dalam memperoleh dan membuktikan *kebenaran* yang baru dengan menggunakan kebenaran yang sebelumnya.
- Cara berfikir deduktif membedakan berfikir matematis dengan yang lainnya.

Pada pintu terpampang:

Apa sajakah persamaannya?

an Huef, A., Kaliszewski, S. & Raeburn, I. F. (2008). Covariant representations of Hecke algebras and imprimitivity for crossed products by homogeneous spaces. *Journal of Pure and Applied Algebra, 212* (10), 2344-2357.
View Abstract

Kaliszewski, S., Quigg, J. & Raeburn, I. F. (2008). Proper actions, fixed-point algebras, and naturality in nonabelian duality. *Journal of Functional Analysis, 254* (12), 2949-2968.
View Abstract

Crocker, D., Raeburn, I. F. & Williams, D. P. (2007). Equivariant Brauer and Picard groups and a Chase-Harrison-Rosenberg exact sequence. *Journal of Algebra, 307* (1), 397-408.

Adji, S., Raeburn, I. F. & Rosjanuardi, R. (2007). Group Extensions and the Primitive Ideal Spaces of Toeplitz Algebras. *Glasgow Mathematical Journal, 49* (1), 81-92.

an Huef, A., Raeburn, I. F. & Williams, D. P. (2007). Properties preserved under Morita equivalence of C*-algebras. *Proceedings of the American Mathematical Society, 135* (5), 1495-1503.

Apa sajakah persamaannya?

Larsen, N. S. & Raeburn, I. (2007). Projective multi-resolution analyses arising from direct limits of Hilbert modules. *Mathematica Scandinavica, 100* (2), 317-360.

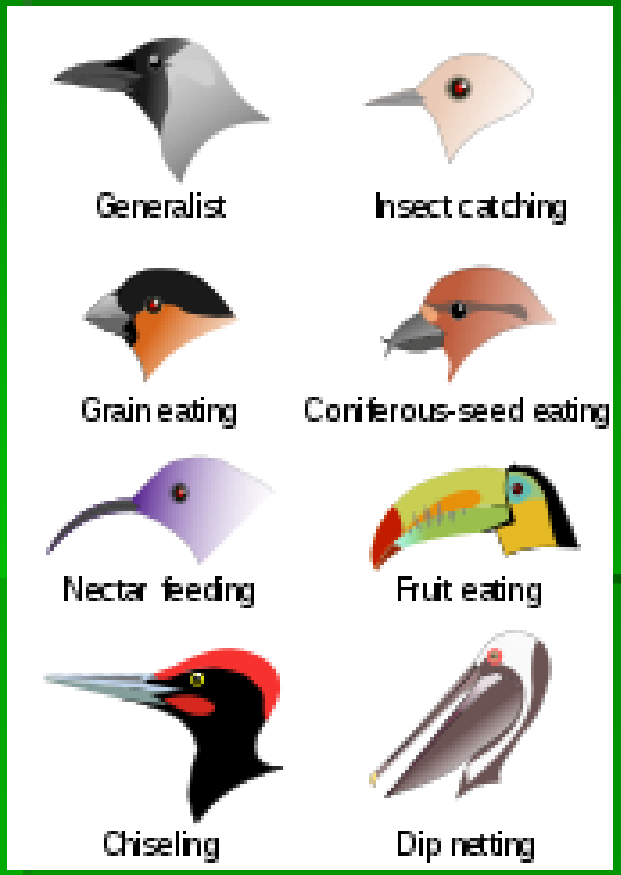
an Huef, A., Kaliszewski, S. & Raeburn, I. (2007). Extension problems and non-abelian duality for C*-algebras. *Bulletin of the Australian Mathematical Society, 75* (2), 229-238.

an Huef, A., Kaliszewski, S., Raeburn, I. F. & Williams, D. P. (2007). Induction in stages for crossed products of C*-algebras by maximal coactions. *Journal of Functional Analysis, 252* (1), 356-398.
View Abstract

Brownlowe, N. D. & Raeburn, I. F. (2006). Exel's crossed product and relative Cuntz-Pimsner algebras. *Mathematical Proceedings of the Cambridge Philosophical Society, 141* (3), 497-508.

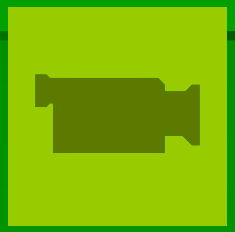
Pask, D. A., Raeburn, I. F., Rordam, M. & Sims, A. D. (2006). Rank-2 graphs whose C*-algebras are direct limits of circle algebras. *Journal of Functional Analysis, 239* (1), 137-178.
View Abstract

Spesialisasi



Bergantung pada lingkungan

Di manakah masalah matematika muncul?



Berfikir matematis (kajian di sekolah)

- Diambil dari tulisannya Kaye Stacey

Teaching students to think mathematically.

- I will discuss a mathematical problem which can be used to teach students to think mathematically and to solve mathematical problems that are unfamiliar and new to them. The processes of looking at special cases, generalising, conjecturing and convincing will be highlighted through these examples, These are key processes in thinking mathematically.

Principles

- Mathematical thinking is an important goal of schooling
- Mathematical thinking is important as a way of learning mathematics
- Mathematical thinking is important for teaching mathematics
- Mathematical thinking proceeds by
  - specialising and generalising
  - conjecturing and convincing

Andrew Wiles: Doing mathematics is like a journey through a dark unexplored mansion.

One enters the first room of the mansion and it's dark. One stumbles around bumping into furniture, but gradually you learn where each piece of furniture is. Finally, after six months of so, you find the light switch, you turn it on, and suddenly it's all illuminated. You can see exactly where you were. Then you move into the next room and spend another six months in the dark. So each of these breakthroughs, while sometimes they're momentary, sometimes over a period of a day or two, they are the culmination of, and couldn't exist without, the many months of stumbling around in the dark that precede them.

Andrew Wiles proved Fermat's Last Theorem in 1994.
First stated by Pierre de Fermat, 1637.
Unsolved for 357 years.
Quoted by Simon Singh (1997)

mathematical thinking

Activity Name	Age	Purpose	Things You Will Need
Shape Sorters	3-4	To help your child learn about numbers, counting and problem solving.	▪ Foam shapes (rectangle, square, circle, diamond, triangle, star, heart, or oval)
Bears At the Zoo	3-4	To help your child learn to sort, understand patterns and positional words.	▪ "Counting Bears" (about 20 small plastic bears in 4 colors) ▪ Four (4) containers, labeled with the same colors as the bears ▪ The book: *We're Going on a Bear Hunt* by Helen Oxenbury
Shape Detective	3-4	To help your child identify and look for shapes.	▪ The book: *Brown Rabbit's Shape Book* by Allen Baker ▪ Paper bag ▪ Foam shapes (rectangle, square, circle, diamond, triangle, star, heart, or oval)
Let's Measure it!	3-4	To help your child begin to understand measurement.	▪ Plastic measuring cups ▪ Plastic measuring spoons ▪ Two (2) plastic tubs or containers
Water Play	0-2	To support your child in exploring his/her world.	▪ Plastic measuring cups ▪ Plastic tub

The School Readiness Activity Box Series, developed by Ready At Five, will help you build your child's skills in the seven Domains of Learning:

- Social & emotional development
- Physical development
- Language & literacy
- Mathematical thinking
- Scientific thinking
- Social studies
- The arts

To get activities in each of the above areas, visit www.readyatfive.org.

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