

# Kemampuan Melihat & Mempelajari “Hantu” Matematika

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*Freedom Institute*

Maret 2015

# Kemiripan antara Matematika & Hantu

- Orang yang bisa menguasai matematika seperti orang yang bisa melihat hantu.
- Ia seolah bisa masuk ke alam matematika, asyik bermain di sana, tetapi ketika kembali ke alam fisis dan menceritakannya **kepada orang lain**, tidak ada yang memahaminya.
- Padahal, menurutnya, “hantu” matematika itu cantik. Sayangnya ‘ngga ada yang percaya. “Apa gunanya mempelajari hantu matematika itu?”

# Perbedaan antara Matematika & Hantu

- Bayangkan rumah angker yang dipercayai ada hantunya.
- Bawa ~5 orang yang mengaku bisa melihat hantu.
- Minta mereka, SECARA TERPISAH, menulis/ menjelaskan sosok hantu yang mereka lihat.
- Bandingkan penjelasan mereka.
- *Kira-kira mereka sepakat 'ngga ya tentang sosok hantu itu?*

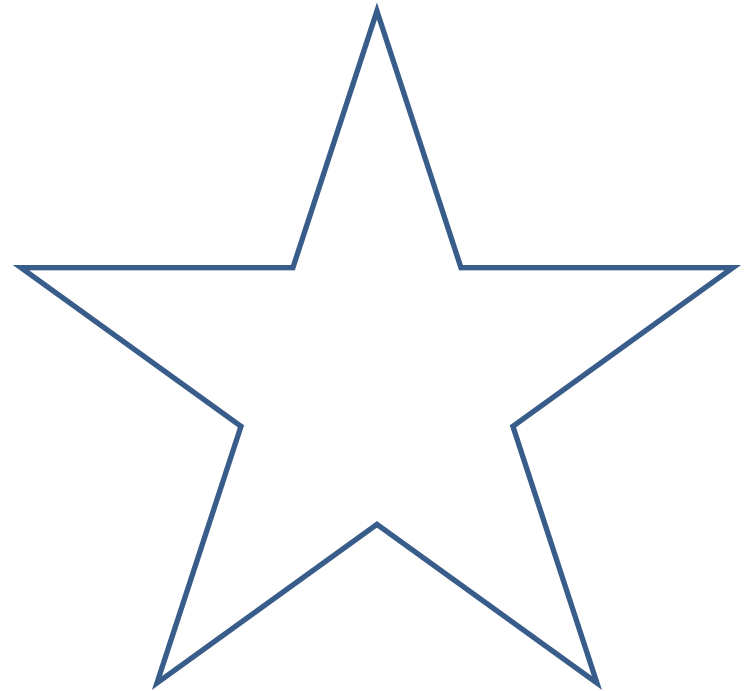
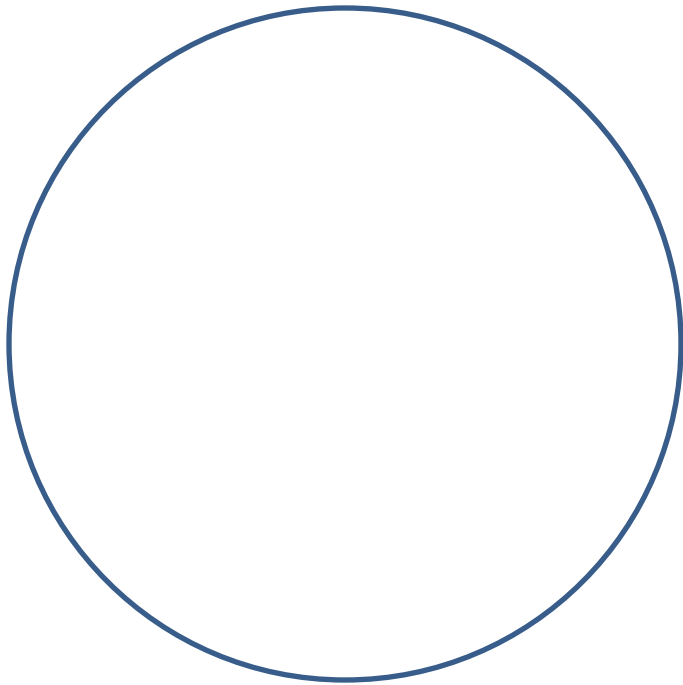
# Ilmu tentang Hantu

- Bayangkan si A telah melihat hantu, lalu menulis tentang hantu itu.
- Bayangkan 10 tahun kemudian, si B yang telah membaca tulisan si A, juga bisa melihat hantu itu dan kemudian mempelajari LEBIH LANJUT tentang hantu itu. Sebagai hasilnya, si B membuat tulisan yang lebih rinci tentang hantu itu.
- Bayangkan 20 tahun kemudian si C membaca tulisan si A dan si B, lalu... [teruskan sendiri]

# Matematika merupakan Ilmu

- Berbeda dengan hantu yang gaib itu, matematika merupakan ilmu.
- Ia dikembangkan dan berkembang sebagai ilmu, khususnya sejak era Yunani Kuno.
- Kemampuan dan ***kepekaan*** matematika bisa diasah [bukan dengan bertapa tetapi berlatih].

# Apa yang Anda Lihat?



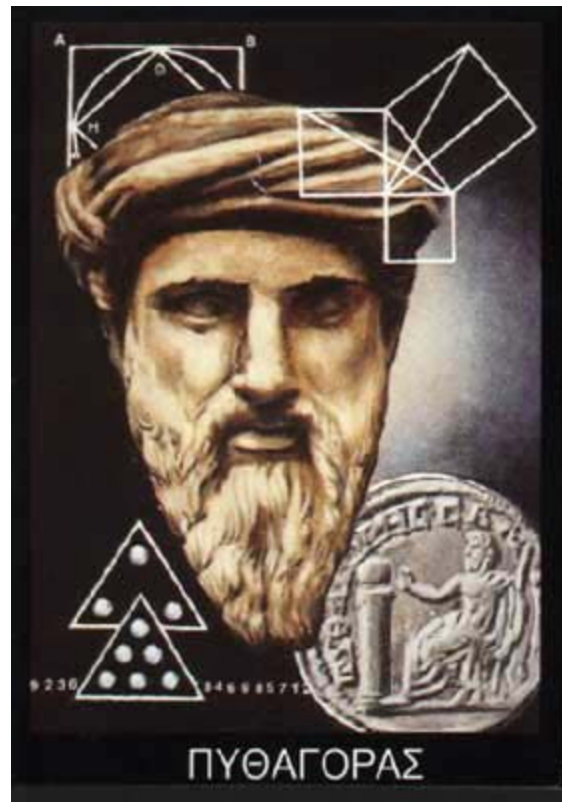
Kalau anda hanya melihat lingkaran (di sebelah kiri) dan bintang (di sebelah kanan), anda perlu mengasah kepekaan matematika anda. 😊

# Kemampuan Matematika

- Sebagai matematikawan, saya bisa menceritakan apa yang saya telah pelajari dan temukan **kepada sesama matematikawan**, dan mereka bisa memahaminya dan setuju.
- Tetapi, barangkali mirip dengan kemampuan melihat hantu, kemampuan matematika juga bertingkat-tingkat. Apa yang dipahami oleh Terence Tao tidak serta-merta bisa dipahami oleh saya **(karena kemampuan saya lebih rendah)**.
- Apa yang telah disetujui oleh para matematikawan menjadi dokumen tertulis dan terus bertambah **sejak era Yunani Kuno**.

# Pythagoras

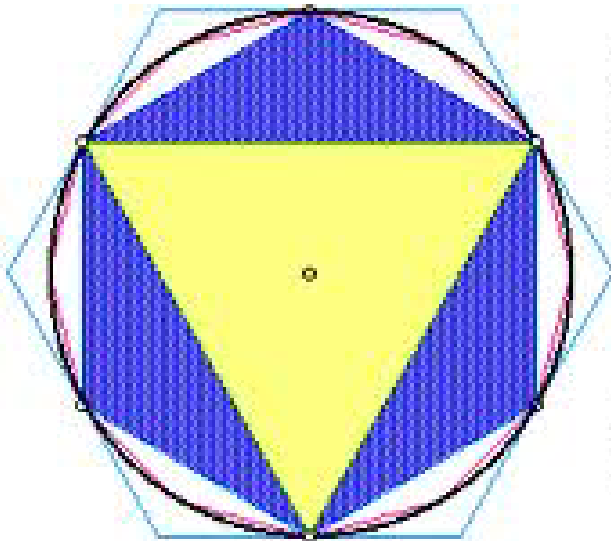
[NoMaas.org]





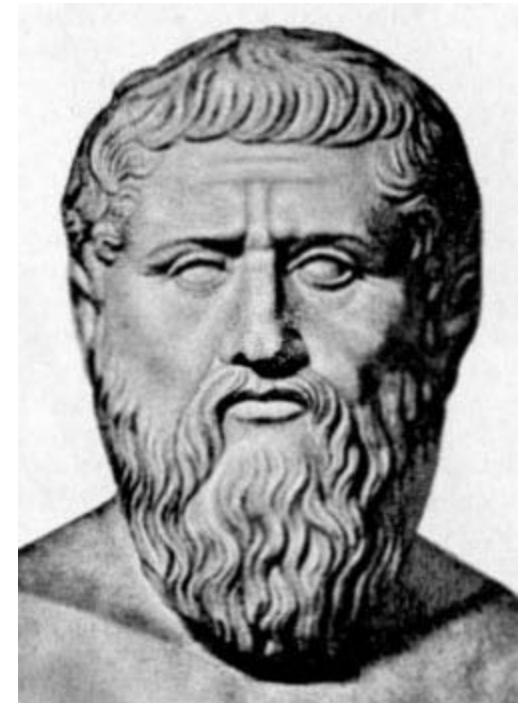
# Antiphon

[[perseus.mpiwg-berlin.mpg.de](http://perseus.mpiwg-berlin.mpg.de)]



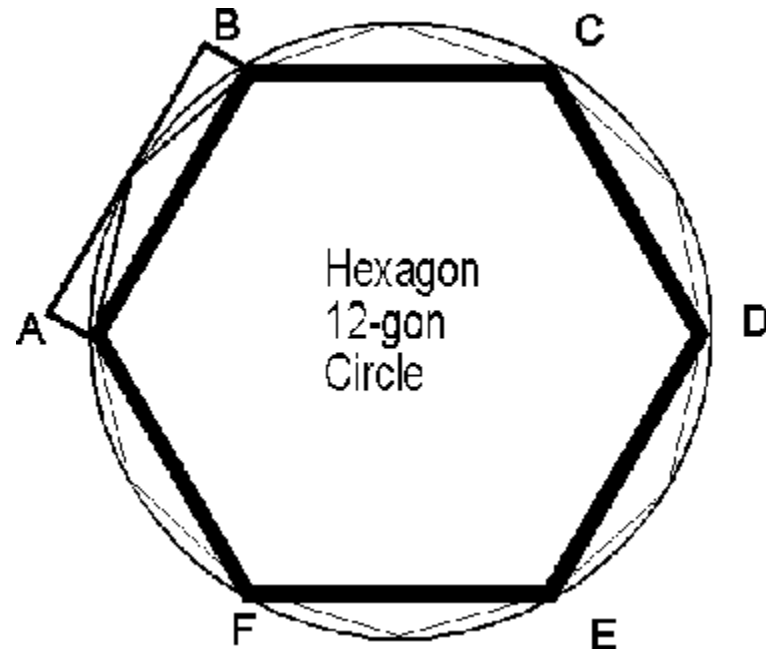
The practicality of Antiphon's idea is apparent since it is already difficult to see the excess area between the duodecagon (pink) and the circle.

Bryson's idea was to "squeeze" out the actual area, as illustrated by the two blue hexagons.



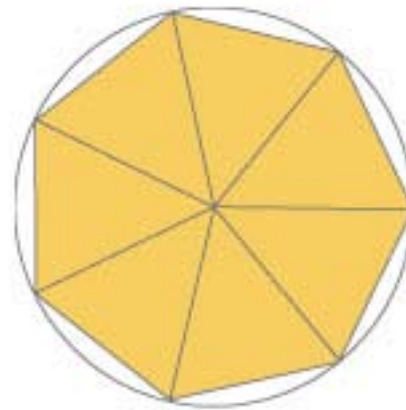
# Eudoxus

[people.famouswhy.com]



# Archimedes

[en.wikipedia.org]



$\pi$

# ***Math Genealogy***

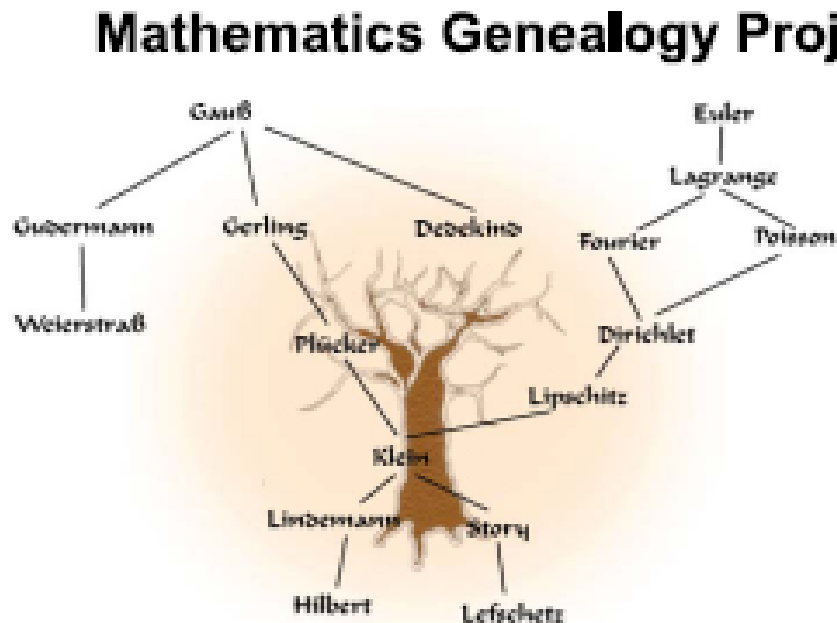
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## Hendra Gunawan

[MathSciNet](#)

Ph.D. [University of New South Wales](#) 1992



Dissertation: *Maximal Functions and Harmonic Analysis*

Mathematics Subject Classification: 42—Fourier analysis

Advisor: [Michael George Cowling](#)

Students:

Click [here](#) to see the students listed in chronological order.

Name	School	Year	Descendants
<a href="#">Eridani Campanato</a>	Institut Teknologi Bandung	2005	
<a href="#">Sumaneng Gazali</a>	Institut Teknologi Bandung	2012	
<a href="#">Endang Ruswaman</a>	Padjadjaran University	2010	
<a href="#">Alha Sihwaningrum</a>	Institut Teknologi Bandung	2010	

According to our current on-line database, Hendra Gunawan has 4 [students](#)  
 and 4 [descendants](#).

We welcome any additional information.

If you have additional information or corrections regarding this mathematician, please use the [update form](#). To submit students of this mathematician, please use the [new data form](#), noting this mathematician's MGP ID of 103120 for the advisor ID.

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## Michael George Cowling

[MathSciNet](#)

Ph.D. [Flinders University of South Australia](#) 1974



Dissertation: *Spaces  $A_p$  and  $L^p$ - $L^q$  Fourier Multipliers*

Advisor: [Garth Isac Gaudry](#)

Students:

Click [here](#) to see the students listed in chronological order.

Name	School	Year	Descendants
<a href="#">Abdul Alshofari</a>	University of New South Wales	2005	
<a href="#">Brian Dacorogna</a>	University of New South Wales	1995	
<a href="#">Hendra Gunawan</a>	University of New South Wales	1992	4
<a href="#">Rupert McCauley</a>	University of New South Wales	2007	
<a href="#">Wfried Ehas</a>	University of New South Wales	1997	
<a href="#">Keith Rossas</a>	University of New South Wales	2004	
<a href="#">Robert Tannari</a>	University of New South Wales	2008	
<a href="#">Benjamin Warhurst</a>	University of New South Wales	2005	

According to our current online database, Michael Cowling has [8 students](#) and [12 descendants](#).

We welcome any additional information.

If you have additional information or corrections regarding this mathematician, please use the [update form](#). To submit students of this mathematician, please use the [new data form](#), noting this mathematician's MGP ID of 75710 for the advisor ID.

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## Garth Ian Gaudry

[MathSciNet](#)

Ph.D. [Australian National University](#) 1965



Dissertation: *Quasimeasures and Multiplier Problems*

Mathematics Subject Classification: 43—Abstract harmonic analysis

Advisor: [Robert Edmund Edwards](#)

Student:

Name	School	Year	Descendants
<a href="#">Michael Grewing</a>	Flinders University of South Australia	1974	12

According to our current on-line database, Garth Gaudry has [1 student](#) and [13 descendants](#).

We welcome any additional information.

If you have additional information or corrections regarding this mathematician, please use the [update form](#). To submit students of this mathematician, please use the [new data form](#), noting this mathematician's MGP ID of 57370 for the advisor ID.

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Fargo, North Dakota 58108-6050





# Mathematics Genealogy Project

## Robert Edmund Edwards

[MathSciNet](#)

Ph.D. University of London 1951



Dissertation: *Theory of Normed Rings, and Translations in Function Spaces*

Advisor 1: [Jacob Linnel Bakst Gerner](#)

Students:

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Name	School	Year	Descendants
<a href="#">Lynette Bloom</a>	Australian National University	1979	
<a href="#">Walker Bloom</a>	Australian National University	1974	
<a href="#">Anthony Dooley</a>	Australian National University	1977	11
<a href="#">Graham Elton</a>	Australian National University	1968	1
<a href="#">Desmond Feamly-Sander</a>	Australian National University	1963	2
<a href="#">Garth Gaudry</a>	Australian National University	1965	13
<a href="#">John Price</a>	Australian National University	1970	2
<a href="#">Jeffery Sanders</a>	Australian National University	1975	

According to our current on-line database, Robert Edwards has 8 [students](#) and 37 [descendants](#).

We welcome any additional information.

If you have additional information or corrections regarding this mathematician, please use the [update form](#). To submit students of this mathematician, please use the [new data form](#), noting this mathematician's MGP ID of 42237 for the advisor ID.

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## Jacob Lionel Bakst Cooper

[Biography](#) [MathSciNet](#)

D.Phil. University of Oxford 1940



Dissertation: *Theory And Application Of Fourier Integrals*

Advisor: [Edward Charles Titchmarsh](#)

Students:

Click [here](#) to see the students listed in chronological order.

Name	School	Year	Descendants
<a href="#">Robert Edwards</a>	University of London	1951	37
<a href="#">Carlos Finau</a>	University of London	1978	1
<a href="#">Ron Larhem</a>	University of London	1980	
<a href="#">James Stewart</a>	University of Toronto	1957	2

According to our current on-line database, Jacob Cooper has 4 [students](#) and 44 [descendants](#).

We welcome any additional information.

If you have additional information or corrections regarding this mathematician, please use the [update form](#). To submit students of this mathematician, please use the [new data form](#), noting this mathematician's MGP ID of 18575 for the advisor ID.

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## Edward Charles Titchmarsh

[Electronic MathSciNet](#)

M.A. [University of Oxford](#)



Dissertation:

Advisor: [G. H. \(Godfrey Harold\) Hardy](#)

Students:

Click [here](#) to see the students listed in chronological order.

Name	School	Year	Descendants
<a href="#">Frederick Atkinson</a>	University of Oxford	1939	40
<a href="#">Peter Bush</a>	University of Oxford	1961	1
<a href="#">Nalini Chakraverty</a>	Calcutta University	1961	
<a href="#">Richard Cooke</a>		1928	8
<a href="#">Jacob Cooper</a>	University of Oxford	1940	44
<a href="#">William Evans</a>	University of Oxford	1966	11
<a href="#">W. Norris Everitt</a>	University of Oxford	1966	34
<a href="#">Andrew Guinand</a>	University of Oxford		4
<a href="#">P. Heywood</a>	University of Oxford	1952	
<a href="#">Morsy Macphail</a>	University of Oxford	1936	2
<a href="#">John MeLond</a>	University of Oxford	1959	53
<a href="#">Szu-Hoa Min (孫華敏)</a>	University of Oxford	1947	37
<a href="#">Bajji Prasad</a>	Université de Paris	1932	25
<a href="#">Douglas Sears</a>			25
<a href="#">S. M. Shah</a>	University of London	1942	90

According to our current on-line database, Edward Titchmarsh has 15 [students](#) and 389 [descendants](#).

We welcome any additional information.

## G. H. (Godfrey Harold) Hardy

[Biography](#) [MathSciNet](#)

M.A. University of Cambridge 1903



Dissertation:

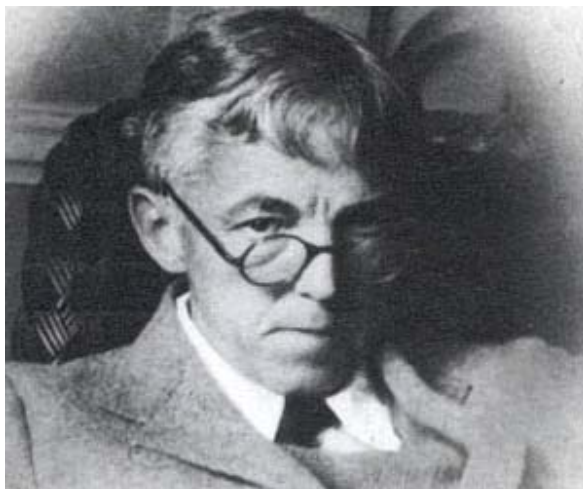
Advisor 1: [Augustus Edward Hough Love](#)

Advisor 2: [Edmund Taylor Whittaker](#)

Students:

Click [here](#) to see the students listed in chronological order.

Name	School	Year	Descendants
<a href="#">M. Ahmed</a>	University of Edinburgh	1931	
<a href="#">A. Bassani</a>	University of Oxford	1936	
<a href="#">Lancelotti Rosanoff</a>	University of Oxford	1930	93
<a href="#">Mary Cartwright</a>	University of Oxford	1930	139
<a href="#">Sydney Chapman</a>	University of Cambridge	1911	104
<a href="#">Irving Good</a>	University of Cambridge	1941	3
<a href="#">Mihirad Haslam-Jones</a>	University of Oxford	1928	66
<a href="#">E. Infont</a>	University of Oxford	1929	12
<a href="#">Frank Morley</a>	University of Oxford	1923	
<a href="#">A. Cyril Offord</a>	University of Cambridge	1936	34
<a href="#">P. Owen</a>	University of Oxford	1933	
<a href="#">Edgar Phillips</a>	University of Oxford	1933	
<a href="#">Harry Pitt</a>	University of Cambridge	1938	7
<a href="#">R. Probst</a>	University of Oxford	1934	
<a href="#">Richard Rado</a>	University of Cambridge	1935	280
<a href="#">Srinivasa Ramanujan</a>	University of Cambridge	1913	1
<a href="#">Robert Rankin</a>	University of Cambridge	1940	11
<a href="#">K. Ananda Rau</a>	University of Cambridge	1919	229
<a href="#">Frank Smithies</a>	University of Cambridge	1937	894
<a href="#">Doris H. Spencer</a>	University of Cambridge	1939	807
<a href="#">P. L. Srivastava</a>	University of Oxford	1927	
<a href="#">Edward Titchmarsh</a>	University of Oxford		389
<a href="#">T. Vijayaraghavan</a>	University of Oxford	1929	27
<a href="#">Edward Wright</a>	University of Oxford		1



*Terima Kasih atas Perhatiannya.*