https://en.wikipedia.org/wiki/OpenGL

JULIA GILLARD
CHAIR OF THE BOARD OF DIRECTORS

Julia Gillard joined the Global Partnership for Education as chair of the Board of Directors in 2014 after a distinguished public service career in Australia. Following her passion for education, she was appointed a Commissioner at the International Commission for Global Education Opportunity in 2015 and became Patron at CAMFED, the Campaign for Female Education, in 2016. She is also a Distinguished Fellow at the Center for Universal Education at the Brookings Institution.

Ms. Gillard served as Prime Minister of Australia between 2010 and 2013 and delivered nation-changing policies including reforming Australia's education at every level from early childhood to university education, improving the provision and sustainability of health care, aged care and dental care, commencing Australia's first ever national scheme to care for people with disabilities.

Before becoming Prime Minister, Ms. Gillard was Deputy Prime Minister and Minister for Education, Employment and Workplace Relations and Social Inclusion. From 2003 to 2006, Ms. Gillard served as Shadow Minister for Health followed in 2006 by an appointment as Shadow Minister for Employment and Industrial Relations and Social Inclusion.

Ms. Gillard is the first woman to ever serve as Australia's Prime Minister and Deputy Prime Minister. In October 2012, Ms Gillard received worldwide attention for her speech in Parliament on the treatment of women in professional and public life.

In recognition of her remarkable achievements and public service, Ms Gillard was awarded a Companion in the Order of Australia in January 2017.

GPE Transforming Education information@globalpartnership.org GPforEducation GlobalPartnership GPforEducation globalpartnership.org

JULIA GILLARD
PRÉSIDENTE DU CONSEIL D'ADMINISTRATION

Julia Gillard a rejoint le Partenariat mondial pour l'éducation en tant que Présidente du Conseil d'administration en 2014, après une brillante carrière au service de son pays, l'Australie.

Passionnée par l'éducation, elle a été nommée en 2015, commissaire à la Commission Internationale sur le financement des opportunités en matière d'éducation dans le monde, et est devenue « marraine » de la CAMFED (Campagne pour l'éducation des femmes) en 2016. Elle est également un membre émérite du *Center for Universal Education* de la Brookings Institution.

Mme Gillard a été Première Ministre de l'Australie entre 2010 et 2013 et y a entrepris de vastes réformes, notamment dans le secteur de l'éducation, à tous les niveaux de l'éducation, de la petite enfance à l'enseignement supérieur. Elle a également initié des programmes ayant contribué à l'amélioration de la fourniture et de la durabilité des soins de santé, des soins aux personnes âgées et des soins dentaires, et commençant le tout premier programme australien de soins pour les personnes handicapées.

Avant de prendre les rênes du gouvernement, Mme Gillard a été vice-Première ministre et ministre de l'Éducation, de l'Emploi, des Relations en milieu de travail et de l'Inclusion sociale. De 2003 à 2006, Mme Gillard a exercé les fonctions de ministre déléguée à la santé, suivie en 2006 par un poste de ministre déléguée à l'Emploi, aux Relations industrielles et à l'inclusion sociale.

Mme Gillard a été la première femme à occuper le poste de Première Ministre et vice-première ministre de l'Australie. En octobre 2012, Mme Gillard a attiré l'attention du monde entier pour son discours sur le traitement des femmes dans la vie professionnelle et publique, prononcé devant le Parlement australien.

En reconnaissance de ses réalisations remarquables et des services rendus à son pays, Mme Gillard a reçu le titre de Compagnon de l'Ordre de l'Australie en janvier 2017.

GPE Transformer l'éducation information@globalpartnership.org GPforEducation GlobalPartnership GPforEducation globalpartnership.org

17 Equations That Changed the World
by Ian Stewart

1.	**Pythagoras's Theorem**	$a^2+b^2=c^2$	Pythagoras,530 BC
2.	**Logarithms**	$\log xy = \log x + \log y$	John Napier, 1610
3.	**Calculus**	$\frac{\mathrm{d}f}{\mathrm{d}t} = \lim_{h\to 0} = \frac{f(t+h)-f(t)}{h}$	Newton, 1668
4.	**Law of Gravity**	$F = G\frac{m_1 m_2}{r^2}$	Newton, 1687
5.	**The Square Root of Minus One**	$i^2 = -1$	Euler, 1750
6.	**Euler's Formula for Polyhedra**	$V - E + F = 2$	Euler, 1751
7.	**Normal Distribution**	$\Phi(x) = \frac{1}{\sqrt{2\pi\rho}} e^{\frac{(x-\mu)^2}{2\rho^2}}$	C.F. Gauss, 1810
8.	**Wave Equation**	$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$	J. d'Almbert, 1746
9.	**Fourier Transform**	$f(\omega) = \int_{\infty}^{\infty} f(x) e^{-2\pi i x \omega} \mathrm{d}x$	J. Fourier, 1822
10.	**Navier-Stokes Equation**	$\rho\left(\frac{\partial \mathbf{v}}{\partial t} + \mathbf{v}\cdot\nabla\mathbf{v}\right) = -\nabla p + \nabla\cdot\mathbf{T} + \mathbf{f}$	C. Navier, G. Stokes, 1845
11.	**Maxwell's Equations**	$\nabla\cdot\mathbf{E}=0$, $\nabla\times\mathbf{E} = -\frac{1}{c}\frac{\partial\mathbf{H}}{\partial t}$, $\nabla\cdot\mathbf{H}=0$, $\nabla\times\mathbf{H} = \frac{1}{c}\frac{\partial E}{\partial t}$	J.C. Maxwell, 1865
12.	**Second Law of Thermodynamics**	$\mathrm{d}S \geq 0$	L. Boltzmann, 1874
13.	**Relativity**	$E = mc^2$	Einstein, 1905
14.	**Schrodinger's Equation**	$i\hbar\frac{\partial}{\partial t}\Psi = H\Psi$	E. Schrodinger, 1927
15.	**Information Theory**	$H = -\sum p(x)\log p(x)$	C. Shannon, 1949
16.	**Chaos Theory**	$x_{t+1} = kx_t(1-x_t)$	Robert May, 1975
17.	**Black-Scholes Equation**	$\frac{1}{2}\sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} + rS\frac{\partial V}{\partial S} + \frac{\partial V}{\partial t} - rV = 0$	F. Black, M. Scholes, 1990

https://en.wikipedia.org/wiki/Quadratic_equation

https://en.wikipedia.org/wiki/Percolation

Finished achieving equality,
next achieve proper marriage certificate,
in the context of January 15th,
among neighbours, while eight planets are travelling.

https://en.wikipedia.org/wiki/Travelling_salesman_problem

https://en.wikipedia.org/wiki/Four_color_theorem#Simplification_and_verification

Australian Labour Party.

To,
Pope Benedict,
Pope Francis,
and Julia Eileen Gillard.

Subject: Regarding May 25th, Towel Day

President James Abram Garfield has solved Pythagoras theorem,
and four_colour_theorem has been been solved.

Regarding 'percolation' among residents and neighbours, while the planets are travelling,
poincare_conjecture has been established to be true.

The birthday of Gregor Mendel, happens to be 20th July, 1822.
{ e^(i*π) + tan(π/4) = 40 – ((5*4)*2) }

So wish you a Happy New Year, 2021 Common Era, January 15th.

Previously I had decided that, I will not be purchasing content from media outlets,
that keep publishing => "Britney Spears, got married again, and got a divorce after thirty minutes of marriage".

OK, then,
thanks, and bye.
N K Kumar

Additional note:
This seems to be a relevant and good video => https://youtu.be/A84MgzOtOLA
The 7 Smartest Animals In The World | Answers With Joe.

Generally speaking, another member of the same species will be involved,
because tan(pie_by_four) is not_a_prime_number. OK.

https://en.wikipedia.org/wiki/Britney_Spears#2008-2010:_Conservatorship_and_Circus
https://en.wikipedia.org/wiki/Whanganui_River

https://en.wikipedia.org/wiki/Travelling_salesman_problem
https://www.youtube.com/results?search_query=madonna+the+power+of+good+bye+with+lyrics
Angle within a regular polygon of a-sides = [(a-2)/a]*(pi); while summation = 1 + 2 + 3 + ... + (a-1) + a = a*(a+1)/2;
Angle within a regular polygon of b-sides = [(b-2)/b]*(pi); while summation = 1 + 2 + 3 + ... + (b-1) + b = b*(b+1)/2;

Perimeter of an Ellipse

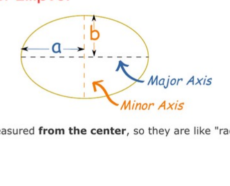
On the Ellipse page we looked at the definition and some of the simple properties of the ellipse, but here we look at how to more accurately calculate its perimeter.

Perimeter

Rather strangely, the perimeter of an ellipse is **very difficult to calculate**!

There are many formulas, here are some interesting ones. (Also see Calculation Tool below.)

First Measure Your Ellipse!



a and **b** are measured **from the center**, so they are like "radius" measures.

Approximation 1

This approximation is within about 5% of the true value, so long as **a** is not more than 3 times longer than **b** (in other words, the ellipse is not too "squashed"):

$$p \approx 2\pi\sqrt{\frac{a^2+b^2}{2}}$$

Approximation 2

The famous Indian mathematician **Ramanujan** came up with this better approximation:

$$p \approx \pi\left[3(a+b) - \sqrt{(3a+b)(a+3b)}\right]$$

Approximation 3

Ramanujan also came up with this one. First we calculate "h":

$$h = \frac{(a-b)^2}{(a+b)^2}$$

Then use it here:

$$p \approx \pi(a+b)\left(1 + \frac{3h}{10+\sqrt{4-3h}}\right)$$

Infinite Series 1

This is an **exact formula**, but it needs an "infinite series" of calculations to be exact, so in practice we still only get an approximation.

First we calculate e (the "eccentricity", **not** Euler's number "e"):

$$e = \frac{\sqrt{a^2-b^2}}{a}$$

Then use this "infinite sum" formula:

$$p = 2a\pi\left(1 - \sum_{i=1}^{\infty}\frac{(2i)!^2}{(2^i\cdot i!)^4}\cdot\frac{e^{2i}}{2i-1}\right)$$

Which may look complicated, but expands like this:

$$p = 2a\pi\left[1 - \left(\frac{1}{2}\right)^2 e^2 - \left(\frac{1\cdot 3}{2\cdot 4}\right)^2\frac{e^4}{3} - \left(\frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6}\right)^2\frac{e^6}{5} - \ldots\right]$$

The terms continue on infinitely, and unfortunately we must calculate a lot of terms to get a reasonably close answer.

Infinite Series 2

But my favorite **exact formula** (because it gives a very close answer after only a few terms) is as follows:

First we calculate "h":

$$h = \frac{(a-b)^2}{(a+b)^2}$$

Then use this "infinite sum" formula:

$$p = \pi(a+b)\sum_{n=0}^{\infty}\binom{0.5}{n}^2 h^n$$

(Note: the $\binom{0.5}{n}$ is the Binomial Coefficient with half-integer factorials ... wow!)

It may look a bit scary, but it expands to this series of calculations:

$$p = \pi(a+b)\left(1 + \frac{1}{4}h + \frac{1}{64}h^2 + \frac{1}{256}h^3 + \ldots\right)$$

The more terms we calculate, the more accurate it becomes (the next term is 25$\mathbf{h}^4$/16384, which is getting quite small, and the next is 49$\mathbf{h}^5$/65536, then 441$\mathbf{h}^6$/1048576)

The Perfect Formula

There is a perfect formula using an integral:

$$p = 4a\int_0^{\frac{\pi}{2}}\sqrt{(1 - e^2\sin^2\theta)}\,d\theta$$

But calculating it needs an infinite amount of terms ("Infinite Series 1" above).

Comparing

Just for fun, I calculate the perimeter using the three approximation formulas, and the two exact formulas (but only the **first four terms including the "1"**, so it is still just an approximation) for the following values of **a** and **b**:

	Circle				Lines
a:	**10**	**10**	**10**	**10**	**10**
b:	**10**	**5**	**3**	**1**	**0**
Approx 1:	62.832	49.673	46.385	44.65	44.429
Approx 2:	62.832	48.442	43.857	40.606	39.834
Approx 3:	62.832	48.442	43.859	40.639	39.984
Series 1:	62.832	48.876	45.174	43.204	42.951
Series 2:	62.832	48.442	43.859	40.623	39.884
Exact*:	**20π**				**40**

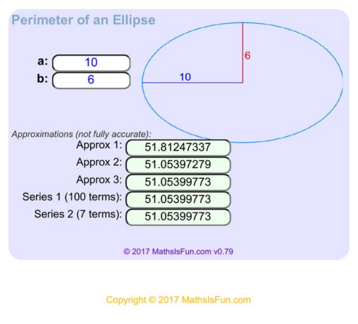
*** Exact:**

- When **a=b**, the ellipse is a circle, and the perimeter is **2πa** (62.832... in our example).
- When **b=0** (the shape is really two lines back and forth) the perimeter is **4a** (40 in our example).

They all get the perimeter of the circle correct, but only **Approx 2 and 3** and **Series 2** get close to the value of 40 for the extreme case of b=0.

Ellipse Perimeter Calculations Tool

This tool does the calculations from above, but with more terms for the Series.



https://en.wikipedia.org/wiki/Dydd_Santes_Dwynwen