**E is none of these**

1) A sizable portion of our current knowledge of ancient Egyptian mathematics stems from this text. In its 14th problem the volume of a frustum acting as a base for a pyramid is calculated. What is the name of this ancient Egyptian manuscript?
   A) Reisner Papyrus  B) Rhind Papyrus  C) Moscow Papyrus  D) Berlin Papyrus

2) This Indian mathematician and priest from around 800 BC presented an approximation for $\sqrt{2}$ correct to five decimal places in his Sulbasutra. In addition, his Sulbasutra also contained geometric solutions to linear equations of one unknown, an early version of the Pythagorean Theorem, and an approximation of $\pi$ accurate enough for constructing circular shapes on altars. Quadratic equations of the forms $ax^2 = c$ and $ax^2 + bx = c$ were also found in his writings.
   A) Baudhayana  B) Katyayana  C) Apastamba  D) Aryabhata I

3) Born around 624 BC, this Greek mathematician, philosopher, scientist, and engineer, regarded as the first of the Seven Sages, or wise men of Ancient Greece, founded abstract geometry. He is credited for theorems such as "If two straight lines intersect, the opposite angles formed are equal", and "Any angle inscribed in a semicircle is a right angle". The latter theorem is named after him. It is also said that he defined the constellation Ursa Minor, which greatly helped navigators.
   A) Thales of Miletus  B) Anaximander  C) Archimedes  D) Zeno of Elea

4) Although Gauss provided the first rigorous proof for the Fundamental Theorem of Arithmetic, stating that "All natural numbers can be formed by multiplying a unique set of prime numbers unless they are prime themselves"; this Greek mathematician essentially proved it a millennium and a half earlier. This very famous Greek mathematician hailed from a famous city which had a colossal library that was unfortunately burned down. This mathematician also wrote a very, very famous book. In Europe, during the Middle Ages, only the Bible sold more copies than this book. Name the mathematician, city, and book. Remember, they are all famous.
   A) Apollonius, Perga, *Conics*  B) Ptolemy, Alexandria, Almagest
   C) Euclid, Megara, *Elements*  D) Euclid, Athens, *Catoptrics*

5) The *Jiuzhang Suansh,* also known as *The Nine Chapters on the Mathematical Art*, was a Chinese mathematical text containing 246 practical problems. This work addressed all of the following subjects except:

A) The Gougu rule B) Volumes of various three-dimensional figures
C) Proportional distribution of money and taxes D) Astronomy

6) Hipparchus of Nicaea is known for having accomplished which of the following?

A) Calculating the radius of the Earth B) Estimating the precession of Venus' rotational axis
C) Measuring the distance from the Earth to the moon D) A & C

7) In 628 AD, this mathematician and astronomer wrote *Brahmasphutasiddhanta* ("The Opening of the Universe"). In this work, he first introduced the idea of zero by considering what happens when a number is subtracted by itself. He used analogies to fortunes and debts to better explain his idea of zero. Some of these analogies were: ***A debt minus zero is a debt. A fortune minus zero is a fortune. Zero minus zero is a zero. A debt subtracted from zero is a fortune.*** Who was this talented Indian mathematician?

A) Mahavira B) Brahmagupta C) Bhaskara D) Aryabhata II

8) Born in 805 AD, this Arab philosopher, astronomer, and mathematician was an early pioneer in the field of cryptography. He wrote *A Manuscript on Deciphering Cryptographic Messages,* which is considered to be the first text explaining methods of cryptanalysis. In it he demonstrated his frequency analysis method, in which variations in the frequency of incidence of letters were analyzed and exploited to break codes. He is also remembered for having made Greek works more accessible to Arabic scholars by translating them into a standard Arabic philosophical language.

A) al-Jawhari B) al-Kindi C) Omar Khayyam D) al-Khwarizmi

9) Which civilization used a base 20 counting system in which numbers were written using a combination of dots and horizontal bars?

A) Olmec B) Maya C) Inca D) A & B

10) Who was the author of *Liber Abaci*, meaning "Book of Calculation"? This work introduced to notion of algorithms to Europe, as well as the concept of zero.

A) Baldassarre Boncompagni B) Leonardo Pisano
C) Plato of Tivoli D) Gregorio Fontana

11) This French mathematician invented coordinate geometry, was the first to use fractional exponents, and studied infinite series. He presented his ideas on coordinate geometry in his *Tractatus de configuration qualitatum et motuum,* in which he employed the parameters of *latitudo* and *longitudo* to define different properties of a quantity. In modern notation these two would refer to the ordinate and abscissa, respectively. He also did some work on music theory and on psychology.

A) Albert Girard B) Gerard Desargues C) Rene Descartes D) Nicole Oresme

12) Mathematicians can certainly be vicious if the result of their hard work gets stolen by others. Niccolò Fontana Tartaglia and Girolamo Cardano, both excellent mathematicians, had a very nasty dispute which lasted more than a decade. This conflict occurred after Cardano claimed the credit for a discovery which Tartaglia revealed to him in secret. In order to punish Cardano, Tartaglia resorted to using one of Cardano's sons to act as an informant, and had Cardano turned over to the Inquisition for having published a horoscope of Jesus in 1554, a serious heresy at the time. Over what mathematical discovery did these mathematicians have such a bitter quarrel?

A) The solution to one case of the cubic equation
B) The proof that circles cannot be squared
C) The series expansion for the inverse-tangent function
D) The determination of the area under a cycloid

13) His nickname was Marvellous Merchiston. He had a pet black rooster, and is said to have always carried with him a black spider in a black box. Some accused him of being a necromancer, but no evidence has ever been found to back this claim. More importantly, he invented logarithms, and popularized the use of the decimal point.

A) Ludolph van Ceulen B) Henry Briggs C) James Gregory D) John Napier

14) Sir Isaac Newton was a remarkable man. He made significant advances in several scientific fields, but also dedicated a lot of his studies to theology. Which of the following works did Newton **not** write?

A) *On the Method of Series and Fluxions* B) *The Chronology of Ancient Kingdoms*
C) *On Analysis by Infinite Series* D) *On the motion of bodies in an orbit*

15) Who wrote *Discourse on Method* and *Le Monde,* respectively? The latter, a defense on the heliocentric view of the universe, was never published after its writer saw the Catholic Church's reaction to Galileo's *Dialogue*.

A) Descartes, Descartes B) Leibniz, Descartes
C) Leibniz, Kepler D) Cavalieri, Descartes

16) This seventeenth century physicist and mathematician was the first man to ever create a sustained vacuum. In 1643, he used this to create the first barometer. In addition, he devised an equation to obtain the final velocity of a moving object under a constant acceleration, without knowing the time interval involved in the acceleration. Due to his contributions to the development of calculus, another name for the Fundamental Theorem of Calculus contains his last name.

A) Isaac Barrow B) Gilles de Roberval C) Evangelista Torricelli D) James Gregory

17) Which of the following mathematicians presented the formula $e^{ix} = \cos x + i \sin x$ in his *Introductio in analysin infinitorum*?

A) Johann Bernoulli B) Brook Taylor C) Christian Goldbach D) Leonhard Euler

18) The Bernoulli family is renowned for producing exceptional mathematicians. Which of these Bernoulli's came up with the Bernoulli principle? This Bernoulli devoted most of his work to studying the basic properties of fluid flow, density, pressure and velocity.

A) Nicolaus B) Daniel C) Jakob D) Johann

19) This self-educated mathematician was born in the mid-seventeenth century. He is best remembered for having developed a theorem that states:
"If a real-valued function f is continuous on a closed interval [*a,b*], differentiable on the open interval (*a,b*), and $f(a) = f(b)$, then there is some real number c in the open interval (*a,b*) such that $f'(c) = 0$" He was also the first to use the notation $\sqrt[n]{x}$ to refer to the n$^{th}$ root of x. He is known for having described calculus as "a collection of ingenious fallacies".

A) John Craig B) Gottfried Leibniz C) James Gregory D) Michel Rolle

20) Georges-Louis Leclerc, also known as Comte de Buffon, was a French mathematician and naturalist whose views influenced the ideas of Charles Darwin. In fact, in the foreword of the sixth edition of the *Origin of Species*, Darwin wrote, "the first author who in modern times has treated [natural selection] in a scientific spirit was Buffon ". Due to his contributions to a certain field of mathematics, a famous problem was named after him, namely, the problem of Buffon's Needle. To what field of mathematics does this problem primarily apply?

A) Optimization B) Discrete Mathematics C) Integral Calculus D) Differential Geometry

21) Name the Italian mathematician and astronomer who made contributions to analysis, number theory, and to classical and celestial mechanics. He wrote *Mécanique Analytique,* is buried in the Panthéon, and during his lifetime was named to the Legion of Honour by Napoleon.

A) Joseph-Louis Lagrange B) Lorenzo Mascheroni
C) Pietro Abbati Marescotti D) Jean le Rond d'Alembert

22) All of the following are true about Carl Friedrich Gauss, except:

A) He developed the prime number theorem
B) He is the author of *Disquisitiones Arithmeticae*
C) He was born in the Duchy of Brunswick, at the time part of the Holy Roman Empire
D) He proved that constructing a regular polygon with a number of sides equal to a Fermat prime is impossible.

23) This mathematician hailed from Transylvania, Hungary. His main work was the *Tentamen*, in which he attempted to create a rigorous and systematic foundation of geometry, arithmetic, algebra, and analysis. He independently discovered, at the same time as Joseph Raabe, that a series would be convergent if it were monotonically increasing and bounded from above. He dedicated a lot of his work to try to prove the existence of non-Euclidean geometry, but ultimately, his son Janos was the one who made this discovery.

A) Nikolai Lobachevsky B) Alfréd Haar C) Farkas Bolyai D) Gyula Vályi

24) Bernhard Riemann was a German mathematician who made several contributions to the fields of analysis and differential geometry. Due to his significant work, many mathematical concepts are named after him, concepts such Riemann matrices, Riemann spheres, etc. Which of the following is not a real mathematical concept named after Riemann?

A) Riemann Sum B) Riemann Integral C) Riemann Cubic D) Riemann zeta function

25) This mathematician was born in 1802 and died in 1829. His most important discovery was that he proved that solving quintic equations in radicals was impossible. He published this finding in his *Memoir on algebraic equations, in which the impossibility of solving the general equation of the fifth degree is proven*. Despite contracting tuberculosis during his visit to Paris, he travelled by sled to visit his fiancée on December of 1828. Although the poor guy lived long enough to enjoy Christmas with her, he died some days later. Who was this brilliant mathematician after whom a certain set of functions and transformations are named for?

A) Sophus Lie B) Niels Abel C) Évariste Galois D) August Crelle

26) This German mathematician, born in Russia, is most remembered for creating a hierarchy of infinite sets based on their cardinal number. He demonstrated that the set of rational fractions has a lower cardinal number than the set of real numbers.

A) Georg Cantor B) Richard Dedekind C) Leopold Kronecker D) Karl Weierstrass

27) All of the following are true of Bertrand Russel except?

A) He is a co-author of *Principia Mathematica*.
B) He won a Nobel Prize in literature
C) Although he was pacifist, he believed that the United States should have stopped the USSR's aggressive policy towards the countries of Eastern Europe, by military means if necessary.
D) He believed that mathematics could not be based on logic

28) This hardcore mathematician "loved only numbers". He did not own any property, did not marry, and spent any money he received on charity or on awards for mathematicians who managed to solve difficult problems. He authored more than 1500 papers.

A) Kurt Gödel B) John von Neumann C) Imre Lakatos D) Géza Lakatos

29) He is quoted for stating that "Physics is much too hard for physicists". He wrote *Foundations of Geometry*. He posed 23 problems for mathematicians to solve over the course of the twentieth century, and he is regarded as the founder of the formalist school of mathematics.

A) David Hilbert B) Robert Moore C) Gustave Choquet D) Benoit Mandelbrot

30) This mathematician proved Fermat's Last Theorem.

A) Nicholas Katz B) Goro Shimura C) Andrew Wiles D) André Weil

**Tiebreaker** #1:

Name the country from which each of the following mathematicians comes from.

1) François Viète 2) Augustus De Morgan 3) Josiah Willard Gibbs

4) William Rowan Hamilton 5) Christiaan Huygens

**Tiebreaker** #2:

For each of the listed works, name the mathematician who authored it. Writing the author's last name is sufficient.

1) *Arithmetica* 2) *Mécanique Céleste* 3) *The Whetstone of Witte*

4) *Ad Locos Planos et Solidos Isagoge* 5) *Zhui shu (Method of Interpolation)*

**Tiebreaker** #3:

What do sangaku, soroban, and Pokémon have in common, and no, it's not that they all have seven letters.