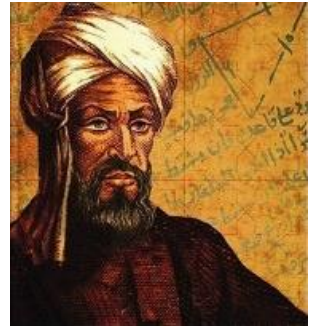


**Here is a various Arabian mathematics leader to inspire you:**

The father of Algebra and the founder of Algorithms.

**Muhammad ibn Musa al-Khwarizmi [780 – c. 850),**

Al-Khwarizmi's popularizing treatise on algebra. The Compendious Book on Calculation by Completion and Balancing, presented the first systematic solution of linear and quadratic equations. One of his principal achievements in algebra was his demonstration of how to solve quadratic equations by completing the square, for which he provided geometric justifications. Because he was the first to treat algebra as an independent discipline and introduced the methods of "reduction" and "balancing" (the transposition of subtracted terms to the other side of an equation, that is, the cancellation of like terms on opposite sides of the equation). His name gave rise to the terms algorism and algorithm.



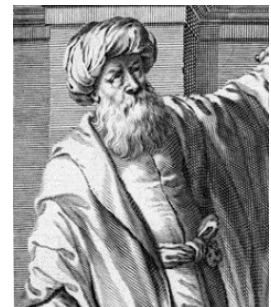
**Ibn al-Haytham c. 965 – c. 1040**

Worked on;

"the beginnings of the link between algebra and geometry"

He developed a formula for summing the first 100 natural numbers, using a geometric proof to prove the formula.

The lunes of Alhazen. The two blue lunes together have the same area as the green right triangle.



Alhazen explored what is now known as the Euclidean parallel postulate, the fifth postulate in Euclid's Elements, using a proof by contradiction, and in effect introducing the concept of motion into geometry. He formulated the Lambert quadrilateral, which Boris Abramovich Rozenfeld names the "Ibn al-Haytham–Lambert quadrilateral".

In elementary geometry, Alhazen attempted to solve the problem of squaring the circle using the area of lunes (crescent shapes), but later gave up on the impossible task. The two lunes formed from a right triangle by erecting a semicircle on each of the triangle's sides, inward for the hypotenuse and outward for the other two sides, are known as the lunes of Alhazen; they have the same total area as the triangle itself.

#### Number theory

Alhazen's contributions to number theory include his work on perfect numbers. In his Analysis and Synthesis, he may have been the first to state that every even perfect number is of the form  $2^{n-1}(2^n - 1)$  where  $2^n - 1$  is prime, but he was not able to prove this result; Euler later proved it in the 18th century.

Alhazen solved problems involving congruences using what is now called Wilson's theorem. In his Opuscula, Alhazen considers the solution of a system of congruences, and gives two general methods of solution. His first method, the canonical method, involved Wilson's theorem, while his second method involved a version of the Chinese remainder theorem.

## Calculus

Alhazen discovered the sum formula for the fourth power, using a method that could be generally used to determine the sum for any integral power. He used this to find the volume of a paraboloid. He could find the integral formula for any polynomial without having developed a general formula.



### **Omar Khayyam: (18 May 1048 – 4 December 1131)**

A Persian mathematician, astronomer, philosopher, and poet.

As a mathematician, he is most notable for his work on the classification and solution of cubic equations, where he provided geometric solutions by the intersection of conics.[7] Khayyam also contributed to the understanding of the parallel axiom.

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