ارجاعات به آثار ارسطو

- *Metaphysica* (مابعدالطبیعه) : I.9, II.2, III.5-6, V.2, IX.9, X.1-3, XI.10-12, XIII.1-10, XIV.1-6
- *Physica* (طبیعیات) : II.2-3, III.4-8, V.3, VI.1-10
- *Categoriae* (مقولات) : V.6
- *Analytica Priora* (منطق) : I.1-13, 27-30
- *Analytica Posteriora* (آنالوطیقای‌دوم) : I.1-2, I.7, I.26
- *De Anima* (روح) : III.3, III.7
- *De Caelo* (سماوات) : I.2, I.5-7, II.13-14

ماهیت اشیاء ریاضی

• The faculty of thinking then thinks the forms in images…the mind when it is thinking the objects of Mathematics thinks as separate, elements that do not exist as separate. In every case the mind which is actively thinking is the objects which it thinks. *De Anima*: III.7

• Now the mathematician, though he too treats these things, nevertheless does not treat them as limits of physical body; nor does he consider the attributes indicated as the attributes of such bodies. That is, he separates them; for in thought they are separable from motion, and it makes no difference, nor does any falsity result, if they are separated. *Physica*: II.2

Analytica Posteriora, I.2   مبنای دانش علمی

We suppose ourselves to possess unqualified scientific knowledge of a thing, as opposed to knowing it in an accidental way... when we know the cause on which the fact depends...

What I now assert is that at all events we do know by demonstration. I mean a syllogism productive of scientific knowledge, a syllogism, that is, the grasp of which is *eo ipso* such knowledge. Assuming then my thesis as to the nature of scientific knowing is correct, <u>the premises of demonstrated knowledge must be true, primary, immediate, better known than and prior to the conclusion</u>, which is further related to them as effect to cause... The premises must be true: for that which is non-existent cannot be known – we cannot know, e.g., that the diagonal of a square is commensurable with side.

Analytica Posteriora, I.2

We suppose ourselves to possess unqualified scientific knowledge of a thing, as opposed to knowing it in an accidental way… when we know the cause on which the fact depends…What I now assert is that at all events we do know by demonstration. I mean a syllogism productive of scientific knowledge, a syllogism, that is, the grasp of which is *eo ipso* such knowledge. Assuming then my thesis as to the nature of scientific knowing is correct, <u>the premises of demonstrated knowledge must be true, primary, immediate, better known than and prior to the conclusion</u>, which is further related to them as effect to cause…

Discrete vs Continuous: *Categoriae*, V.6

Quantity is either discrete or continuous…Instances of discrete are numbers and speech; of continuous, lines, surfaces, solids, and, besides these, time and place…
In the case of the parts of a number, there is no common boundary at which they join. For example: two fives make ten, but the two fives have no common boundary, but are separate; the parts three and seven also do not join at any boundary… Number, therefore, is a discrete quantity…A line, on the other hand, is a continuous quantity, for it is possible to find a common boundary at which its parts join. In the case of the line, this common boundary is the point…

Discrete vs Continuous: *Analytica Posteriora*, I.7

It follows that we cannot in demonstrating pass from one genus to another. We cannot, for instance, prove geometrical truths by arithmetic. For there are three elements in demonstration: (1) what is proved, the conclusion – an attribute inhering essentially in a genus; (2) the axioms, i.e., the axioms which are premises of demonstration; (3) the subject genus whose attributes, i.e., essential properties, are revealed by the demonstration. The axioms which are the premises of demonstration may be identical in two or more sciences: but in the case of two different genera such as arithmetic and geometry you cannot apply arithmetical demonstration to the properties of magnitudes unless the magnitudes in question are numbers...(cont.)

Discrete vs Continuous: *Analytica Posteriora,* I.7

Arithmetical demonstration and the other sciences likewise possess, each of them, their own genera; so that if the demonstration is to pass from one sphere to another, the genus must be either absolutely or to some extent the same. If this is not so, transference is clearly impossible, because the extreme and the middle terms must be drawn from the same genus: otherwise as predicated, they will not be essential and will thus be accidents. That is why it cannot be proved by geometry that ...the product of two cubes is a cube.

Summary Contents of Euclid's *Elements*

Book	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	Totals
Definitions	23	2	11	7	18	4	22	–	–	16	28	–	–	131
Postulates	5	–	–	–	–	–	–	–	–	–	–	–	–	5
Common Notions	5	–	–	–	–	–	–	–	–	–	–	–	–	5
Propositions	48	14	37	16	25	33	39	27	36	115	39	18	18	465

https://en.wikipedia.org/wiki/Euclid%27s_Elements
(February 9,2024)

منابع ریاضیات دوره اسلامی

- منابع اولیه به عربی و ترجمه‌های فارسی و زبان‌های اروپایی

- مقالات متعدد به‌خصوص از Roshdi Rashed و Jan Hogendijk

- از دوکتاب زیر خیلی استفاده شده است:

Rashed, R. *The Development of Arabic Mathematics: Between Arithmetic and Algeba*,1994

Rashed,R. & B. Vahabzadeh
Omar Khayyam, the Mathematician, 2000

مطالب این کتاب شامل محاسباتی است در ارث و وصیت و مقاسمه (= تقسیم کردن اموال مشترک) و امور دیوانی و تجارت، و نیز در مورد تمام اموری که به حساب و معامله مربوط می‌شود ـــ مانند: مساحت کردن زمینها و اندازه گیری نهرها و هندسه (= نقشه کشی) و دیگر مباحث و فنون ریاضی ـ قابل استفاده خواهد بود. این کتاب را با حسن‌نیتی که

- از مقدمه *جبر و مقابله* خوارزمی، ترجمه حسین خدیوجم
- انتشارات اطلاعات، ۱۳۶۳