Activités relatives aux éléments d'Euclide – traduction d'Oliver Byrne

Activité 1 :

Citer en français les propriétés et théorèmes figurant en Annexe.

Activité 2 :

Rédiger à la manière de Byrne dans sa traduction des éléments d'Euclide, les propriétés suivantes (avec schémas et couleurs) :

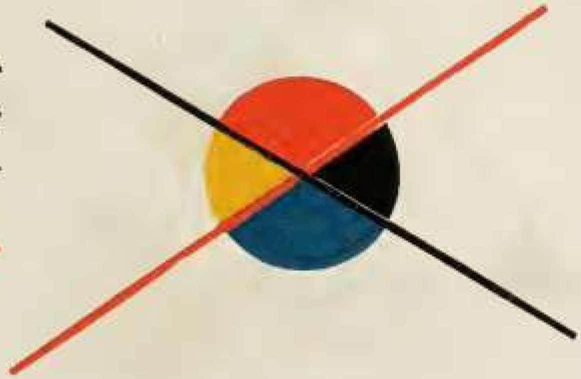
- Dans un triangle la somme des mesures des angles est égale à la mesure d'un angle plat.
- Dans un quadrilatère la somme des mesures des angles est égale à la mesure de deux angles plats.
- Si un quadrilatère a trois angles droits alors le quatrième angle est droit.
- Si deux droites coupées par une troisième définissent des angles alternes-internes égaux, alors ces deux droites sont parallèles.

(certaines des propriétés figurant en annexe, notamment celle sur les angles opposés par le sommet peuvent être données aux élèves dans le cadre de l'activité 2
certaines des propriétés de l'activité 2 peuvent être demandées aux élèves en démonstrations, à la manière de Byrne)

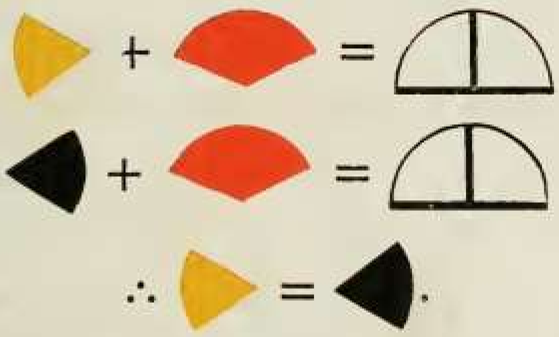
Activité 3 :

Réécrire en langage mathématique actuel les démonstrations des propriétés et théorèmes figurant en Annexe

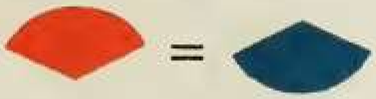
Annexe :



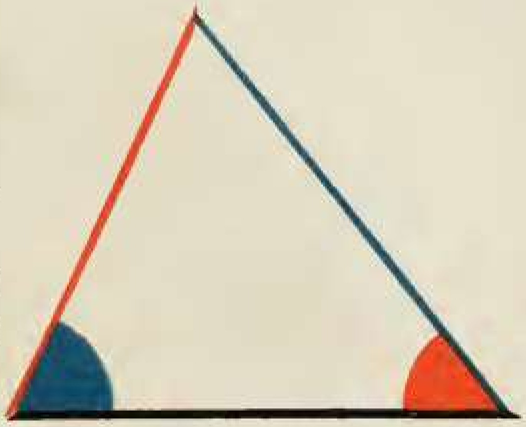
If two right lines (and) interfect one another, the vertical angles and , and are equal.



In the fame manner it may be fhown that



Q. E. D.



IF *in any triangle one angle be greater than another the side which is opposite to the greater angle, is greater than the side opposite the less.*

If be not greater than then must

= or ⊐ .

If = then

= (pr. 5.);

which is contrary to the hypothesis.

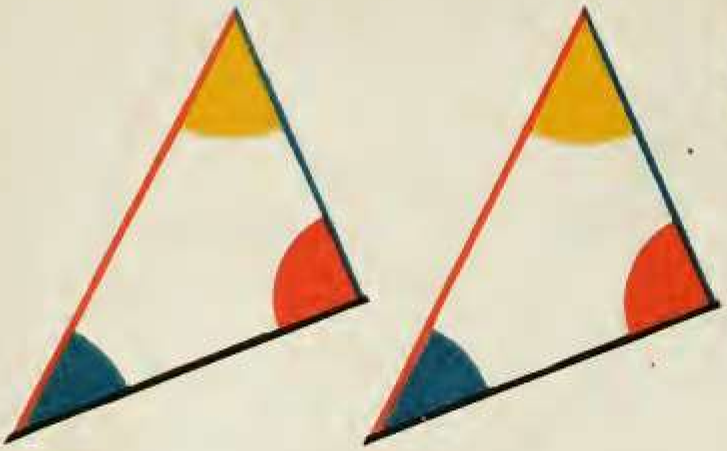
is not less than ; for if it were,

⊐ (pr. 18.)

which is contrary to the hypothesis:

∴ ⊏ .

Q. E. D.

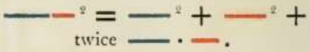


IF two triangles have two sides of the one respectively equal to two sides of the other, (to and to) and the angles ( and ) contained by those equal sides also equal; then their bases or their sides (and) are also equal: and the remaining and their remaining angles opposite to equal sides are respectively equal ( =  and  = ): and the triangles are equal in every respect.

Let the two triangles be conceived, to be so placed, that the vertex of the one of the equal angles,  or  ; shall fall upon that of the other, and to coincide with , then will coincide with if applied: consequently will coincide with , or two straight lines will enclose a space, which is impossible (ax. 10), therefore = ,  =  and  =  , and as the triangles  and  coincide, when applied, they are equal in every respect.

Q. E. D.

If a ſtraight line be divided into any two parts *, the ſquare of the whole line is equal to the ſquares of the parts, together with twice the rectangle contained by the parts.*



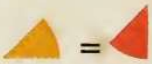
Deſcribe  (pr. 46, B. 1.)

draw (poſt. 1.),

and  (pr. 31, B. 1.)

 (pr. 5, B. 1.),

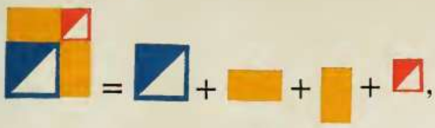
 (pr. 29, B. 1.)

∴ 

∴ by (prs. 6, 29, 34. B. 1.)  is a ſquare = .

For the ſame reaſons  is a ſquare = ,

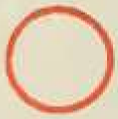
 (pr. 43, b. 1.)

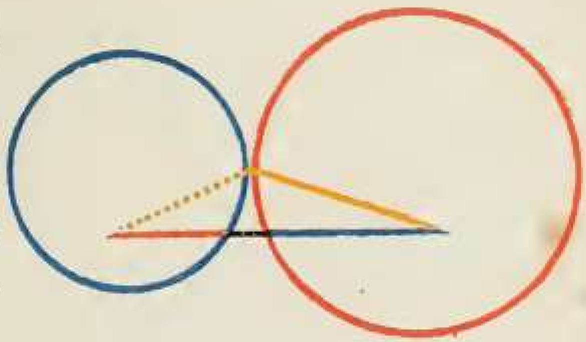
but ,

∴ 

twice .

Q. E. D.

IF two circles  *and*  *touch one another externally, the ſtraight line joining their centres, paſſes through the point of contact.*



If it be poſſible, let join the centres, and not paſs through a point of contact; then from a point of contact draw and to the centres.

Becauſe + ⊏

(B. I. pr. 20.),

and = (B. I. def. 15.),

and = (B. I. def. 15.),

∴ + ⊏ , a part greater than the whole, which is abſurd.

The centres are not therefore ſo placed, that the line joining them can paſs through any point but the point of contact.

Q. E. D.