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Law of cosines proof without words
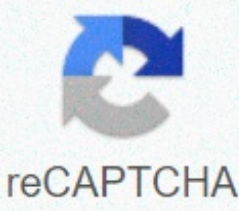
(I really need to put this on a poster.) I am trying to prove the law of Cosines using the following chart taken from Thomas' Calculus 11th edition. I have an answer, but I think there must be a simpler or better way to do it. Here's my answer: Construct a coordinate system so that $ (0.0) $ is located in the lower right corner of the pictured triangle. Then the red line cuts hypotenuse to $(-a.0)$ and a leg of $(-b\cos\theta,b\sin\theta)$. Thus, the squared distance c from $(-a.0)$ to $(-b\cos\theta,b\sin\theta)$ \begin{align} c^2 &=(-b\cos\theta-(-a))^2 + (b\sin\theta)^2\\ &=a^2-2ab\cos\theta+b^2\cos^2\theta+b^2\sin^2\theta\\ &=a^2+b^2-2ab\cos\theta. \end{align} I feel that there has to be a simpler way as my proof is basically ignoring the right triangle, circle, etc. If anyone can show me another proof, that would be great. Thanks. UPDATE: It looks like I needed Intersecting Chords The phrase from Geometry to write $ (a + c) (a-c)=(2a\cos\theta-b)(b)$. The Cosines Act establishes a relationship between the angles and page lengths of \(\Delta ABC\): \(c^{2} = a^{2} + b^{2} - 2ab\cdot \mbox{cos}\gamma,\) where \(\gamma\) is the angle of \(\Delta ABC\) opposite page \(c\\). This proof without words posted by Anders Kaseorg combines together \(3\) similar triangles; but where is the third? The proof was actually published on American Mathematical Monthly, 121, February 2014, p.m. 149, by Miles Dillon Edwards. (There are several theorems that are proven by similar technique.) |Contact| | Home| | Content| | Geometry| | Up| Copyright © 1996-2018 Alexander Bogomolny This is a proof by Sidney H. Kung: Of the intersecting chords Theorem, $(a+c)(a-c)=(2a\cos\theta-b)b,$ ie, $a^2-c^2=2ab\cos\theta -b^2.$ References R.B. Nelson, Proofs Without Words, MAA, 1993, p. 32 | Contact| | | Home| | Content| | Geometry| | Up| Copyright © 1996-2018 Alexander Bogomolny by Sidney H. Kung (Jacksonville University)This article originally appeared in: Mathematics MagazineDecember, 1990Subject classification (s): Geometry and Topology | Geometric evidence | Trigonometric | Trigonometric Identities Current course(s): 2.2 TrigonometryMa author evidence visually cosines law. A pdf copy of the article can be viewed by clicking below. Because the copy is a faithful representation of the actual journal pages, the article cannot begin at the top of the first page. Click to open this file. These PDF files are furnished by JSTOR. Classroom Capsules would not be possible without contributions from JSTOR. JSTOR provides online access to pdf copies of 512 journals, including all three printed journals of the Mathematical Association of America: The American Mathematical Monthly, College Mathematics Journal, and Mathematics Magazine. We are grateful for JSTOR's collaboration in delivering the PDF pages we use for Classroom Another proof of the law of Cosines of Sidney H. Kung, Jacksonville University From Mathematics Magazine Proof Without Words: The Law of Cosines by Sidney H. Kung, Jacksonville University From Mathematics Magazine Magazine