The Regular Hexagon

VOLKER W. THÜREY
Bremen, Germany *

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Abstract:
We provide coordinates of a regular hexagon.

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We have found approximate coordinates of a regular hexagon in the german wikipedia, see [1]. The exact values of a regular hexagon seem to be a mystery. To our great surprise we find only one more information. It seems that the first who calculated the coordinates of a regular hexagon was the Indian Gopal Menon. See [2]. Here are exact values if a = 2. It holds that

$$(-2,0);\left(-1,+\sqrt{3}\right);\left(+1,+\sqrt{3}\right);(+2,0);\left(+1,-\sqrt{3}\right);\left(-1,-\sqrt{3}\right)$$

are coordinates for a horizontal regular hexagon, and

$$(0,+2);\left(+\sqrt{3},+1\right);\left(+\sqrt{3},-1\right);(0,-2);\left(-\sqrt{3},-1\right);\left(-\sqrt{3},+1\right)$$

are coordinates of an upright regular hexagon.

Proof. An easy calculation shows that in the first 6-gon the six interior angles have 120 degrees. All edgelengths are 2. The proof is done. □

We have made the coodinates as simple as possible. The calculation of the above coordinates without [2] would be easy, if one knows that a hexagon consists of six equilateral triangles.

References

[1] https://de.wikipedia.org/wiki/Sechseck

[2] https://www.quora.com/How-can-you-find-the-coordinates-in-a-hexagon

*49 (0)421 591777, volker@thuerey.de