How to draw an octagon on graph paper

Assign length, s, to square side; for example, line segmentAB. Since this is a square, we know that all four sides are the same length. The length of diagonals (AC and BD) is obtained from pythagorean theorem: s2 + s2 = AC2 AC = SQRT(2s2) AC = s * SQRT(2) Compass is adjusted to half the diagonal length, so AC/2 or SQRT(2) * s/2 . Line segments created with compass are sqrt(2)*s/2 length; for example, AE, BG, CF. This creates shortline segments about each corner (for example, BE, BF) has length: s - SQRT(2)*s/2 Square has octagonal faces lying on it (eg, FG) length: FG = s - 2 * (s - SQRT(s) 2)*s /2) FG = s - 2s + SQRT(2)*s FG = s * (1 - 2 + SQRT(2)) FG = s * (SQRT(2) - 1) Now consider the length of octagonal faces formed by lying along square corners and cutting corners (eg, EF). It turns out that by applying Pythagoras Theorem, we are dealing with the right isocial triangles again (eg, triangle BEF), as in the above item#2 triangle ABC. So you already know that the segment will be EF length * SQRT(2). Therefore: EF = BE * SQRT(2) EF = (s - SQRT(2)*s/2) * SQRT(2) [substance from #5] EF = s*SQRT(2) - s EF = s * (SQRT(2) - 1) EF = FG [substance #6] In fact #3, each side of the octagon will be the same length; for example, line segments EF and FG have been proven. To determine the inner angle, FZG, we divide in half by leaving it upright, ZH. Zh has a length of s/2 and is half the fg of FG, s/2 * (SQRT(2) - 1). This creates a perpendilar triangle ZHF with an internal angle FZH and trigonometric property: tan (FZH) = FH / ZH tan(FZH) = (s/2 * (SQRT(2) - 1)) / (s/2) tan(FZH) = SQRT(2) - 1 tan (FZH) = 0.0 414213562373 FZH = arctan(0.414213562373) FZH = 22.5° FZG = 2 * FZH FZG = 2 * 22.5° FZG = 45° #2, inner angle of each triangle -- for example, angle FZG - will be one-eight of a full circle; that is, 360 ° / 8 = 45 ° proven. In the study, we see that the octal is divided into eight isosel triangles. Each triangle has the same angles and edges of the same length. Therefore, there are 8 identical triangles. In #1, it has been proven that a regular octagon will contain 8 identical isosel triangles. By March 13, 2018 Participant on how to draw an octagon with 8 equal sides (peer octagon) without doing any calculations other than measuring the square size that will be used to easily draw octagons. This includes a description of how this works, so student learning geometry will know the steps to how it works. Draw a square the same size as the octagon to be drawn (in this example, the frame has a 5-inch edge). Make an X by drawing two lines from corner to corner. Using another piece of paper, place an edge at the Xin intersection and It's in a corner of the square. **A ruler can also be used for this step, just pay attention to the size between X and the corner. A compass can also be used for this step. Set the point of the compass to one of the corners of the square and open Xe. Open the piece of paper and place a square mark on the edge of the piece of paper, with the mark in the square corner. Continue with both sides of each corner until there are eight (8) total marks on the square. **If you are using a compass, make two marks on each adjacent side of the square for eight total marks, with dots in each corner of the square. **If you're using a ruler, measure the same distance from each corner as in Step 2. Draw a line between the two closest marks to each corner and delete the square and X corners to complete the awkkening octagon. HOW IT WORKS: Calculate the length of the hypotenus or C in the picture using pythagorean theorem, which is $A^2+B^2=C^2$. The length of one side of the square is 5 inches, so 1/2 of that length is 2-1/2 . Because each side of the frame is equal, A and B are both 2-1/2. This equation is: 6.25 + 6.25 = 12.5. The square root of 12.5 is 3,535, i.e. C = 3,535. 1.4645 distance from the other corner in Step 4 (3,535 marks were placed from each corner of the square, which is AA in the picture. 5 - C = AA. So AA = 1.4645. Since each sign is 1.4645 from every corner of the square. To achieve the length of the side of the octagon (CC), remove two of these measurements from the edge of the square: Use pythagorean theorem to twice control the length of the hypotenuse of the AA-BB-CC triangle in the picture (AA and BB equals, or 1.4645): The square root of 4,289 is 2,071, which is equal to the step above, confirming that it is an akenar octagon. This article about the author, written by a professional author, copied and actually checked with a multi-point inspection system, efforts to ensure that our readers receive only the best information. To submit your questions or ideas or learn more, see our page about us: to the link below. Draw a square that is used to draw this octagon. Divide the lengths by one-third. However, if you want a regular octagon, the ratio of lengths should be around 7:10:7.9 draw along the marks to create small squares. Draw lines where octage can be seen in 9 frames. Delete unnecessary sides as you create an octagon. The problem that arises in this Instructables title can be considered a problem in entertainment mathematics. There are many sites on the Internet that describe how a regular octal can be built inside a square with four octaes on the edges of the square. Many of these structures require the use of a compass and a ruler resulting in an octagonal less than the square in which the octagon is inserted into the area. the area of the octave √2 – 1) is approximately eight-tenths of the square area.) The problem mentioned in this Instructables header can be considered an extension of these second methods, which result in an octagon whose space is larger than that of the square. The only requirements for this method are: a solid frame that moves as a template; a straight edge; (different from the ruler, there are no signs for measurement on a flat edge; the ruler can be used as a straight edge, but not vice versa); a piece of paper on which octage is drawn; a pen or pen. Use a square template to create a two-by-two-square grid. Place the corner of the frame template on one of the outer corners of the square grid and align the other corner of the template so that it is on one of the outer sides of the square grid. Then place a mark on this side of the square grid where the other corner of the template meets the outside of the square grid. Repeat the previous operation by using the same corner of the square grid, but now you only have the opposite corner of the template lying on the outside of the square grid at marked side right angles. Step 2 for each of the remaining three outer corners of the square grid, and repeat this step. Draw lines between pairs of marks on the adjacent outer sides of the square grid closest to the outer corners of the square grid. The four lines that combine the adjacent outer edges of the square grid and the four lines on the outer edges of the square grid between the two closest marks to the outer corners form a regular octave with 8 times (√2 – 1) of the area of the square template, whose area is about three times that of the template. Larger octagons can be drawn using this approach by first creating a larger square grid using the frame template. The only constraint is that the number of frames on the outside of the square grid is n. For a n with an N frame grid, use the frame template n2 times to create the grid. Then place both marks on the outer edges of the square grid so that the distance between each outer corner of the square grid and the marks on the outer side of the square grid is equal to the length of the diagonal length of the n/2 square template using the diagonal length of the square template. Finally, draw lines between pairs of marks on the adjacent outer sides of the square grid closest to the outer corners of the square grid. The diagram above provides an example for a 6-to-6 frame grid. Given the single number, n, square grid of squares of the a2 area on each outer side of the grid, it is not possible to mark the points on each outer side of the grid, whose total length is equal to n/2 times the length, using a hard square template with a side length. Cross the square template. This follows only because the lengths of the √2 can be used as a tool to mark distances using the diagonal of the square template. However, a single-numbered grid of frames on both sides of the grid can be created by following these steps: (2n)A 2n square grid with 2 frames; build octagonal as described above; Delete all single horizontal and vertical lines in 2n up to 2n grid, leaving the grid where n is the only number; The first horizontal and vertical lines are horizontal and vertical lines for two lines of one of the corner squares that are not on the outer edges of the grid. Using a 6-to-6 frame grid in step 5, and coloring the double lines in this grid blue line results in the diagram shown in this step. This diagram shows a regular octagon (red) inside the blue 3-to-3 frame grid. One feature of the grid in the diagram above relates to an Instructables published in 2013. It describes a simple way to draw an octagon in a square that includes the author of Instructables: splitting the square sides by a third; placing marks on the edges of the square to indicate the points of division; Create a 3-to-3 frame grid; Drawing lines between pairs of marks closest to the outer corners of the square grid. The diagram above shows that the corners of a normal octage do not overlap when blue lines intersect with the outer edges of the grid. Although the method described in the 2013 Instructables article results in being octagonal, this octagon is not a regular octagon. To make a regular octagon from the octagon described in the 2013 Instructables article, both pairs of marker on the outer edges of the square grid in the 2013 Instructables article must be shifted by approximately 12% toward the outer corners of the square grid. The diagram above shows some corners on the frame and the octagon with labels placed on them. To prove that a regular octagon is obtained using the method outlined in steps 1-5, we need to show that the length of bc in the diagram above is equal to that of CE. The equality of the lengths of the remaining parties comes after repeated operations in the method. The following evidence is for the grid where a is the side length of the frame template. AD = AC length = BD length = (na √2) / 2 = na / √2 CD length = AD length – AC length – na - na / √2 = NA (2 – √2) / 2 = EU = EU length = EU length = 2 √ / 2 – na (2 – √2) / 2 = na (√2 – 1) using Pyagothor, CE length = (CD length) × √2= na (√2 – Bc length = CE length. Again, using a n square grid and a n in the previous step of the diagram, triangular CDE area = (CD length) × (DE length) / 2 = [na (2 – √2)] 2 / 8 = [(na)2 (3 - 2√2)] / 4.N square grid by n = area - 4 × (triangular CDE area) = 2 (na)2 (√2). The area of the frame template is a2. Ratio of octave field to square template = 2 n2 (√2 - 1). In this last step, we return to the method described in 2013 Instructables. As described in the 2013 Instructables article, the square is derived from an expression for the amount that marks on each outer side of the grid must be moved from the non-regular octagon to create a regular octagon. In 2013 Instructables, if the distance between each of the two marks on both outer sides of the square grid is a length, these marks must be shifted to reduce the length of the distances between the outer corners of the square grid and the marks on the outer edges of the square grid (see diagram in Step 6). The length from each corner of the frame, a, must be shortened so that its length is equal to the EU length in the diagram in Step 7 n = 3. The difference between these lengths is a - (EU length) = a - {[3a(2 – √2)] / 2} = a(3√2 - 4) / 2 = a(3/√2 - 2). Therefore, each of the marks that will touch the grid lines in Step 6 (using the method described in 2013 Instructables) must be moved approximately 12% away from 100 × (3/√2 - 2) towards the corners on the outer edges of the grid. 12%.

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