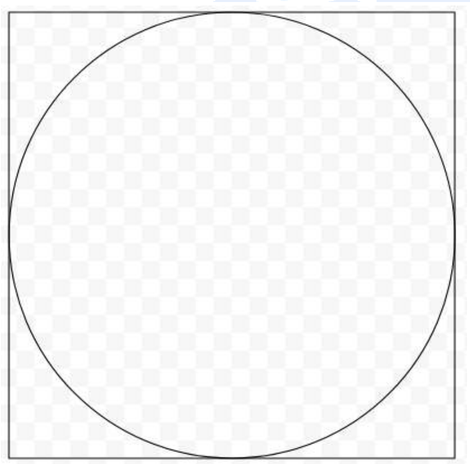
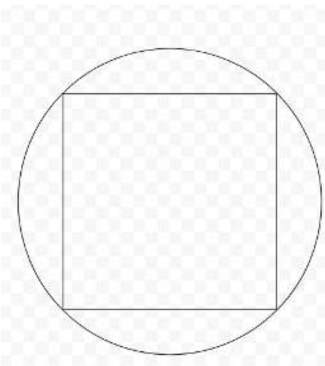
Soo Hawk

1. if the remainder when P(x) is 2 when divided by (x+2), what is P(-2) ?
2. A polynomial P(x) is multiplied by a polynomial Q(x). P(x) has degree of 3, and Q(x) has degree of 2. What is the degree of the polynomial generated by multiplying these two?
3. A circle is inscribed a square as shown below. Given the side length of the square is 6, find the area outside the circle but inside the square.

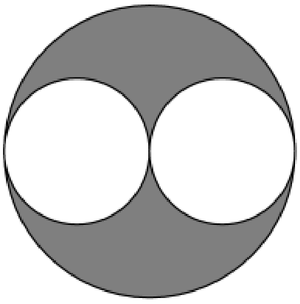


4. A square is inscribed a circle. Given the square's side length is 4, find the radius of the circle. - **Challenge**



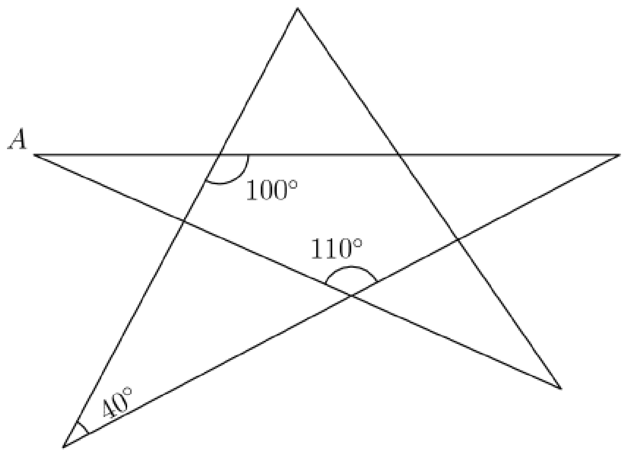
5. In the diagram below, the diameter of each of the two smaller circles is a radius of the larger circle. If the two smaller circles have a

combined area of 1 square unit, then what is the area of the shaded region, in square units? (Source: AMC 8 #15)



6. Given that three angles of a triangle are x, 2x, and 57 degrees, find x.
7. What is the degree measure of angle A?

(Source: AMC 8 #21) - **Challenge**




**Solutions:**

1. **If the remainder when this polynomial is divided by x+2 is 2, this means that the polynomial P(x) can be written in the following manner:**

**P(x) = Q(x)* (x+2) + 2.**

**Since we are finding P(-2)**

**P(-2) = Q(x) * (-2 + 2) + 2**

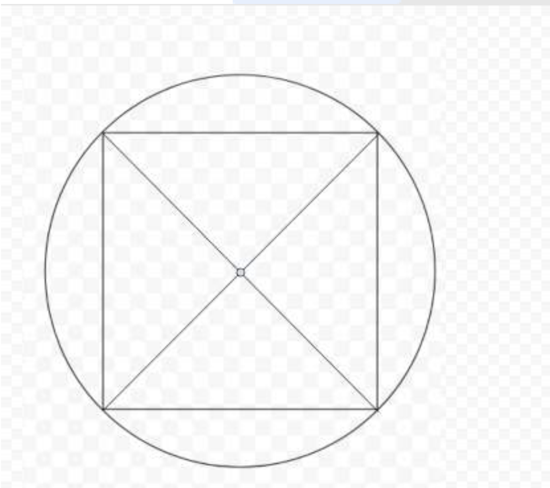
**P(-2) = 0 + 2 = 2.**

2. **Since we are multiplying the polynomials, we have to add the degrees. This is because when we multiply two exponents, we add their exponents.**

**This means that the degree of the new polynomial is 2 + 3 = 5.**

3. **Since the side length of the square is 6, the diameter of the circle is 6 as seen in the diagram. This means the radius of the circle is 6/2 = 3. As a result, the area of the circle is 3 * 3 * Π = 9Π. The area of the square is 6 * 6 = 36. All we need to do for the answer is subtract the area of the circle from the square. 36 - 9Π is the answer.**

4. **Drawing the Diagonals of the square, we see that they intersect at the center of the circle**



**This could be found by the realization that the square and circle share the same center. This means that the diagonal of the square is equal to the**

diameter of the circle. The square’s side length is 4, so the diagonal has a length of sqrt(4^2 + 4^2) = sqrt(32)= 4 * sqrt(2) from pythagorean theorem. The radius of the circle is equal to half the diameter, which is equal to 2 * sqrt(2).

5. We must note that the diameter of the small circles equals the radius of the large circle, as indicated in the problem. We can call the radius of the small circle r, and the radius of the large circle 2*r because of this. The total area of the large circle is (2r) * (2r) * Π = 4r^2 * Π. The area of one of the small circles is r * r * Π = Πr^2. The area of two of these small circles is 2Πr^2. Now we know that the area of the large circle is 4Πr^2. since we know that 2Πr^2 = 1 because the area of the two small circles is 1, we know that 4* Πr^2 = 2. Now to find the area of the shaded region, we subtract the area of the small circles by the area of the large circle. 2 - 1 = 1, the area of the shaded region.

6. Since the sum of angles in a triangle is 180, we add all these quantities together, to get x + 2x + 57 = 180. Solving, we get x = 41.

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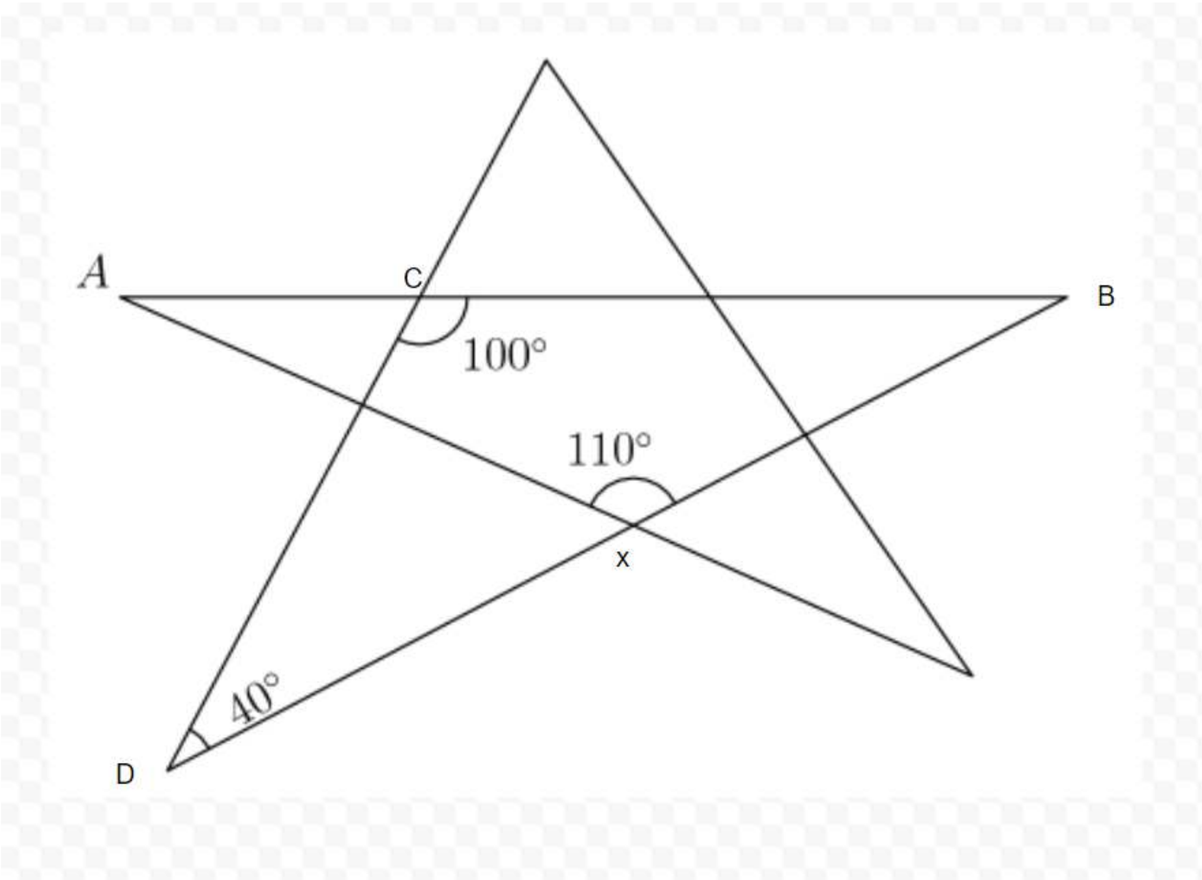
7. **Labeling the following vertices: B,C, and D, and X we can solve this problem in an creative way.**




**Notice triangle BCD. We know two of the angles, angle C and angle D. Now we can find angle B, which is 180 - 100 - 40 = 40 degrees. Now notice the triangle ABX. We know angle B and X. Angle B is 40 degrees and angle X is 110 degrees. Angle A + Angle B + Angle X = 180 degrees. 110 + 40 + Angle A = 180, Angle A = 30 degrees.**