π Quiz and Scavenger Hunt

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In partnership with City of Fairfax Regional Library, FCPL

March 1–15, 2026

Try solving these clues about π. Use the library's online resources and/or take a stroll around Old Town Fairfax to find the answers. Return your completed paper to the library's Information Desk before 5pm on 3/15 to check your answers and earn a small prize.

Clue 1. In the 1920s, the first editor of the journal *Annals of Mathematics* asked the Fairfax County Board of Supervisors for space to house what would later become the Fairfax County Public Library.

Question: What was the name of this astronomer and mathematician?

Answer 1: _____ _____

Clue 2. There is a mathematical term for a number that is not the root of any polynomial equation with integer coefficients. Around the corner from the library on the Courthouse Professional Center sign, you will find a business name that includes this word.

Question: Using the clues above, what is this word?

Answer 2: _____

Clue 3. Consider Answer 1. The first name in Answer 1 begins with a circle, just like the name of a local restaurant. Also, at this restaurant, a pie might be baked on a device named in Answer 1.

Question: What is the name of the nearby restaurant?

Answer 3: _____

Clue 4. "Squaring the circle" is a geometry problem: given a circle, construct a square having the same area as the circle using only a straightedge and a compass. Many mathematical cranks have falsely claimed to have squared the circle despite the fact that it was proved to be impossible (because π is <Answer 2>).

Instead of trying to square the circle, for this question, circle the square. On the perimeter of Old Town Square, you will find a device that has four circles, on the same post, each subdivided into twelfths.

Question: What is this mysterious device?

Answer 4: _____

Clue 5. The probability that two randomly selected integers are relatively prime (have no positive common factors other than 1) is $6/\pi^2$. This fact can be proved using the Principle of Inclusion-Exclusion (PIE) in combination with a function named for a famous mathematician and astronomer and denoted by the Greek letter μ.

Question: Which local business, with an address on Main Street, bears the name of this famous function?

Answer 5: _____

Clue 6. Archimedes approximated π using inscribed and circumscribed polygons of a circle. He found that $223/71 < \pi < 22/7$ by considering polygons of up to 96 sides. In modern times, $22/7 = 3.142857...$ is still sometimes used as an approximation to π, though it is on the _____ _____.

Question: Fill in the blanks above with the name of a restaurant found on Chain Bridge Road.

Answer 6: _____

Clue 7. We can approximate π by measuring a circle's circumference and diameter, then dividing them.

Question: Find the semicircle in the southeast corner of the Fairfax County Judicial Complex and judiciously measure it to approximate π.[1]

Answer 7: $\pi \approx$ _____ = _____/_____

Bonus Challenge: How could you find a diameter of the circle in front of the Fairfax County Courthouse using only a straightedge and compass?

[1] Hint for Clue 7: A semicircle is only half of a circle. After measuring the semicircle, find the circumference of a circle.