Time limit: 15 minutes.
Instructions: This tiebreaker contains 3 short answer questions. All answers must be expressed in simplest form unless specified otherwise. You will submit answers to the problem as you solve them, and may solve problems in any order. You will not be informed whether your answer is correct until the end of the tiebreaker. You may submit multiple times for any of the problems, but **only the last submission for a given problem will be graded**. The participant who correctly answers the most problems wins the tiebreaker, with ties broken by the time of the last correct submission.
No calculators.

1. You're at a carnival and enter to play a dart-throwing game. The dartboard consists of three concentric circles of radii 2 inches, 4 inches, and 6 inches. If the dart lands in the innermost circle, you win $4, if it lands in between the first and second circles, you lose $2, and if it lands in between the second and third circles, you win $1. How many dollars should you have to pay to play in order to make it a fair game?

2. Three spheres of radius 6 have centers at points A, B, C. Triangle $\triangle ABC$ is equilateral with side length s. Suppose there are two points at which all three spheres intersect. If the distance between those two points is $2\sqrt{3}$, compute s.

3. $f(x)$ is a nonconstant polynomial. Given that $f(f(x)) + f(x) = f(x)^2$, compute $f(3)$.