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Answer the questions in the spaces provided. If you run out of room for an answer, continue on the back of the page.

1. Is it true that  $x^n + y^n = z^n$  if (x, y, z) and n are positive integers?. Explain.

2. Prove that the real part of all non-trivial zeros of the function  $\zeta(z)$  is  $\frac{1}{2}$ .

3. Compute

$$\int_0^\infty \frac{\sin(x)}{x}$$