



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

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