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

Name and section: _____

Instructor's name: _____

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

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

4. Given the equation $x^n + y^n = z^n$ for x, y, z and n positive integers.
   (a) For what values of n is the statement in the previous question true?

   (b) (1 point (bonus)) For $n = 2$ there's a theorem with a special name. What's that name?

   (c) What famous mathematician had an elegant proof for this theorem but there was not enough space in the margin to write it down?

      i. Who actually proved the theorem?

      ii. How long did actually take to solve this problem?

Total for Question 4: 0

5. Which of these famous physicists invented time?
   A. Stephen Hawking B. Albert Einstein C. Emmy Noether D. This makes no sense

6. Which of these famous physicists published a paper on Brownian Motion?
   - ◯ Stephen Hawking
   - ◯ Albert Einstein
   - ◯ Emmy Noether
   - ◯ I don't know

7. Which of these famous physicists invented time?
   A. Stephen Hawking
   B. Albert Einstein
   C. Emmy Noether
   D. This makes no sense

8. (30 points (bonus)) Prove that the real part of all non-trivial zeros of the function $\zeta(z)$ is $\frac{1}{2}$

Question:	1	2	3	4	5	6	7	8	Total
Points:	0	0	0	0	0	0	0	0	0
Bonus Points:	0	0	0	1	0	0	0	30	31
Score:									

Question	Points	Score
1	0	
2	0	
3	0	
4	0	
5	0	
6	0	
7	0	
8	0	
Total:	0	

Question	Bonus Points	Score
1	0	
2	0	
3	0	
4	1	
5	0	
6	0	
7	0	
8	30	
Total:	31	