

MATH 201B FALL 2013 PRACTICE TEST #1

*Write clearly, on separate paper. All questions carry equal weight.
You will receive credit for your three best answers.*

Prove or disprove three of the following statements:

- (1) For subsets A, B, C of a universe U , one has

$$\overline{(A \cup B)} \cap \overline{C} = (A \cap B) \cup C.$$

- (2) For integers x and y , if $5x - y$ is odd, then x and y have opposite parity.
- (3) If n is an odd integer, then $4 \mid n^3 + n^2 + n + 1$.
- (4) If x and y are positive real numbers, then

$$\frac{x}{y} + \frac{y}{x} \geq 2.$$