

**MATH 201 FALL 2019 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 sets  $A, B$ , one has

$$\mathcal{P}(A) \cup \mathcal{P}(B) = \mathcal{P}(A \cup B).$$

(2) For integers  $x$  and  $y$ , if  $3x - 5y$  is odd, then  $x$  and  $y$  have opposite parity.

(3) If  $n$  is an odd integer, then  $4 \mid (n^3 + 3n^2 - n - 3)$ .

(4) If  $y < x < 0$ , then  $x^4 < y^4$ .