

**MATH 135 Online (Spring 2020)**  
**Midterm**

1. Let  $A = \{s^4 - s^2 : s \in \mathbb{Z}\}$  and  $B = \{n \in \mathbb{Z} : 4 \mid n\}$ . Prove that  $A \subseteq B$ . Do you think  $A$  is a proper subset of  $B$  or  $A$  is equal to  $B$ ? Justify your answer.
2. Use the Principle of Strong Induction (POSI) to prove that every positive integer  $n$  can be written in the form  $n = (2^s)t$ , where  $s$  is a non-negative integer and  $t$  is an odd integer.