

250 MIDTERM — FOR 20 MORE POINTS
DUE March 11, Dead Cat March 12

For each of the following statements say if it is TRUE or FALSE and justify your answer. You CAN use that $\sqrt{3}, \sqrt{7}, \sqrt{343} \notin \mathbb{Q}$ but no other number being irrational. (The expression $\mathbb{Q} - \{0\}$ is the set of NONZERO rationals.)

Be NEAT! Be CLEAR! We are not going to spend much time grading them.

1. $(\exists x \in \mathbb{Z} - \{0\})(\exists y \in \mathbb{Z} - \{0\})(\exists z \in \mathbb{Z} - \{0\})[x\sqrt{3} + y\sqrt{7} + z \in \mathbb{Q}]$.
2. $(\exists x \in \mathbb{Z} - \{0\})(\exists y \in \mathbb{Z} - \{0\})(\exists z \in \mathbb{Z} - \{0\})[x\sqrt{7} + y\sqrt{343} + z \in \mathbb{Q}]$.

(NOTE- if you need some other number irrational to do this problem then prove that number irrational.