

### Problem # 161

What is the largest positive integer  $n$ , such that  $n + 10$  divides  $n^3 + 100$ ?

**Solution:**

*Answer:*

*Proof.*

Dividing polynomial  $x^3 + 100$  by  $x + 10$ , we get the remainder  $-900$ . Hence  $n + 10$  divides  $n^3 + 100$  only if  $n + 10$  divides  $900$ . The largest positive integer in question is therefore  $890$ .

□

Source: American Invitational Mathematics Examination (AIME) 1986.