

Write your name and code on the back.

1. { 6 points } **Determine the truth value of each of these statements, if the universe of discourse consists of all integers. Check the appropriate box:**

(a)  $\exists n(n = -n^2)$   True  
 False

(b)  $\forall n(n^3 \geq n)$   True  
 False

(c)  $\exists n(n + 3 = 3n)$   True  
 False

2. { 4 points } **Let  $P(x)$  be “ $x$  is perfect” and  $Q(x)$  be “ $x$  is your friend”. Translate each of the following sentences into logical expressions using predicates, quantifiers, and logical connectives.**

(a) Not everybody is perfect or someone is not your friend.

(b) One of your friends is not perfect.