Quiz #2

SOLUTIONS

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

$(n = -n^2)$ **is true for** $n = -1$**.**

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

☐ True
✓ **False**

$(n^3 \geq n)$ **is not true for all integers** n**, e.g. for** $n = -2$**.**

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

☐ True
✓ **False**

The equation has only one solution $n = 1.5$ **which is not integer.**

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.

$$\neg(\forall x \ P(x)) \ \vee \ \exists x \ (\neg Q(x))$$

(b) One of your friends is not perfect.

$$\exists x \ (\, Q(x) \wedge \neg P(x) \,)$$