1. **Is it a proposition?**
   - $2 + 2 = 4$
   - $x + 2 = 4$
   - Arnold Schwarzenegger is a handsome man.

2. **Quantifiers**
   Let $\mathbb{X} = \{\text{photos}\}$ and $\mathbb{Y} = \{\text{humans}\}$, which one of the following is equivalent to “Every photo is taken by some human”?
   - $(\forall x \in \mathbb{X})(\forall y \in \mathbb{Y})(x \text{ is taken by } y)$
   - $(\forall x \in \mathbb{X})(\exists y \in \mathbb{Y})(x \text{ is taken by } y)$
   - $(\exists x \in \mathbb{X})(\forall y \in \mathbb{Y})(x \text{ is taken by } y)$
   - $(\exists x \in \mathbb{X})(\exists y \in \mathbb{Y})(x \text{ is taken by } y)$

3. **Direct Proofs**
   
a) We call integer $n$ an even number if and only if there exists an integer $k$, such that $n = 2k$. Prove that the negative of any even integer $n$ is even.

b) Prove that the sum of any three consecutive integers is divisible by three.
4. Proof by Contraposition

Let $x$ and $y$ be two positive integers. Prove that if $x \times y < 36$ then $x < 6$ or $y < 6$. 