3.	Write the fo	llowing s	statement i	in natural	language	and then	negate it:
$\forall x$	$f \in \mathbb{R}, \exists n \in \mathbb{N}$	$i \ni n > i$	x.				

[6 points]

- 4. Write the converse and contrapositive to the following statements:
 - (a) If you are 18, you can vote. [2 points]
 - (b) If I live in Ocean City, then I live in Maryland.
 - (c) A square is a four-sided figure. [2 points]
 - (d) If it is raining, then there are dark clouds in the sky.
 - (e) If n is an odd integer, then $n^2 + n 2$ is an even integer.

[2 points]

[2 points]

[2 points]

5. Prove that the product of any two odd numbers is odd.

[10 points]

6. Show that the statement "All primes are odd" is false.

[6 points]

7. Use induction to prove that $1 + 2 + 2^2 + \cdots + 2^n = 2^{n+1} - 1$ for all nonnegative integers n.

[10 points]

8. Use strong induction to prove that every amount of postage of 7 cents or more can be formed using just 3-cent and 5-cent stamps.

[10 points]

9. How many bit strings of length 10 begin and end with 0? (Remember bit strings are made up of 0's and 1's only).

[6 points]

10. (a) Compute $\begin{pmatrix} 6\\4 \end{pmatrix}$

[6 points]

(b) Find $(x+1)^4$ using binomial coefficients.

[6 points]

11. A club has twenty members. In how many ways can they chose a slate of four officers consisting of a president, vice-president, secretary, and treasurer?

[6 points]

12. A group of people is comprised of six from Pennsylvania, seven from Vermont, and eight from Illinois. In how many ways can a committee of six be formed with two people from each state?

[6 points]