1. Suppose $x$ is an integer. Prove by contrapositive that if $x^2$ is not divisible by 4 then $x$ is odd. [25 pts]

2. Suppose $x$ is a real number. Prove that if $x(x - 4) > -3$ then $x < 1$ or $x > 3$. [25 pts]

3. Prove by contradiction that if $n$ is a natural number that:

$$\frac{n}{n+1} < \frac{n+1}{n+2}$$

[25 pts]

4. Suppose $a$ and $b$ are positive integers. Prove by contradiction that if $a < b$ and $ab < 3$ then $a = 1$. [25 pts]