Student ID: _____

Definitions and Formulas: This page contains some definitions used in this exam and a list of formulas (theorems) that you may use in the exam (without having to provide a proof). Note that you might not need all of these formulas on this exam.

Definitions

1. $N = \{0, 1, 2, 3, \ldots\}$, the set of non-negative integers.
2. $Z^+ = \{1, 2, 3, \ldots\}$, the set of positive integers.
3. Z is the set of *all* integers.
4. R is the set of *real numbers*.
5. R^+ is the set of positive *real numbers*.
6. Let $n \in Z^+$. Then $Z_n = \{0, 1, 2, 3, \ldots, (n-2), (n-1)\}$.

Formulas:

1. $\binom{n}{i} = \frac{n!}{i!\,(n-i)!}$
2. If $0 < i < n$ then $\binom{n}{i} = \binom{n-1}{i-1} + \binom{n-1}{i}$
3. $\neg(p \wedge q)$ is equivalent to $\neg p \vee \neg q$
4. $\neg(p \vee q)$ is equivalent to $\neg p \wedge \neg q$
5. $p \Rightarrow q$ is equivalent to $\neg p \vee q$
6. $\neg \forall x \in U\,(p(x))$ is equivalent to $\exists x \in U\,(\neg p(x))$
7. $\sum_{i=1}^{n-1} i = n(n-1)/2$
8. $\sum_{i=1}^{n-1} i^2 = \frac{2n^3-3n^2+n}{6}$
9. If $r \neq 1$ then $\sum_{i=0}^{n-1} r^i = \frac{1-r^n}{1-r}$
10. If $r \neq 1$ then $\sum_{i=0}^{n} ir^i = \frac{nr^{n+2}-(n+1)r^{n+1}+r}{(1-r)^2}$