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.

Note: This is a preliminary version of the page that will appear on the exam. The actual corresponding page on the exam will contain all of these formulas but might also contain a few others

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. R is the set of *real numbers*.
4. R^+ is the set of positive *real numbers*.

Formulas:

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