

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. $N = \{0, 1, 2, 3, \dots\}$, the set of non-negative integers.
2. $Z^+ = \{1, 2, 3, \dots\}$, the set of positive integers.
3. R is the set of *real numbers*.
4. R^+ is the set of positive *real numbers*.

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