Midterm 1 Formula Sheet

These are all the formulas that you should have memorized for Midterm 1:

Sequence Formulas:

Arithmetic Recursion: $a_{n+1}=a_n+d$

Arithmetic Generating: $a_n=a_1+(n-1)d$

Geometric Recursion: $a_{n+1}=r\,a_n$

Geometric Generating: $a_n=r^{n-1}a_1$

Series Formulas:

Finite Arithmetic Series (a_i is arithmetic):

$$\sum_{i=1}^{k} a_i=\frac{k}{2}(a_1+a_k)=\frac{k}{2}(2a_1+(k-1)d)$$

Infinite Geometric Series (a_i is geometric): $\sum_{i=1}^{\infty} a_i=\frac{a_1}{1-r}$ (if -1 < r < 1)

Series Rules:

1) If $c\in\mathbb{R}$ then, $\sum_{i=1}^{k} c=c\,k$

2) If , $c\in\mathbb{R}$, then $\sum_{i=1}^{k} c\,a_i=c\sum_{i=1}^{k} a_i$

3) $\sum_{i=1}^{k} a_i\pm b_i=\sum_{i=1}^{k} a_i\pm\sum_{i=1}^{k} b_i$

Counting Formula:

n choose k (no repetition, order does not matter) $\binom{n}{k}=\frac{n!}{(n-k)!\,k!}$