

1. Approximate $\sum_{1 \leq i \leq n} i^{2/3}$ to accuracy $\Theta(1)$.

2. Consider the function $\sum_j \binom{n}{j} \binom{m}{k-j} x^j$.
 - 2a. Write the function in terms of a hypergeometric function.

 - 2b. There are a few values of x for which you can give the exact value of the function. List those values of x and the corresponding function value.

 - 2c. Approximate the function for small x . Use a power series and have accuracy of at least $\Theta(x^2)$.

3. Suppose an algorithm divides a file into three equal size pieces plus two more pieces of size 1, using time $an + b$ for a file of size n . It then processes (recursively) each piece with size greater than 1.
 - 3a. Write a recurrence equation for the running time.

 - 3b. Solve the recurrence equation.