1. A length-4 list is made from the letters A, B C, D, E, with repetition allowed.
How many such lists begin with a vowel **or** have no repeated letters?
(Examples: EDCC, EAAA, ABCD, DCAE, BCDE.)

2. Use the binomial theorem to show why $3^n = 2^0 \binom{n}{0} + 2^1 \binom{n}{1} + 2^2 \binom{n}{2} + 2^3 \binom{n}{3} + \cdots + 2^n \binom{n}{n}$

1. A length-4 list is made from the letters A, B C, D, E, with repetition allowed.
   How many such lists begin with a vowel **or** end with a consonant?

2. Use the binomial theorem to show why $4^n = 3^0 \binom{n}{0} + 3^1 \binom{n}{1} + 3^2 \binom{n}{2} + 3^3 \binom{n}{3} + \cdots + 3^n \binom{n}{n}$