1. Find a generating function for the number of selections of \( r \) soft drink cans (chosen from 4 brands: Coke, Pepsi, Mountain Dew, and Dr. Pepper), given that the cans come only in six-packs. **Solution:** There are 4 types and we can only buy cans in increments of 6. This gives us the following generating function: **Ans:** \((1 + x^6 + x^{12} + x^{18} + \ldots)^4\).

2. Find the coefficient of \( x^{10} \) in \( \frac{x^2 + 8x}{(1-x)^5} \). **Solution:** We can rewrite the function as \( x^2 \frac{1}{(1-x)^5} + 8x \frac{1}{(1-x)^5} \). So we are interested in \( c_8 + 8c_9 \) in \( \frac{1}{(1-x)^5} \). **Ans:** \( \binom{8+5-1}{8} + 8 \binom{9+5-1}{9} \).