

1. Problem §8.6, #19.
2. Problem §8.6, #20.
3. In how many ways can a roll of five dice of different colors sum to 20? How many distinguishable outcomes are there if the dice are identical? (*Recall that the six sides of a die are labelled 1 through 6.*)
4. Problem §8.6, #27.
5. Prove Euler's second identity:

$$\prod_{i=1}^{\infty} (1 + x^{2i}) = 1 + \sum_{k \geq 1} \frac{x^{k(k+1)}}{(1-x^2)(1-x^4)(1-x^6) \cdots (1-x^{2k})}$$