

Quiz 10, Discrete Math (15 points), Fall 2016

The quiz is 20 minutes. Show your work and justify your answers where appropriate. If you write the correct answer without sufficient work or justification, you will receive little or no credit.

1. (1 point) True or false (no partial credit, no justification required):

$$\binom{15}{5} = \binom{14}{4} + \binom{14}{5}. \quad \text{TRUE} \quad \text{FALSE}$$

2. (1 point) True or false (no partial credit, no justification required):

$$\binom{10}{1} + \binom{10}{2} + \binom{10}{3} + \cdots + \binom{10}{9} = 2^{10}. \quad \text{TRUE} \quad \text{FALSE}$$

3. (4 points) Find the coefficient of x^{32} in the binomial expansion of

$$\left(7x^4 - \frac{3}{x^2}\right)^{14}.$$

4. (5 points) Let $A = \{1, 2, 3, 4, 5, 6, 7\}$. How many partitions of A consist of exactly 4 parts?

5. (4 points) Find a very simple expression for

$$\binom{n}{0} + 4\binom{n}{1} + 16\binom{n}{2} + \cdots + 4^n \binom{n}{n},$$

and show your answer is correct by using the Binomial Theorem.