

MAT2540, Quiz4, Spring2026

ID: _____

Name: _____

- This quiz consists of 4 questions for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Show all work and justify your answers.
- Wishing you success.

$$1. P(5, 3) = \frac{5!}{(5-3)!} = \frac{5!}{2!} = 5 \cdot 4 \cdot 3 = 60$$

$$2. C(4, 2) = \frac{4!}{2!(4-2)!} = \frac{4!}{2!2!} = \frac{4 \cdot 3}{2!} = \frac{12}{2} = 6$$

3. How many ways are there to seat four of a group of ten people around a circular table where two seatings are considered the same when everyone has the same immediate left and immediate right neighbor?

Pick 4 people from 10 people (the order doesn't matter)

$$\text{There are } C(10, 4) = \frac{10!}{4!(10-4)!} = \frac{10!}{4!6!} = \frac{10 \cdot 9 \cdot 8 \cdot 7}{4!} = 210 \text{ ways to pick people}$$

To seat the same 4 ppl around a circular table, there are $4!$ ways but it is the same if the right/left neighbor is the same, then we only have $\frac{4!}{4} = 3!$ ways. Thus the total is $210 \cdot 3! = 1260$.

4. There are 18 mathematics majors and 325 computer science majors at a college. In how many ways can two representatives be picked so that one is a mathematics major and the other is a computer science major?

since the order doesn't matter:

$$C_1^{18} \cdot C_1^{325} \text{ (product rule)}$$

$$= \frac{18!}{1!17!} \cdot \frac{325!}{1!324!} = 18 \cdot 325 = 5850$$