

Counting Strategies

Selections From Menu

| Starters | Mains | Desserts |
|----------------|---------|----------------|
| Soup | Beef | Rice Pudding |
| Prawn Cocktail | Pork | Ice Cream |
| Cheese Dip | Lamb | Banana Custard |
| | Chicken | Apple Pie |
| | Fish | |
| 3 | 5 | 4 |

How many different ways can you choose a 3-course meal?

$$3 \times 5 \times 4 = 60$$

How many ways can I list A, B, C, D

| | | | |
|------|------|------|------|
| ABCD | BACD | CABD | DABC |
| ABDC | BADC | CADB | DACB |
| ACBD | BCAD | CBAD | DBAC |
| ACDB | BCDA | CBDA | DBCA |
| ADBC | BDAC | CDAB | DCAB |
| ADCB | BDCA | CDBA | DCBA |

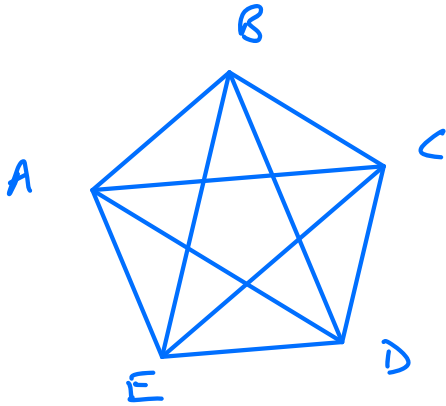
$$4 \times 3 \times 2 \times 1 = 4!$$

$$= 24$$

4 factorial

Shaking Hands

5 people in a room. Everyone shakes the hand of everyone else. How many handshakes take place



10 handshakes

5 people shake 4 hands each $5 \times 4 = 20$
but each handshake involves 2 people $\frac{20}{2} = 10$

More generally if there are n people in the room then the number of handshakes would be

$$\frac{n \times (n-1)}{2} \quad \text{or} \quad \frac{n^2 - n}{2}$$

10CMR Today

18 Girls 10 Boys

How many ways can we select a committee of 2 with 1 boy and 1 girl

$$= 10 \times 18 = 180$$

How many ways can we select a committee of 2 from the 28 students if gender

is not considered?

$$= \frac{28 \times 27}{2} = 378$$
