

PRACTICE 8.2 – Mutually Exclusive Events/Sample Space Diagrams

* Full, worked solutions can be found in the folder linked on the Course Website ☺

Exercise 8E

- Here are some events relating to throwing two dice:
A: Both dice show a 4.
B: The total is 7 or more.
C: There is at least one 6.
D: The two dice show the same number.
E: Both dice are odd.
Which of these pairs of events are mutually exclusive?
a A and B **b** A and C **c** A and D
d A and E **e** B and E **f** C and D
g B and C
- Two events N and M are such that $P(N) = \frac{1}{5}$ and $P(M) = \frac{1}{10}$ and $P(N \cup M) = \frac{3}{10}$. Are N and M mutually exclusive?
- In an inter-school quiz, the probability of School A winning the competition is $\frac{1}{3}$, the probability of school B winning is $\frac{1}{4}$ and the probability of school C winning is $\frac{1}{5}$. Find the probability that:
a A or B wins the competition.
b A, B or C wins the competition.
c Are there any other schools in the competition? How do you know?

Exercise 8F



- Three unbiased coins are tossed one at a time and the results are noted. One possible outcome is that all three coins are heads. This is written HHH. Another is that the first two coins are heads and the last one is a tail. This is written HHT.
List the complete sample space for this random experiment.
Find the probability that:
a The number of heads is greater than the number of tails.
b At least two heads are tossed consecutively.
c Heads and tails are tossed alternately.
- Two tetrahedral dice, one blue and the other red, are each numbered 1 to 4. The two dice are rolled and the results noted.
a Draw a sample space diagram for this experiment.
b Find the probability that:
i the number on the red dice is greater than the number on the blue dice
ii the difference between the numbers of the dice is 1
iii the red dice shows an odd number and the blue dice shows an even number
iv the sum of the numbers on the dice is a prime number.
- A box contains three cards bearing the numbers 1, 2, 3. A second box contains four cards with the numbers 2, 3, 4, 5. A card is chosen at random from each box.
a Draw the sample space diagram for the experiment.
b Find the probability that:
i the cards have the same number.
ii the larger of the two numbers drawn is a 3
iii the sum of the two numbers on the card is less than 7
iv the product of the numbers on the card is at least 8
v at least one even number is chosen.
- Toby plays a game with a dice called "Come and Go".
He rolls the dice. If the score is 1 he moves forward 1 m. If the score is 2 he moves right 1 m. If the score is 3 he moves backwards 1 m. If the score is 4 he moves left 1 m. If the score is a 5 or 6 he stays where he is.
Toby rolls the dice twice. What is the probability that he is:
a at the same point where he started
b exactly 2 m away from his starting point
c more than one but less than 2 m away from his starting point.