

Section Check In – 2.03 Probability

Questions

1. The random variable X has the probability distribution shown in this table.

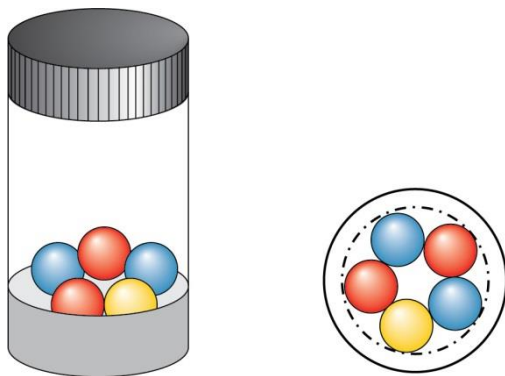
x	0	1	2	3
$P(X = x)$	0.1	0.2	0.3	0.4

A is the event that $X > 2$. Find $P(A)$.

2. A and B are independent events. $P(A) = 0.35$ and $P(B) = 0.04$.

Calculate $P(A \text{ and } B)$.

3. A tube contains 5 balls. Two of the balls are red, two are blue and one is yellow. Mia shakes the tube and the balls fall into a ring.



Use a sample space diagram to explain why the probability that the two blue balls touch is $\frac{1}{2}$.

4. In a school class, half the pupils represent the school at a winter sport, one third represent the school at a summer sport and one tenth do both. A student is chosen at random from this class. Find the probability that they represent the school at sport.
5. Idris works five days a week, Monday to Friday. The chance that he gets up late on any working day is 0.3. Last week, Idris got up late **exactly once** during the working week. What percentage of working weeks would you expect this to happen?

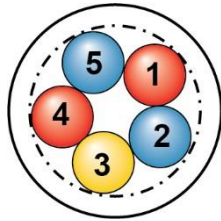
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Worked solutions

1. $X > 2 \Rightarrow x = 3$ and $P(x = 3) = 0.4$

2. Because A and B are independent, $P(A \text{ and } B) = P(A) \times P(B)$
 $= 0.35 \times 0.04 = 0.014$

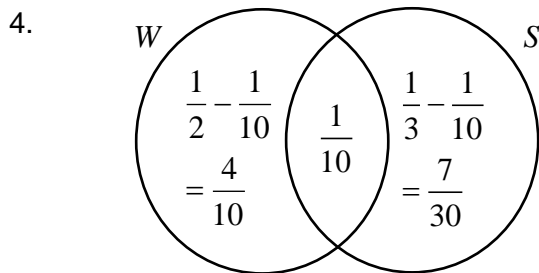
3. If we label the positions 1 to 5 then there are 10 possible positions for the two blue balls:



(1, 2) (1, 3) (1, 4) (1, 5) (2, 3) (2, 4) (2, 5) (3, 4) (3, 5) (4, 5)

Of these, the blue balls are touching in 5 possible positions: (1, 2) (1, 5) (2, 3) (3, 4) (4, 5)

So the probability is $\frac{5}{10} = \frac{1}{2}$



So the probability that someone chosen at random represents the school at sport is

$$\frac{4}{10} + \frac{1}{10} + \frac{7}{30} = \frac{11}{15}$$

5. The probability that Idris gets up late exactly once in a working week is

$$0.3 \times 0.7 \times 0.7 \times 0.7 \times 0.7 \times 5 = 0.36015$$

So we would expect this to happen in about 36% of working weeks.

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