

Probability of One Event

Starter

1. Write down the first ten: (a) prime numbers (b) square numbers.

Working: Prime number: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Square numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

2. A number between 1 and 30 inclusive is chosen at random. Write down the probability of getting:

(a) a prime number (b) a square number

Working: (a) There are 10 prime numbers between 1 and 30

$$\therefore P(\text{prime number}) = \frac{10}{30} = \frac{1}{3}$$

(b) There are 5 square numbers between 1 and 30

$$\therefore P(\text{square number}) = \frac{5}{30} = \frac{1}{6}$$

3. The probability of rain tomorrow is $\frac{2}{5}$. What is the probability of it not raining?

Working: $P(\text{not raining}) = 1 - P(\text{raining}) = 1 - \frac{2}{5} = \frac{3}{5}$

E.g. 1 A bag contains 4 blue, 5 red and 7 green discs. Find the probability of:

- (a) choosing a blue disc
(b) not choosing a green disc.

Working: (a) $P(\text{blue}) = \frac{4}{16} = \frac{1}{4}$

(b) $P(\text{not green}) = 1 - \frac{7}{16} = \frac{9}{16}$

E.g. 2 Bag A has 3 red and 5 blue cubes in. Bag B has 8 red and 11 blue cubes in. A red cube is taken out of Bag A and put in Bag B. What is the probability now of taking a red cube out of Bag B?

Working: Bag B now has 9 red and 11 blue cubes

$$\therefore P(\text{red cube from bag B}) = \frac{9}{9+11} = \frac{9}{20}$$

E.g. 3* Jill has 2 bags containing blue and red cubes. Bag A has 14 blue and n red cubes. Bag B has n blue cubes and 30 red cubes. Two blue cubes are taken from Bag A and placed into Bag B. Given that the original probability of choosing a red cube from Bag B is $\frac{5}{8}$, show that the probability of picking a blue cube is now the same for both bags.

Working: Originally, $P(\text{blue cube from bag A}) = \frac{5}{8} = \frac{30}{30+n}$

Cross multiply: $5(30+n) = 240$
 $150 + 5n = 240$
 $5n = 90$
 $n = 18$

After the 2 blue cubes are swapped over:

$$P(\text{blue cube from bag A}) = \frac{12}{12+n} = \frac{12}{12+18} = \frac{12}{30} = \frac{2}{5}$$

$$P(\text{blue cube from bag B}) = \frac{18+2}{18+32} = \frac{20}{50} = \frac{2}{5}$$

$$\frac{12}{n+12} = \frac{n+2}{n+32} \text{ gives } \frac{12}{30} = \frac{20}{42} \text{ true}$$

So the probability of picking a blue cube is now the same for both bags.

Video: [Probability of One Event](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook: p234 M8.2 Qu 1-15 odd
A*-G class textbook: p204 M8.2 Qu 1-15 odd
9-1 homework book: p78 M8.2 Qu 1-10
A*-G homework book: p56 M8.2 Qu 1-10

[Homework book answers \(only available during a lockdown\)](#)