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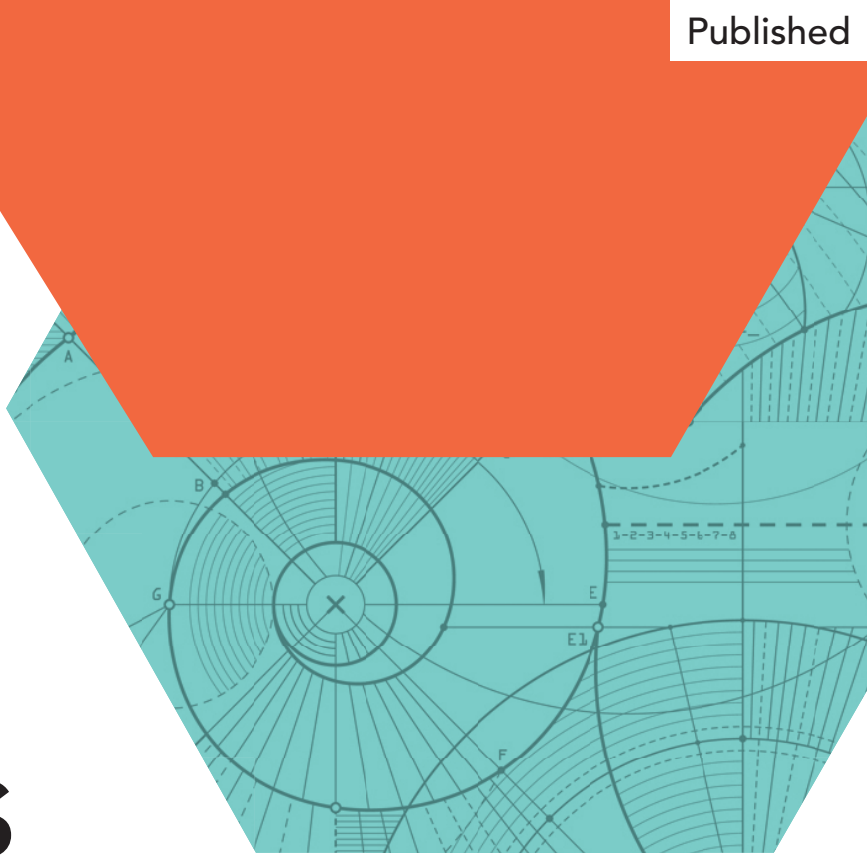

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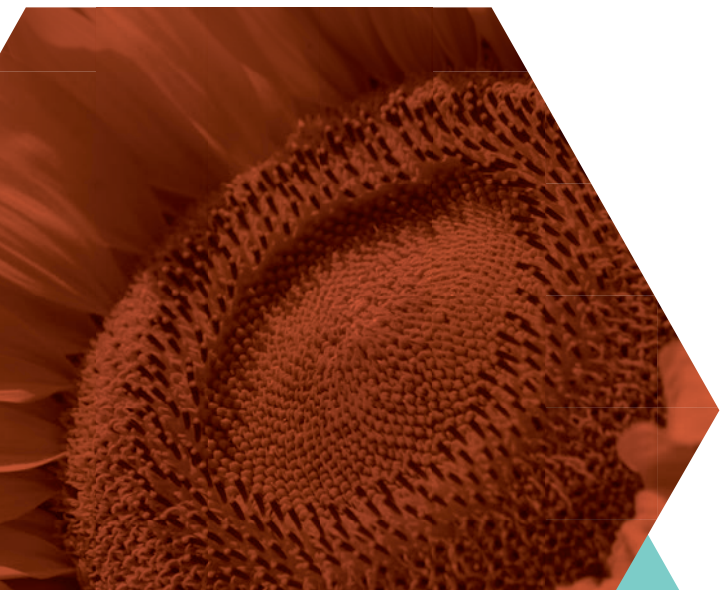

Chris Pearce

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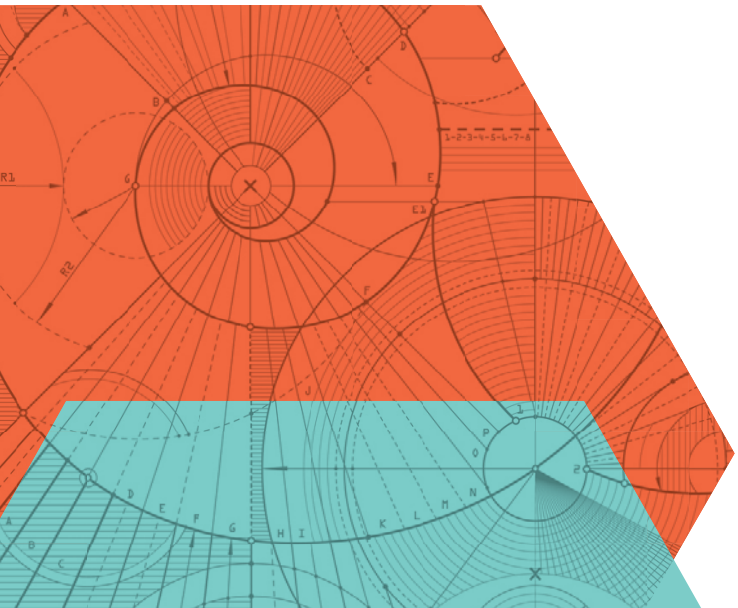


Chris Pearce

Probability

WORKED EXAMPLE

There are red, blue and black pens in a drawer.

Tracey takes one pen from the drawer, without looking.

The probability that she takes a red pen is $\frac{3}{5}$.

The probability that she takes a black pen is $\frac{3}{10}$.

a. Work out the probability that her pen is:

i. not red **ii.** blue.

b. Denise says: 'There are now 15 pens left in the drawer.'

Explain why this is false.

SOLUTION

The question says that Tracey takes the pen without looking. This means that she is equally likely to take a pen of any colour. You could also say that she takes a pen 'at random'.

a. i. The probability that the pen is **not** red = 1 – the probability that it **is** red

$$= 1 - \frac{3}{5} = \frac{2}{5}$$

ii. The pen must be red, blue or black. The three probabilities must add up to one.

The probability the pen is blue $= 1 - \left(\frac{3}{5} + \frac{3}{10}\right)$

$$= 1 - \frac{9}{10} = \frac{1}{10}$$

b. If there are 15 pens left then originally there were 16 pens, since only one has been taken out.

But originally $\frac{3}{5}$ of the pens were red – that is what the probability tells you.

However, $\frac{3}{5}$ of 16 is not a whole number. Tracey must be wrong.

You could also have used one of the other probabilities ($\frac{3}{10}$ or $\frac{1}{10}$) to justify your answer.

QUESTIONS

1. Graham has seven cards. Each card has a letter and a number on it.

A	B	C	D	E	F	G
1	2	3	4	5	6	7

Graham takes a card at random.

Work out the probability that the card has on it:

a. a multiple of 3

b. a letter in the word GRAHAM

c. an even number and a letter in the word CAMERA.

2. Weather each day is put in one of three categories:

sunny

cloudy and dry

wet.

The probability it is sunny today is 0.3.

The probability it is not cloudy and dry is 0.9.

What is the probability it is wet?

3. Lucy has a large jar that contains 80 coloured sweets.

She says: 'If you take one without looking, the probability that you will **not** get a red sweet is $\frac{4}{5}$.'

Lucy is correct. How many of the sweets in the jar are red? Give a reason for your answer.

4. Gurdeep has a 2p coin, a 10p coin and a 20p coin.

He throws all three coins. Each coin can show a head (H) or a tail (T).

a. Copy and complete this table to show all the possible outcomes. You will need to add more rows.

2p	10p	10p
H	H	H

b. Work out the probability of his throwing at least one head.

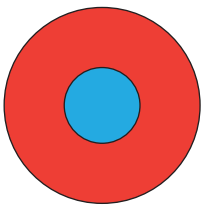
c. Work out the probability of his throwing more heads than tails.

5. In a game, Sasha throws darts at this target.

The probability that Sasha will miss the target is 10%.

The probability he will hit red is twice the probability he will hit blue.

What is the probability he will hit red?



6. Ewan has a pack of cards.

Each card has on it a two-digit number.

Ewan takes a card at random.

The probability that it is an even number is $\frac{3}{4}$.

Look at the statements below. Say whether each one is true or false. Give a reason for each answer.

a. A quarter of the cards have odd numbers.

b. The number on Ewan's card cannot be 98.

c. There could be 50 cards in the pack.

7. This is part of a newspaper report.

Lucky Seven

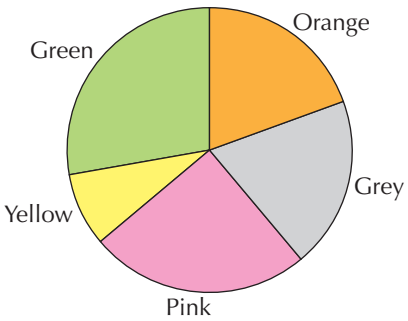
Seven is people's favourite odd number.

A scientist asked 250 people to choose an odd number less than ten. He found that 32% chose seven and 26% chose five.

The other odd numbers were equally likely to be chosen.

What is the probability that a person chose the number three?

***8.** There are 180 raffle tickets in five different colours.
This pie chart shows the proportion of each colour.



Leszek chooses one ticket at random.

a. Which colour is most likely?

b. Which two colours have the same probability?

c. The probability of one colour is $\frac{1}{12}$. Which colour is that?

d. What is the probability that the ticket is not pink?

***9.** The probability that Hendrick is late for school is one-ninth of the probability that he is not late.
What is the probability that he is late for school?

***10.** Cassie throws a dice twice and gets a 4 both times.
She is going to throw the dice again.
She says: 'The probability of a 4 this time is more than $\frac{1}{6}$.'
Is Cassie correct? Give a reason for your answer.

Answers at back of published book in tear-out section.