UNIT 21 *Probability of One Event* Overhead Slides

Overhead Slides

21.1.1 Probability in Words 1
21.1.2 Probability in Words 2
21.2.1 Probability Line 1
21.2.2 Probability Line 2
21.3 Probability of a Single Event
21.4 Relative Frequency
21.5 Relative Frequency Graph
21.6 Complementary Events
21.7 Estimating the Number of Outcomes
21.8 Mutually Exclusive Events
21.9 General Addition Law
21.10 Misconceptions

OS 21.1.1

Probability in Words 1

Cut out the six sections below, and place each one under the word on OS 21.1.2 which best describes its probability:

Liverpool will win the FA Cup next year	It will snow tomorrow	It will rain tomorrow
Exeter City will win the FA Cup next year	It is the Head's birthday tomorrow	You will obtain a total score of 13 when you roll two dice

OS 21.1.2 (For use with OS 21.1.1) *Probability in Words 2*

IMPOSSIBLE

UNLIKELY

LIKELY

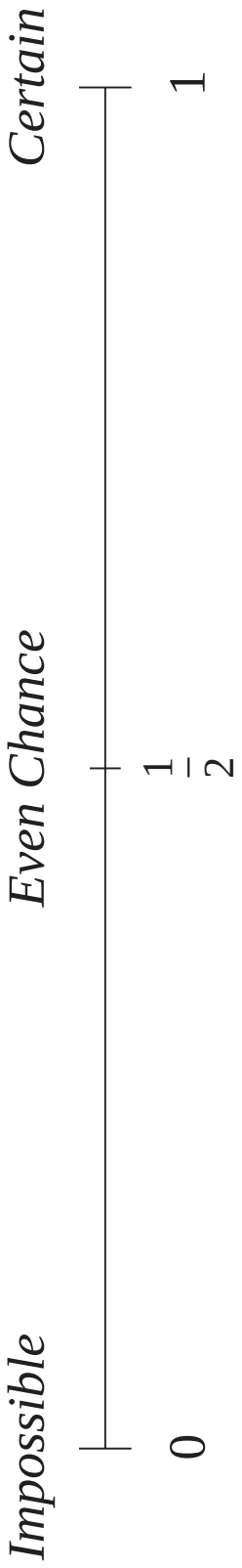
CERTAIN

OS 21.2.1 *Probability Line 1*

Cut out the six sections below, and place each one in the correct position on the probability line on OS 21.2.2.

You will go to school tomorrow	You will be set *MATHS* homework this week	It will snow on 1 August in London next year
You will get an even number when you roll a dice	You will go to bed before midnight tonight	Your family will win the National Lottery next week

OS 21.2.2 (For use with OS 21.2.1) *Probability Line 2*



OS 21.3 *Probability of a Single Event*

$$\text{Probability of an event} = \frac{\text{no. of successful outcomes}}{\text{total no. of outcomes}}$$

(A) When you roll a fair dice, what is the probability of obtaining:

(a) a 'five',

(b) an *even* number,

(c) a 'four' *or* a 'five' ?

(B) A bag of sweets contains 6 *mints* and 4 *eclairs.*
One sweet is taken at random from the bag.
What is the probability that this sweet is

(a) a *mint*,

(b) an *eclair* ?

OS 21.4 *Relative Frequency*

Toss a coin 20 times and record, on the chart below, the number of heads obtained: repeat in units of 20 up to a total of 400.

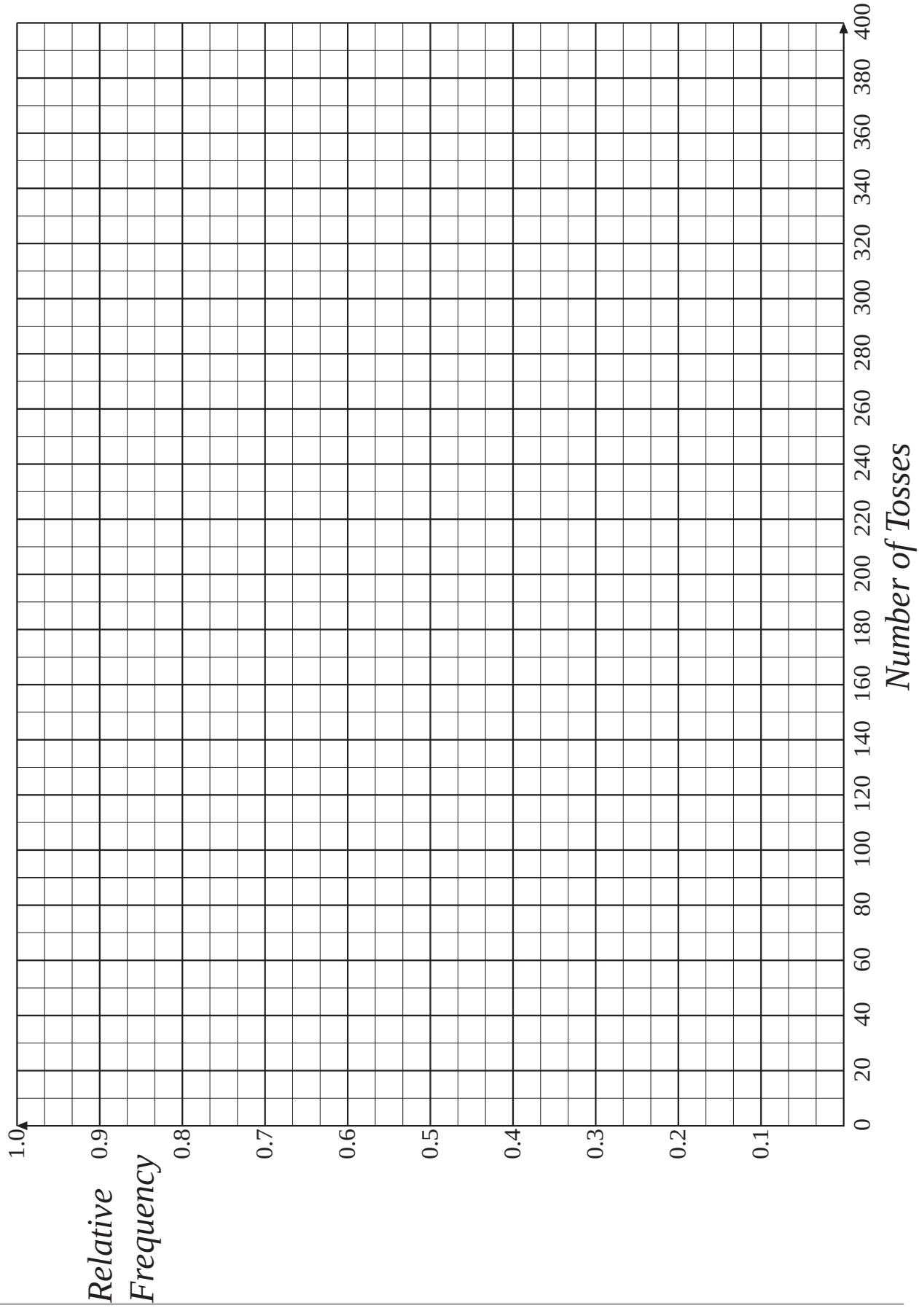
Number of		*Cumulative Number of*		*Relative Frequency*
Tosses	*Heads*	*Tosses*	*Heads*	
20		20		
20		40		
20		60		
20		80		
20		100		
20		120		
20		140		
20		160		
20		180		
20		200		
20		220		
20		240		
20		260		
20		280		
20		300		
20		320		
20		340		
20		360		
20		380		
20		400		

$$\text{Relative frequency} = \frac{\text{total no. of Heads}}{\text{total no. of Tosses}}$$

What is happening to the relative frequency above?

OS 21.5 *Relative Frequency Graph*

Illustrate your results from OS 21.4 on the graph below:



OS 21.6 *Complementary Events*

If A is an event and A' is the complementary event,

$$p(\text{A}) + p(\text{A}') = 1$$

or

$$p(\text{A}') = 1 - p(\text{A})$$

(A) If the probability that it will rain tomorrow is $\frac{1}{5}$, what is the probability that it will *not* rain tomorrow?

(B) If the probability of a white Christmas next year is 0.02, what is the probability of there *not* being a white Christmas next year?

(C) If the probability that Jared Jones passes his driving test is 0.8, what is the probability that he fails ?

OS 21.7 *Estimating the Number of Outcomes*

Expected number of successful outcomes

= probability of success × total number of events

(A) You toss an unbiased coin 500 times.

How many times do you expect to obtain 'Heads'?

(B) You roll a fair dice 120 times.

How many times do you expect to obtain:

(a) a 'six',

(b) a multiple of 3 ?

OS 21.8 *Mutually Exclusive Events*

If two events, A and B, are mutually exclusive,

$$p(\text{A or B}) = p(\text{A}) + p(\text{B})$$

where $p(\text{A}) =$ probability of A

and $p(\text{B}) =$ probability of B

A bag contains 6 red balls, 8 yellow balls and 4 green balls. One ball is taken at random from the bag.

What is the probability that the ball is:

(a) yellow,

(b) green,

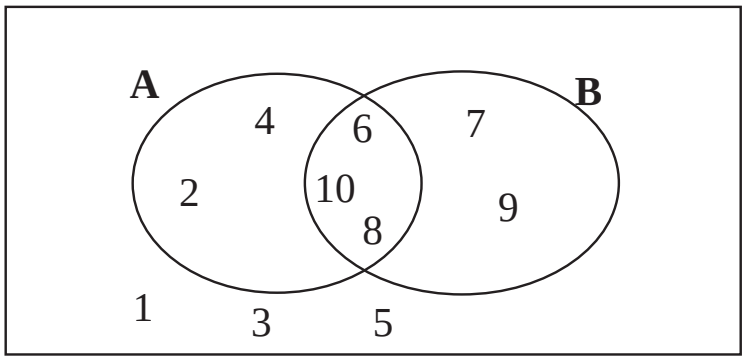
(c) yellow *or* green?

OS 21.9 *General Addition Law*

$$p(\text{A or B}) = p(\text{A}) + p(\text{B}) - p(\text{A and B})$$

One of the numbers 1 to 10, is selected at random.

Let: A be the set of even numbers
and B be the set of numbers greater than 5.



(a) $p(\text{an even number}) = p(\text{A})$

$=$

(b) $p(\text{greater than } 5) = p(\text{B})$

$=$

(c) $p(\text{even } \textit{and} \text{ greater than } 5) = p(\text{A and B})$

$=$

(d) $p(\text{even } \textit{or} \text{ greater than } 5)$

$= p(\text{A}) + p(\text{B}) - p(\text{A and B})$

$=$

OS 21.10 *Misconceptions*

The following statements are *misconceptions*. Explain why.

1. I've spun an *unbiased* coin 3 times and got 3 heads. It is more likely to be tails than heads if I spin it again.	2. Aytown Rovers play Betown United. Aytown can win, lose or draw, so the probability that Aytown will win is $\frac{1}{3}$.
3. There are 3 red beads and 5 blue beads in a bag. I pick a bead at random. The probability that it is red is $\frac{3}{5}$.	4. It is harder to throw a six than a three with a dice.
5. It is not worth buying a National Lottery card with numbers 1, 2, 3, 4, 5, 6, on it as this is less likely to occur than other combinations.	6. My Grandad smoked 20 cigarettes a day for 60 years and lived to be 90, so smoking can't be bad for you.
7. I have thrown an unbiased dice 12 times and not yet got a six. The probability of getting a 6 on my next throw is more than $\frac{1}{6}$.	8. I spin two coins. The probability of getting heads and tails is $\frac{1}{3}$ because I can get Heads and Heads, Heads and Tails or Tails and Tails.