

## Probabilities Using Listings

### Starter

1. (a) A couple have three children. What are the different orders of having boys and girls? (*Hint*: you may wish to consider 2 children first).
- (b) Given that it is equally likely whether the couple have a boy or a girl, find the probability of:
  - (i) having 3 girls
  - (ii) having 1 boy
  - (ii) having at least 1 girl

### Notes

When finding probabilities by listing outcomes it only works when each of the outcomes is *equally likely*.

It is often useful to draw a *probability space diagram*.

**E.g. 1** Two dice are rolled and the difference between the numbers is found.

- (a) Copy and complete the probability space diagram to represent the possible outcomes

Diff	1	2	3	4	5	6
1		1				
2					3	
3						
4				0		
5	4					
6						

Use your table to find the probability of getting a difference of:

- (b) 0
- (c) 2 or 3
- (d) greater than zero

**Working:** (a)

Diff	1	2	3	4	5	6
1	0	1	2	3	4	5
2	1	0	1	2	3	4
3	2	1	0	1	2	3
4	3	2	1	0	1	2
5	4	3	2	1	0	1
6	5	4	3	2	1	0

- (b) There are 6 zeros in the table  
There are 36 possible outcomes

$$P(0) = \frac{6}{36} = \frac{1}{6}$$

**N.B.** Make sure you use correct notation and cancel fractions where possible.

**E.g. 2** Spinner A has the numbers  $-1, 0, 2$  and  $5$  on it  
Spinner B has the numbers  $-3, -2, 1$  and  $4$  on it.

The two spinners are spun and the sum of the numbers found.

(a) Draw a sample space diagram with the possible outcomes.

Sum	$-1$	$0$	$2$	$5$
$-3$	$-4$			
$-2$				$3$
$1$			$3$	
$4$		$4$		

Find the probability of getting a total of:

- (b)  $1$  (c)  $3$  (d) less than  $5$   
(e) more than  $6$  (f) at least  $2$   
(g) a  $2$  on one spinner and  $-3$  on the other (h) a negative total

Video: [Sample space diagrams](#)

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

### Exercise

p176 Ex 10.3 Qu 1-10

### Summary

When finding probabilities by listing outcomes it only works when each of the outcomes is *equally likely*.

It is often useful to draw a *probability space diagram*.

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