

# PROBABILITY AND POSSIBILITY SPACES

We usually write a probability as a fraction, but we can also use a decimal or a percentage.

Example A bag contains 5 red beads, 3 blue and 2 green. A bead is pulled out at random

$$p(\text{the bead is green}) = \frac{2}{10} = \frac{1}{5}$$

(or we could write 0.2 or 20%)

Rule :  $p(X \text{ does happen}) + p(X \text{ doesn't happen}) = 1$

Example (continued)

$$p(\text{the bead is not green}) = 1 - \frac{1}{5} = \frac{4}{5}$$

## More than one event - Possibility Spaces

Examples Ben tosses two coins. What is the probability that they show the same side?

		Coin 2	
		H	T
Coin 1	H	HH	HT
	T	TH	TT

← Possibility Space

$$p(\text{same side}) = \frac{2}{4} = \frac{1}{2}$$

- ② Shona tosses two dice. What is the probability that
- (a) The total score is 5
  - (b) The total is more than 9
  - (c) The numbers are the same.

		2nd Die					
		1	2	3	4	5	6
1st Die	1	(x)	x	x	(x)	x	x
	2	x	(x)	(x)	x	x	x
	3	x	(x)	(x)	x	x	x
	4	(x)	x	x	(x)	x	(x)
	5	x	x	x	x	(x)	(x)
	6	x	x	x	(x)	(x)	(x)

$$(a) \quad p(\text{total is } 5) = \frac{4}{36} = \frac{1}{9}$$

$$(b) \quad p(\text{total} > 9) = \frac{6}{36} = \frac{1}{6}$$

$$(c) \quad p(\text{number same}) = \frac{6}{36} = \frac{1}{6}$$