Topic: Probability (Trees and Venns)

Topic/Skill	Definition/Tips	Example
1. Tree	Tree diagrams show all the possible	Bag A Bag B
Diagrams	outcomes of an event and calculate their	1/2 red
	probabilities.	, 3
		1 red
	All branches must add up to 1 when	5 2 black
	adding downwards.	3 1
	This is because the probability of	
	something not happening is 1 minus the	black
	probability that it does happen.	5 2
	probability that it does happen.	- black
	Multiply going across a tree diagram.	_
	with programmer of the control of th	
	Add going down a tree diagram.	
2. Independent	The outcome of a previous event does not	An example of independent events
Events	influence/affect the outcome of a second	could be <u>replacing</u> a counter in a bag
Z v Gines	event.	after picking it.
3. Dependent	The outcome of a previous event does	An example of dependent events could
Events	influence/affect the outcome of a second	be not replacing a counter in a bag after
Lvents	event.	picking it.
	event.	'Without replacement'
4. Probability	P(A) refers to the probability that event A	P(Red Queen) refers to the probability
Notation	will occur.	of picking a Red Queen from a pack of
Notation	will occur.	cards.
		cards.
	D(A2) refers to the probability that event	D(Dlue') refers to the probability that
	P(A') refers to the probability that event	P(Blue') refers to the probability that
	A will <u>not</u> occur.	you do not pick Blue.
	D(A D) refers to the probability that	D(Planda II Dight Handad) refers to the
	$P(A \cup B)$ refers to the probability that event A or B or both will occur.	P(Blonde U Right Handed) refers to the
	event A or b or both will occur.	probability that you pick someone who
		is Blonde or Right Handed or both.
	$P(A \cap B)$ refers to the probability that	P(Blonde ∩ Right Handed) refers to the
	both events A and B will occur.	probability that you pick someone who
	both events A and B win occur.	is both Blonde and Right Handed.
5. Venn	A Venn Diagram shows the relationship	A U B A O B
Diagrams	between a group of different things and	A B A B
Diagrams	how they overlap.	
	now they overlap.	
	You may be asked to shade Venn Diagrams	
	· ·	$(A \cap B)'$ $(A \cup B)'$
	as shown below and to the right.	A
	$A \cup B$ $A \cap B$	
	$\begin{bmatrix} A & B \\ & A \end{bmatrix}$	
	The Union The Intersection	
	'A or B or Both' 'A and B'	

<u> </u>		
		$A \cup B'$ $A \cup B'$
6. Venn	∈ means 'element of a set' (a value in the	Set A is the even numbers less than 10.
Diagram	set)	$A = \{2, 4, 6, 8\}$
Notation	{ } means the collection of values in the	Sat D is the prime numbers loss than
	set. ξ means the 'universal set' (all the values	Set B is the prime numbers less than 10.
	to consider in the question)	$B = \{2, 3, 5, 7\}$
	,	
	A' means 'not in set A' (called	$A \cup B = \{2, 3, 4, 5, 6, 7, 8\}$
	complement)	$A \cap B = \{2\}$
	A ∪ B means 'A or B or both' (called Union)	
	A ∩ B means 'A and B (called	
	Intersection)	
7. AND rule	When two events, A and B, are	What is the probability of rolling a 4
for Probability	independent:	and flipping a Tails?
	$P(A \text{ and } B) = P(A) \times P(B)$	$P(4 \text{ and } Tails) = P(4) \times P(Tails)$ $= \frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$
8. OR rule for	When two events, A and B, are mutually	What is the probability of rolling a 2 or
Probability	exclusive:	rolling a 5?
	P(A or B) = P(A) + P(B)	$P(2 \text{ or } 5) = P(2) + P(5)$ $= \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$
9. Conditional	The probability of an event A happening,	1st Bead 2nd Bead
Probability	given that event B has already happened.	3/8 Red
	With conditional probability, check if the	8 Red
	numbers on the second branches of a tree	4 8.1
	diagram changes. For example, if you have	$\frac{4}{9}$ Red $\frac{5}{8}$ Green
	4 red beads in a bag of 9 beads and pick a	4
	red bead on the first pick, then there will be 3 red beads left out of 8 beads on the	5 Green 8 Red
	second pick.	
	F	4/8 Green