Year 10 Mathematics
Probability Practice Test 1

1 A letter is chosen randomly from the word TELEVISION.

a How many letters are there in the word TELEVISION?

b Find the probability that the letter is:

i a V ii an E iii not an E iv an E or a V

2 An experiment involves tossing three coins and counting the number of heads. Here are the results after running the experiment 100 times.

Number of heads	0	1	2	3
Frequency	11	40	36	13

a How many times did 2 heads occur?

b How many times did fewer than 2 heads occur?

c Find the experimental probability of obtaining:

i 0 heads ii 2 heads iii fewer than 2 heads iv at least one head

3 Consider the given events A and B that involve numbers taken from the first 10 positive integers.

A = {1, 2, 3, 4, 5, 6} B = {1, 3, 7, 8}

a Represent the two events A and B in a Venn diagram.

b List the sets: i A and B ii A or B

c If a number from the first 10 positive integers is randomly selected, find the probability that the following events occur.

i A ii A and B iii A or B

d Are the events A and B mutually excusive? Why or why not?

4 From a class of 30 students, 12 enjoy cricket (C), 14 enjoy netball (N) and 6 enjoy both cricket and netball.

a Illustrate this information in a Venn diagram.

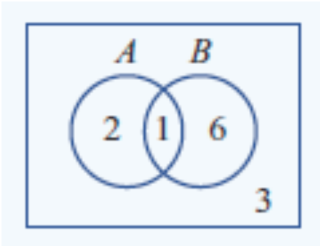
b State the number of students who enjoy:

i netball only ii neither cricket nor netball

c Find the probability that a person chosen at random will enjoy:

i netball ii netball only iii both cricket and netball

5 The Venn diagram shows the distribution of elements in two sets, A and B .



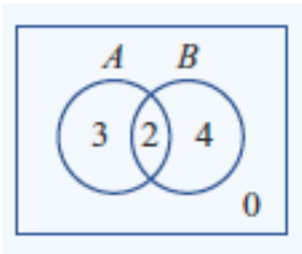
a Transfer the information in the Venn diagram to a two-way table.

b Find the number of elements for these regions.

i) A and B ii B only iii A only iv neither A nor B v A vi not B vii A or B

c Find: i P(A and B) ii P (not A) iii P (A only)

6 Consider this Venn diagram, displaying the number of elements belonging to the events A and B .



Find the following probabilities.

a P(A) b P(A and B) c P(A|B) d P(B|A)

7 From a group of 15 hockey players at a game of hockey, 13 played on the field, 7 sat on the bench and 5 both played and sat on the bench. A hockey player is chosen at random from the team.
Let A be the event 'the person played on the field' and B be the event 'the person sat on the bench'.

a Represent the information in a two-way table.

b Find the probability that the person only sat on the bench.

c Find the probability that the person sat on the bench, given that they played on the field.

d Find the probability that the person played on the field, given that they sat on the bench.

8 A six-sided die is rolled twice.

a List all the outcomes, using a table.

b State the total number of outcomes.

c Find the probability of obtaining the outcome (1, 5).

d Find:

i P(double) ii P(sum of at least 10) iii P(sum not equal to 7)

9 Two letters are chosen from the word KICK, without replacement.

a Construct a table to list the sample space.

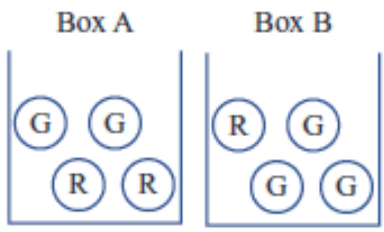
b Find the probability of:

i obtaining the outcome (K, C)

ii selecting two Ks

iii selecting a K and a C

10 Boxes A and B contain 4 counters each. Box A contains 2 red and 2 green counters and box B contains 1 red and 3 green counters. A box is chosen at random and then a single counter is selected.



a What is the probability of selecting a red counter from box A?

b What is the probability of selecting a red counter from box B?

c Represent the options available as a tree diagram that shows all possible outcomes and related probabilities.

d What is the probability of selecting box B and a red counter?

e What is the probability of selecting a red counter?

11 A bag contains 5 blue (B) and 3 white (W) marbles and two marbles are selected without replacement.

a Draw a tree diagram showing all outcomes and probabilities.

b Find the probability of selecting:

i a blue marble followed by a white marble (B, W)

ii 2 blue marbles iii exactly one blue marble

c If the experiment was repeated with replacement, fi nd the answers to each question in part b .

12 Decide whether the following events A and B are independent.

a A die is rolled twice. Let A be the event 'rolling a 6 on the first roll' and let B be the event 'rolling a 3 on the second roll'.

b Two playing cards are randomly selected from a standard deck, without replacement. Let A be the event 'the first card is a heart' and let B be the event 'the second card is a heart'.

ANSWERS

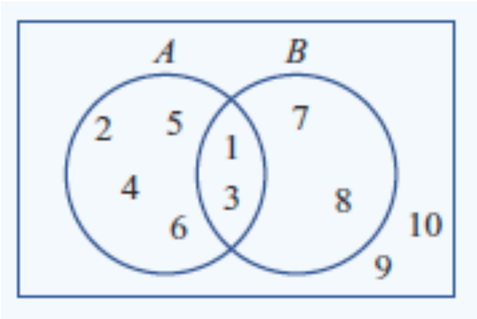
1 a) 10 b) P(E) = 1/5 c) P(Not an E) = 4/5 d) P(E or a V) = 3/10

2 a) 36 b) 51

c) i) P(No heads) = 11/100 ii) P(2 heads) = 36/100

iii) P(fewer than 2 heads) = 51/100 iv) P(at least one head) = 89/100

3 a)

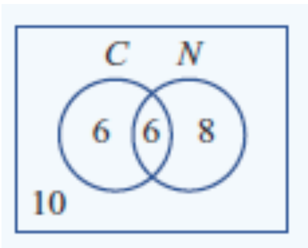


b) i A and B = {1, 3} ii A or B = {1, 2, 3, 4, 5, 6, 7, 8}

c) i P (A) = 3/5 ii P (A **and** B) = 1/5 iii P (A **or** B) = 4/5

d) The sets A and B are not mutually exclusive since there are numbers inside A and B

4 a)



b) i 8 ii 10 c) i P (N) = 7/15 ii P (N only) = 4/15 iii P (C and N) = 1/5

5 a)

	A	not *A*	
B	1	6	7
not *B*	2	3	5
	3	9	12

b) i 1 ii 6 iii 2 iv 3 v 3 vi 5 vii 2 + 1 + 6 = 9

i P(A **and** B) = 1/12 ii P **(not** A) = ¾ iii P **(**A **only)** = 1/6

6 a) P(A) = 5/9 b) P(A and B) = 2/9 c) P(A|B) = 1/3 d) P(B|A) = 2/5

7 a)

	A	not A	
B	5	2	7
not B	8	0	8
	13	2	15

b) P (bench only) = 2/15

c) P(B|A) = 5/13

d) P (A|B) = 5/7

$$P(B|A) = \frac{\text{number in } A \text{ and } B}{\text{number in } A}$$

$$P(A|B) = \frac{\text{number in } A \text{ and } B}{\text{number in } B}$$

8 a)

		Roll 2					
		1	2	3	4	5	6
	1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
	2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
Roll 1	3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
	4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
	5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
	6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

b) 36 outcomes c) P (1, 5) = 1/36

d) i P(double) = 6/36 ii P(sum of at least 10) = 1/6 iii P (sum not equal to 7) = 5/6

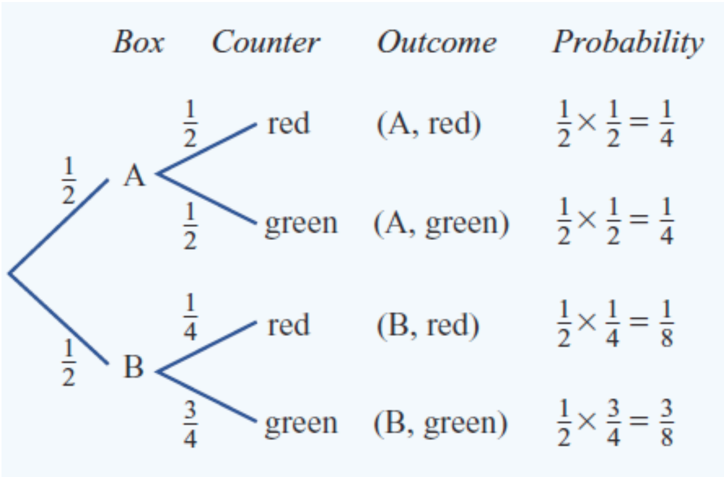
9 a)

		1st			
		K	I	C	K
	K	×	(I, K)	(C, K)	(K, K)
	I	(K, I)	×	(C, I)	(K, I)
2nd	C	(K, C)	(I, C)	×	(K, C)
	K	(K, K)	(I, K)	(C, K)	×

b) i P(K,C) = 1/6 ii P (K,K) = 1/6 iii P (K and C) = 1/3

10 a) P (red from box A) = ½ b P (red from box B) = ¼

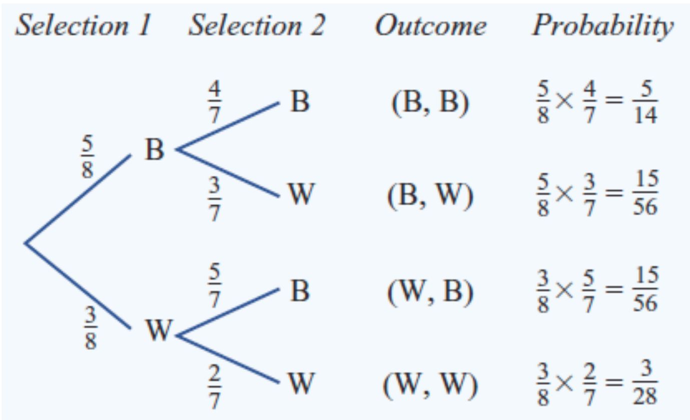
c)



d) P(B, red) = 1/8

e) P(1 red) = 3/8

11 a)



b) i) P (B,W) = 15/56 ii) P (B,B) = 5/14 iii) P (1 blue) = 15/28

c) i) P (B,W) = 15/64 ii) P (B,B) = 25/64 iii) P (1 blue) = 15/32

12 a Yes, events A and B are independent.

b No, events A and B are not independent.