Y8 Maths

Unit 8 Test

Probability

Name: _____

CALCULATORS are allowed

1 A fair 10-sided dice is rolled once. Each face has one number on it from 1 to 10.

a What is the probability of getting

i a square number

1, 4, 9

3/10 ✓ B1

ii a number which is not a multiple of 4

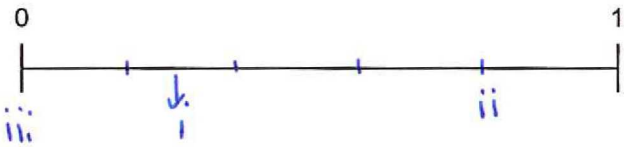
1, 2, 3, 5, 6, 7, 9, 10

8/10 = 4/5 ✓ B1

iii the number 12?

0 ✓ B1

b Show the probabilities from part **a** on this number line. Label each answer.



✓ 1 correct
✓✓ all correct

(5 marks)

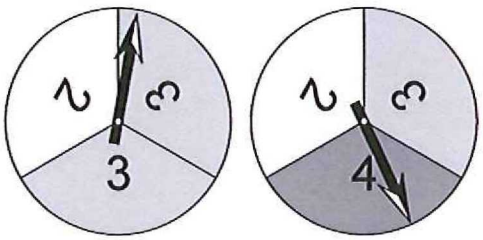
2 A garden plant can produce pink, white or blue flowers. The probability of the plant having pink flowers is 0.5. Blue and white flowers are equally likely. What is the probability of a plant having white flowers?

0.5 ÷ 2 = 0.25 ✓ m1

0.25 ✓ A1

(2 marks)

3 Two spinners are spun together and the numbers obtained are multiplied together.



a Complete the table of outcomes (scores)

	2	3	3
2	4	6	6
3	6	9	9
4	8	12	12

✓ most correct, few errors
✓✓ all correct

b What is the probability of scoring a total of 4?

1/9 ✓ B1

c What is the probability of scoring a total less than 8?

4/9 ✓ B1

d What is the probability of scoring at least 6?

7/9 ✓ B1

(5 marks)

4 **a** The probability that Ayla correctly completes a Sudoku puzzle is $\frac{4}{5}$. What is the probability that she does not complete the puzzle?

$\frac{1}{5}$ ✓ B1

b The probability that Ayla correctly completes a Kakuro puzzle is $\frac{7}{9}$. Is Ayla better at Sudoku or Kakuro puzzles? Explain your reasoning.

$\frac{7}{9}$ or $\frac{4}{5}$ Ayla is better at Sudoku ✓ B1 puzzles as this

$\frac{35}{45} < \frac{36}{45}$ is a higher probability ✓ C1

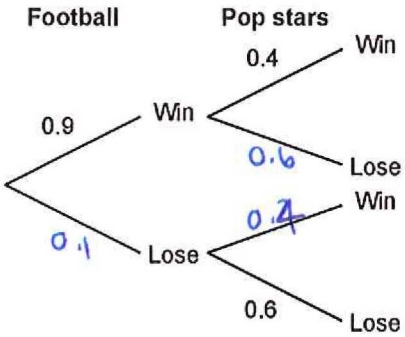
or $7/9 = 0.\dot{6}$ $\frac{4}{5} = 0.8$

(3 marks)

5 The probability that Fergus wins a game of football Top Trumps is 0.9

The probability that he wins a game of pop stars Top Trumps is 0.4

a Complete this tree diagram.



✓ any one probability correct
✓✓ all correct

b What is the probability that Fergus will win both games?

$P(WW) = 0.9 \times 0.4 = 0.36$ ✓ M1

0.36 ✓ A1

c What is the probability that he will win only one of the games?

$P(WL) = 0.9 \times 0.6 = 0.54$ ✓

$P(LW) = 0.1 \times 0.4 = 0.04$ ✓ M2

0.58

0.58 ✓ A1

d Use your answers to parts **b** and **c** (or otherwise) to work out the probability that Fergus will lose both games. Show your working.

$P(LL) = 0.1 \times 0.6 = 0.06$

or ✓ M1

$P(LL) = 1 - (0.36 + 0.58) = 0.06$

0.06 ✓ A1

(9 marks)

6 Eddie and Liam each take a card from a complete pack of 52.

Which of these rules make the game fair? Explain

a) Eddie wins if he gets a red card. Liam wins if he gets a black card.

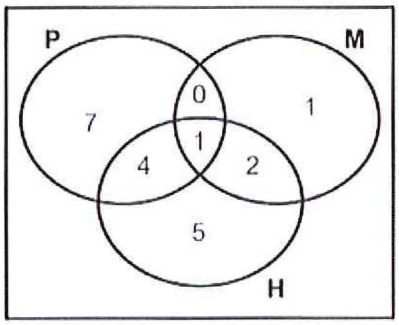
b) Eddie wins if he gets a picture card. Liam wins if he gets a number card.

a) Fair ✓B1 - black and red have equal ✓C1 chance

b) Unfair ✓B1 - only $\frac{12}{52}$ are picture ✓C1 cards and $\frac{40}{52}$ are number cards

(4 marks)

7 Lucy worked at Sam's Pizza Restaurant and drew up the Venn diagram below which shows people's choice of pepperoni (P), ham (H) and mushrooms (M) as pizza toppings



a) Are these events mutually exclusive? Explain your answer

✓B1 No, there are events that can occur at the same time. This means that a person can choose 2 or more ✓C1 toppings on the pizza at once

How many people had

i) three toppings ..... 1 ✓B1

ii) only one topping? (1+7+5) ..... 13 ✓B1

b) How many people had pizza? ..... 20 ✓B1

c) What is the probability that one of these people, picked at random, had two toppings

$\frac{4+2}{20}$ ✓ $= \frac{6}{20} = \frac{3}{10}$ ✓A1

↳ addition with any of the numbers M1

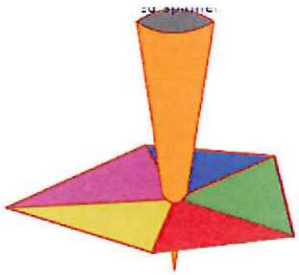
(7 marks)

8 Here is a spinner. Max spins it 900 times and the records the colour it lands on each time.

The table below shows the number of times the spinner landed on the different colours.

Colour	Frequency	P(colour)
Red	108	0.12
Green	306	0.34
Blue	81	0.09
Pink	189	0.21
Yellow	216	0.24

✓B1



a) Copy and complete the table

b) Estimate the probability that the spinner will land on blue or yellow

P (B or Y) = 0.09 + 0.24 = 0.33 ✓M1 ✓A1

c) Max spins the spinner 2700 times. How many times would you expect the spinner to land on pink?

0.21 × 2700 = 567 ✓M1 ✓A1 P(Pink) = $\frac{216}{900}$ = 0.21

OR 3 × 189 = 567

(5 marks)

9 Catrin's jewellery box contains 7 pairs of silver earrings and 5 pairs of gold earrings. She always picks a pair of earrings at random. Once she's worn a pair she does not return the earrings to the box.

What is the probability that the second pair of earrings she takes from the box are silver too?

Total: 12 Silver (1st) = $\frac{7}{12}$ Second pair = $\frac{6}{11}$ ✓ ✓A1

(2 marks)

10 Lilli takes examinations in Maths and English. The probability that she passes Maths is 0.7. The probability that she passes English is 0.8. The results in each subject are independent of each other

a) What is the probability that Lilli fails Maths? $1-0.7 = 0.3$ ✓B1

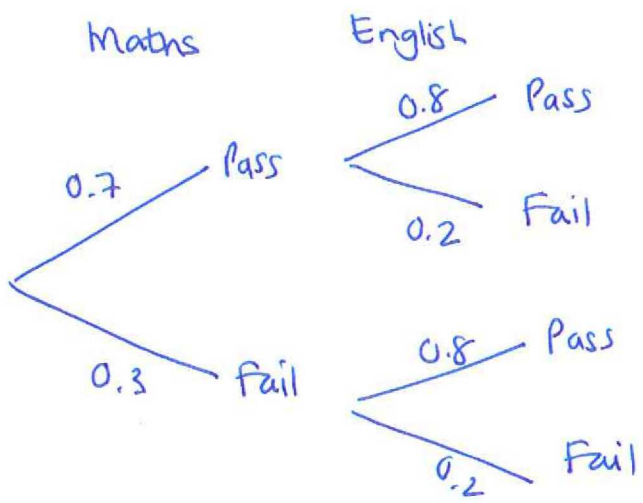
b) Draw a tree diagram below to show the probabilities of Lilli passing and failing Maths and English.

c) Calculate the probability that

i) Lilli passes both subjects;

ii) Lilli passes Maths and fails English

b)



✓B1 for 0.2 and 0.3
B1
✓ others all correct

c) i) $P(P,P) = 0.7 \times 0.8 = 0.56$ ✓M1 ✓A1

ii) $P(P,F) = 0.7 \times 0.2 = 0.14$ ✓M1 ✓A1

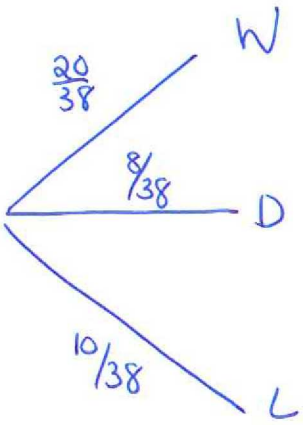
(6 marks)

TOTAL: 48 marks

[End of Test]

If you have finished, and checked your work, try this challenge.
YOU WILL **NOT** BE MARKED ON THIS SECTION

2 Last season, a football club won 20 games, drew 8 games and lost 10 games.
Use a tree diagram to estimate the probability that the club will
a win the next three games
b win two of the next three games.



a) $P(WWW) = \left(\frac{20}{38}\right)^3 =$

b) $P(WWL) = \frac{20}{38} \times \frac{20}{38} \times \frac{10}{38}$
$P(WLW) =$
$P(LWW) =$
$\frac{500}{6859} \times 3$

$\frac{1500}{6859}$

$P(WWD) = \frac{20}{38} \times \frac{20}{38} \times \frac{8}{38}$
$P(WDW) =$
$P(DWW) =$
$\frac{400}{6859} \times 3$

$\frac{1200}{6859}$

$\frac{1500}{6859} + \frac{1200}{6859} = \frac{2700}{6859}$