YEAR 12 Essentials Mathematics
Semester 2 2018
Test 6 – Probability

Baldivis Secondary College

Name: _____

Total Marks: _____ / ~~54~~ 49 marks
Total Time: 55 minutes

Full working out must be shown to get full marks.
Attempt all questions

Resources allowed:
1 A4 page, (1 side) of hand written notes, ruler, calculator

Question 1 **[~~7~~ 8 marks: ~~3~~ 4, 2, 2]**

a) Brett is going to choose a coloured chocolate at random from a pile of 50 chocolates. In the pile there are 9 green, 15 orange, 22 blue and 4 red chocolates.

i. What is the probability that Brett will choose an orange chocolate?

$\frac{15}{50} = \frac{3}{10}$ ✓

ii. What is the probability that Brett will choose a chocolate that is not green?

$15+22+4 = 41$ $\frac{41}{50}$ ✓✓

iii. What is the most likely colour Brett will choose?

Blue ✓

b) When Doover plays golf he has a $\frac{2}{3}$ chance of sinking his first putt on each hole. Doover is playing in a 36-hole competition. On approximately how many holes will Doover sink his first putt?

$\frac{2}{3}$ of 36 = 24 ✓ ✓ 24th Hole

c) Tegan placed a bet on an online gambling site. The probability that her bet will win is $\frac{6}{15}$. Is Tegan more likely to win or lose? Give a reason for your answer.

More likely to lose ✓
as there is $\frac{9}{15}$ chance of losing ✓

Question 2 **[3 marks: 1, 2]**

As of 2014, the distribution of blood types in Australia is as follows:

Blood group	RhD	% of population	
O	O+	40	40
	O-	9	49
A	A+	31	80
	A-	7	87
B	B+	8	95
	B-	2	97
AB	AB+	2	99
	AB-	1	100

a) What is the probability that an Australian resident will have B+ blood type?

$\frac{8}{100} = \frac{2}{25}$ ✓

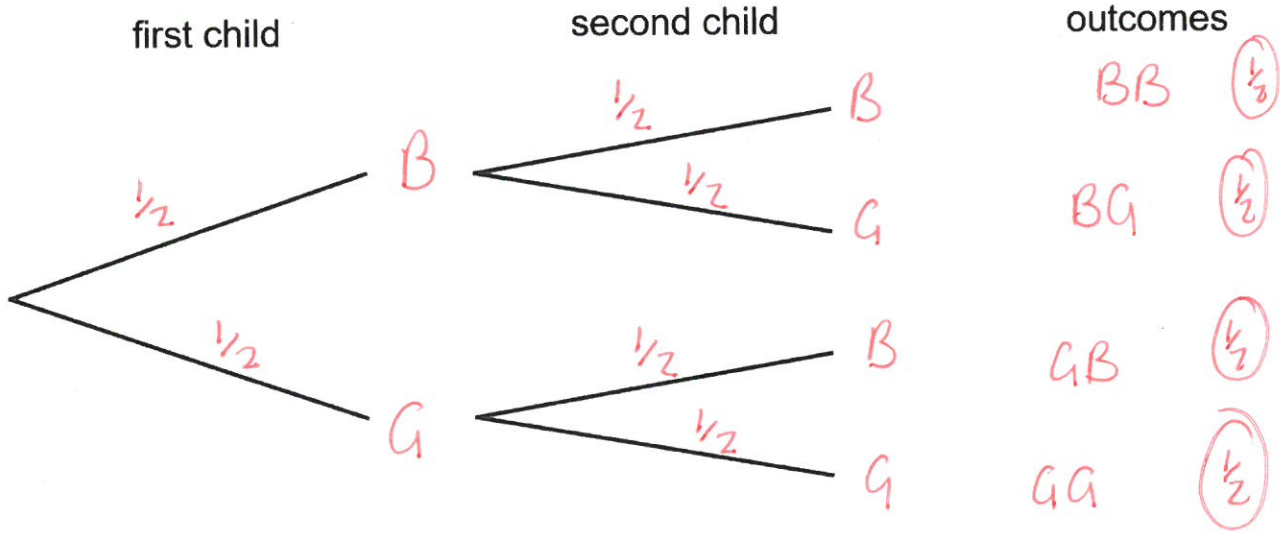
b) Every week, Australia needs over 27 000 blood donations. How many of these blood donations could be from people with A+ blood type?

31% of 27000 ✓

$\frac{31}{100} \times 27000 = 8370$ ✓

Question 3 **[5 marks: 2, 1, 2]**

The following tree diagram represents the possible outcomes of a family which has two children.



a) Label the diagram to show the possibilities of a boy and girl.

b) What is the probability the family could have two girls?

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. ✓

c) How could you simulate this situation and explain why chose this method?

Any reasonable answer that describes 50/50 chance ✓
ie toss coin twice ✓

Question 4 **[12 marks: 3, 2, 2, 2, 3]**

An agricultural research company has completed an investigation into the effect of a new fertiliser on plant growth. The heights of 50 plant seedlings grown under experimental conditions for several weeks were measured and recorded to the nearest centimetre. The heights are listed here.

107	162	151	145	133	125	116	108	111	113	125	126	158	142	139
165	168	152	141	147	147	131	137	137	111	119	121	125	125	156

a) Use the data above to complete the table below:

Height (cm)	Tally	Frequency	Relative Frequency
100 – 109	II	2	0·07
110 – 119	~~IIII~~	5	0·17
120 – 129	~~IIII~~ I	6	0·20
130 – 139	~~IIII~~	5	0·17
140 – 149	~~IIII~~	5	0·17
150 – 159	IIII	4	0·13
160 – 169	III	3	0·10
		30	≈1

✓✓✓

b) What is the probability of plants growing to a height between 120 cm and 129 cm?

$\frac{6}{30} = \frac{1}{5}$ ✓✓

c) What is the probability of plants growing to a height of at least 130 cm?

$5+5+4+3 = \frac{17}{30}$ ✓✓

d) If the experiment is expanded to 1000 plants, how many plants would you expect to grow to a height of at least 130 cm?

$\frac{17}{30} \times 1000 = 567$ plants ✓✓

e) The fertiliser is considered effective if 75% of seedlings have a height of 130 cm or more. Comment on the effectiveness of the fertiliser on plant growth, based on the results from the experiment.

Not effective as only 57% of plants were at least 130cm or more. ✓✓✓

Question 5 **[5 marks]**

A shop sells hot chocolate and churros. Customers can order hot chocolate or churros or both. They were particularly busy and had 250 customers last weekend.

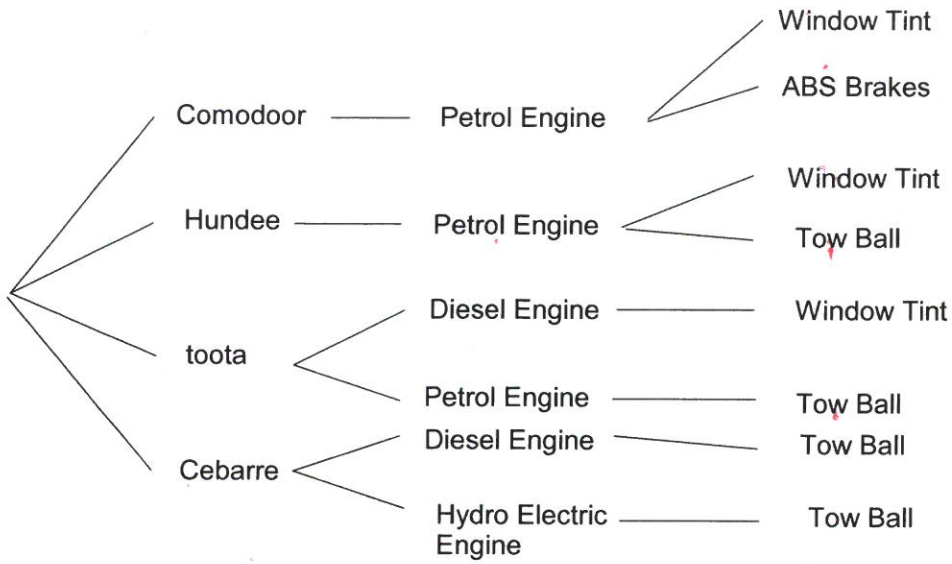
• 83 ordered hot chocolate	• 59 ordered churros and hot chocolate	• 19 ordered no churros or hot chocolate

a) Present this information in a two-way table.

	Churros	No Churros	Total.
Hot Choc.	59	24 ✓	83
Not Hot Choc.	148 ✓	19.	167 ✓
Total	207 ✓	43 ✓	250.

Question 6 **[8 marks: 2, 6]**

The following tree diagram shows some of the choices available when buying a new car:



a) State the sample space of buying a new car from the tree diagram above:

CPW HPW TDW CD(TB)
CPB HP(TB) TP(TB) C(HE)(TB) ✓ ✓

b) In the tree diagram all combinations are equally likely. Given this find the probability of having

i. A Comodoor with a petrol engine and Window tint? 1/8 ✓

ii. A Petrol engine? 5/8 ✓

iii. A petrol engine or a Hydro Electric engine $\frac{5}{8} + \frac{1}{8} = \frac{6}{8} = \frac{3}{4}$ ✓

iv. A Toota and Window Tint? 1/8. ✓

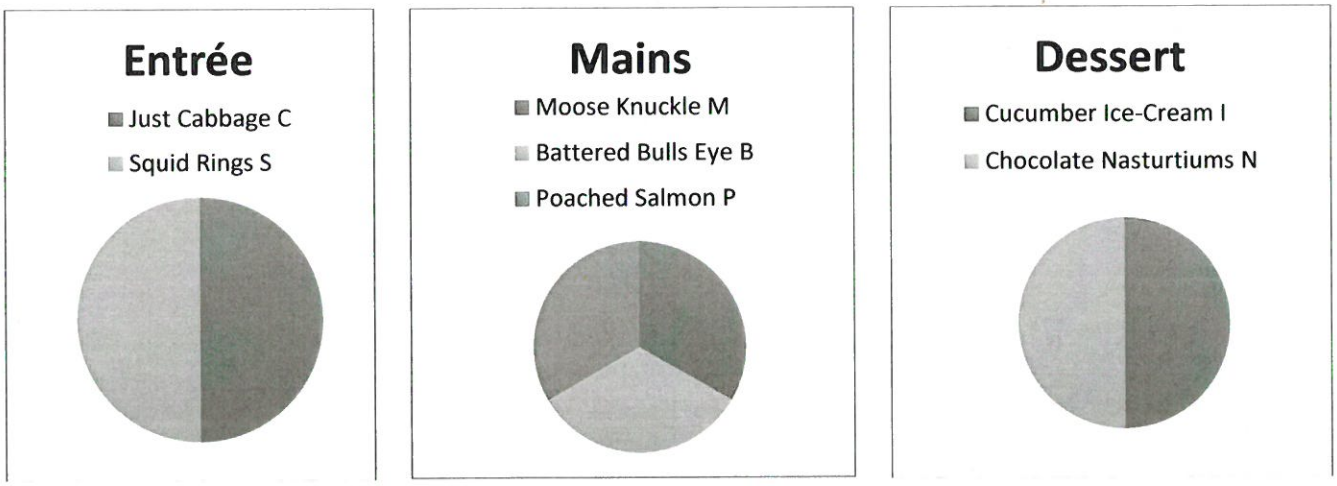
v. A Toota given I had a Tow Ball? 1/8 ✓

vi. Window tint given I didn't have a Hundee?

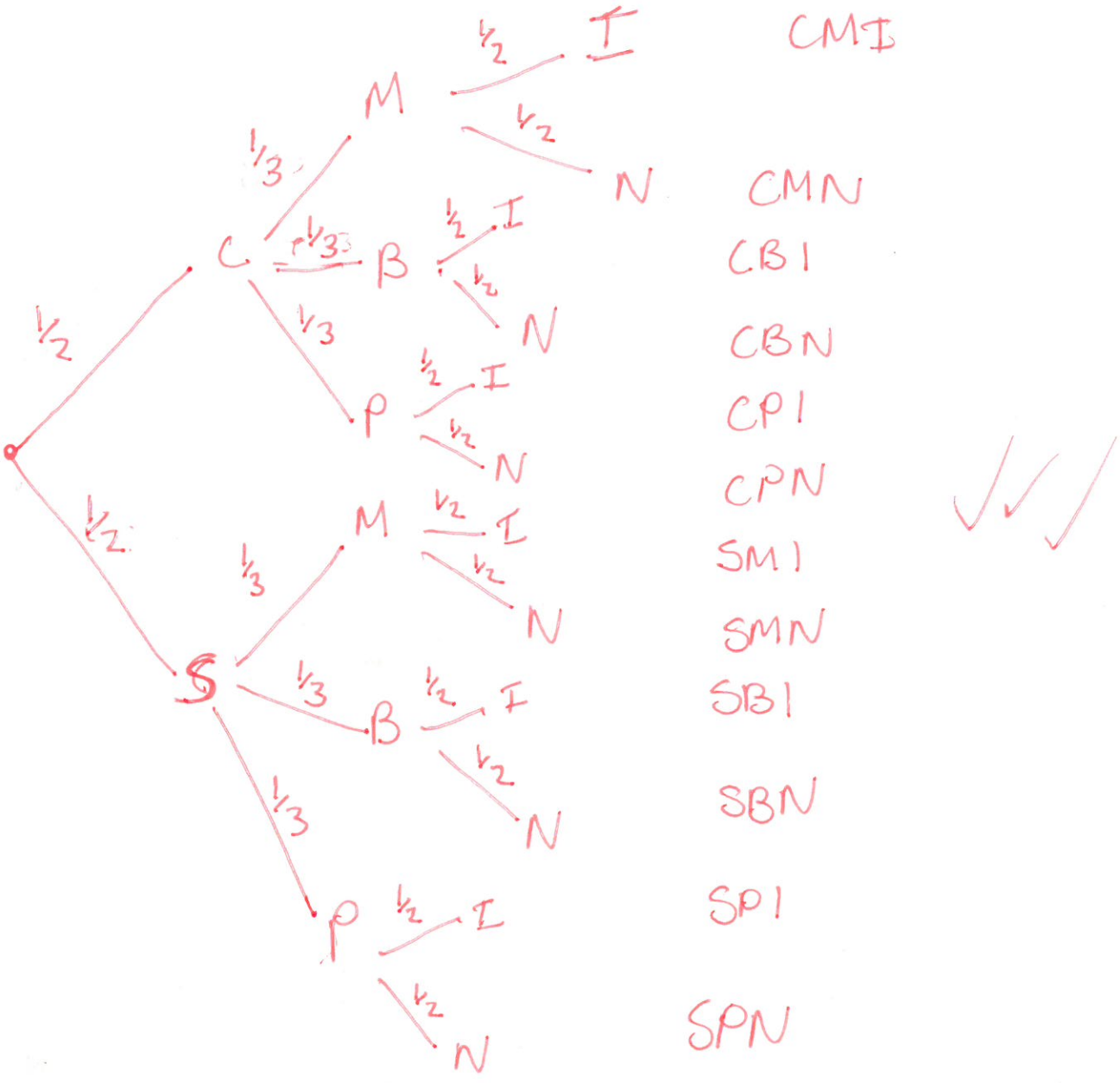
$\frac{2}{8} = \frac{1}{4}$ ✓

Question 7 **[8 marks: 3, 1, 1, 1, 2]**

Spinners is a new restaurant with a randomised menu. A customer chooses each course by flicking a spinner.



Display the following information in a tree diagram.



a) Determine the probability that the meal will be Just Cabbage, Moose Knuckle and Cucumber Ice – Cream

$\frac{1}{2} \times \frac{1}{3} \times \frac{1}{2} = \frac{1}{12}$ ✓

b) Determine the probability that the meal included Poached Salmon

$\frac{1}{12} \times 4 = \frac{4}{12} = \frac{1}{3}$ ✓

c) Determine the probability that the meal included Battered Bullseye and Squid Rings

$\frac{1}{12} \times 2 = \frac{2}{12} = \frac{1}{6}$ ✓

d) What percentage of people had moose knuckle or salmon, and ice cream?

$\frac{1}{12} \times 8 = 66.7\%$ ✓

End of Test