BECA / Huson / 11.1 IB Math SL Name:
5.6 Spiral Review Probability - SPICY (Calculator, Paper 2)

5-6 P2 Probability_spicy

1. *[7 marks]*

Consider the independent events A and B. Given that $\mathrm{P}(B) = 2\mathrm{P}(A)$, and $\mathrm{P}(A \cup B) = 0.52$, find $\mathrm{P}(B)$.

2a. *[4 marks]*

In any given season, a soccer team plays 65 % of their games at home.

When the team plays at home, they win 83 % of their games.

When they play away from home, they win 26 % of their games.

The team plays one game.

Find the probability that the team wins the game.

2b. *[4 marks]*

If the team does not win the game, find the probability that the game was played at home.

3a. *[4 marks]*

Samantha goes to school five days a week. When it rains, the probability that she goes to school by bus is 0.5. When it does not rain, the probability that she goes to school by bus is 0.3. The probability that it rains on any given day is 0.2.

On a randomly selected school day, find the probability that Samantha goes to school by bus.

3b. *[3 marks]*

Given that Samantha went to school by bus on Monday, find the probability that it was raining.

3c. *[2 marks]*

In a randomly chosen school week, find the probability that Samantha goes to school by bus on exactly three days.

3d. *[5 marks]*

After n school days, the probability that Samantha goes to school by bus at least once is greater than 0.95. Find the smallest value of n.

4a. *[2 marks]*

At a large school, students are required to learn at least one language, Spanish or French. It is known that 75% of the students learn Spanish, and 40% learn French.

Find the percentage of students who learn **both** Spanish and French.

4b. *[2 marks]*

At a large school, students are required to learn at least one language, Spanish or French. It is known that 75% of the students learn Spanish, and 40% learn French.

Find the percentage of students who learn Spanish, but not French.

4c. *[5 marks]*

At a large school, students are required to learn at least one language, Spanish or French. It is known that 75% of the students learn Spanish, and 40% learn French.

At this school, 52% of the students are girls, and 85% of the girls learn Spanish.

A student is chosen at random. Let *G* be the event that the student is a girl, and let *S* be the event that the student learns Spanish.

(i) Find $\mathrm{P}(G \cap S)$.

(ii) Show that *G* and *S* are **not** independent.

4d. *[6 marks]*

At a large school, students are required to learn at least one language, Spanish or French. It is known that 75% of the students learn Spanish, and 40% learn French.

At this school, 52% of the students are girls, and 85% of the girls learn Spanish.

A boy is chosen at random. Find the probability that he learns Spanish.

5a. *[3 marks]*

Two fair 4-sided dice, one red and one green, are thrown. For each die, the faces are labelled 1, 2, 3, 4. The score for each die is the number which lands face down.

List the pairs of scores that give a sum of 6.

5b. *[3 marks]*

The probability distribution for the sum of the scores on the two dice is shown below.

Sum	2	3	4	5	6	7	8
Probability	p	q	$\frac{3}{16}$	$\frac{4}{16}$	$\frac{3}{16}$	r	$\frac{1}{16}$

Find the value of p , of q , and of r .

5c. *[6 marks]*

Fred plays a game. He throws two fair 4-sided dice four times. He wins a prize if the sum is 5 on three or more throws.

Find the probability that Fred wins a prize.