

Probability Revision Questions



LC HL Project Maths

- 1. Fundamental principle of counting**
e.g. Sean writes down a code number, which is to be a whole number between 10 and 1000 inclusive.
- (i) How many two digit codes have different digits?
 - (ii) How many three digit codes have different digits?

[illegible]

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2. Arrangements (permutations)

e.g. Eight people, including Stephen, Louise and Mark, sit in a row.

- How many arrangements of all eight people are possible?
- In how many of these arrangements are Stephen, Louise and Mark sitting next to each other?

[illegible]

3. Combinations (choices)

e.g. A man is dealt five cards from an ordinary pack of playing cards.

- In how many ways will the cards contain exactly two kings?
- In how many ways will the cards contain at least one king?
- In how many ways will the cards contain three of one kind and two of another kind, e.g. three jacks and two aces?

[illegible]

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4. Concept of probability

e.g. A coin is tossed repeatedly. Each of the first four tosses results in a head.

What is the probability that the next toss results in a tail?

[illegible]

5. Equally likely outcomes

e.g. A group of students consists of 5 girls and 8 boys. One of the girls is called Mary and one of the boys is called John. If two people are chosen at random from the group, find the probability that neither Mary nor John is chosen.

[illegible]

Probability Revision Questions

6. Probability and set theory

e.g. A and B are two events for an

experiment. $P(A) = \frac{4}{9}$ and

$$P(A \cup B) = \frac{38}{45}.$$

If A and B are mutually exclusive, calculate $P(B)$.

[illegible]

7. Success and Failure

e.g. Three people are chosen at random from 5 men and 9 women.

- Find the probability of getting at least one man.
- Find the probability of getting at most one man.

[illegible]

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8. Addition Rule

e.g. A single card is drawn at random from a standard pack of cards. Let A be the event that it is a red card, and B be the event that it is a '6'.

- (i) Calculate $P(A)$ and $P(B)$.
- (ii) Describe $A \cap B$ and calculate $P(A \cap B)$.
- (iii) If a single card is chosen at random from a pack of cards, what is the probability that it is either a red card or a '6'?

9. Conditional probability

e.g. In a class of all girls, 40% of the girls have brown hair, 25% have brown eyes and 15% have both brown hair and brown eyes. A girl is selected at random from the class.

- (i) If she has brown hair, what is the probability that she also has brown eyes?
- (ii) If she has brown eyes, what is the probability that she also has brown hair?

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10. Independent events

e.g. Three cards are selected at random from a standard pack of 52 cards. E is the event that we get three kings and F is the event that we get exactly one heart.

- Calculate $P(E)$ and $P(F)$.
- By calculating $P(E \cap F)$, investigate if E and F are independent.

11. Multiplication Rule

e.g. A class has 10 boys and 5 girls. Three students are selected, at random and in order, from the class. Find the probability that

- (i) the first two are boys and the third is a girl
- (ii) the first and third are boys and the second is a girl
- (iii) the first and third are of the same sex, and the second is of the opposite sex.

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12. Bernoulli trials

e.g. A die is loaded so that the probability of a '6' appearing is twice that of any other number appearing. What is the probability of the third '6' appearing on the eighth throw of the die?

13. Expected value

e.g. The probability distribution of a random variable X is given in the table below.

x	0	1	2	3
$P(x)$	$\frac{1}{4}$	$\frac{2}{7}$	$\frac{1}{3}$	k

- (i) Find the value of the constant k .
- (ii) Calculate $E(X)$.