

Preparatory Sheet

Required preparation for the session on.....

PROBABILITY EVENTS AND SCORING SYSTEMS

Aims of this session: Review your abilities in each of these areas, Green (feel confident...G), Amber (need to work more on...A), Red (Feel weaker at this...R)

1. Understand the meaning of independence for events
2. Calculate probabilities when events are dependent
3. Understand the implications of 'with or without replacement' problems
4. Understand that the 'Sum of probabilities of all mutually exclusive outcomes' has to be the value '1'.
5. Complete a tree diagram showing probabilities and use to calculate independent and dependent events.

G	A	R
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MOSTLY GREEN

MOSTLY ORANGE

MOSTLY RED

START

Watch the video/s, read and practice using the online materials. Read your GCSE maths AQA book

<https://padlet.com/mathsman230774/iwm53uq8yao5>





Write a comment about what you learned from the videos / materials below

1.

Understand the meaning of independence for events

Q...A probability score is a great way of easily seeing if we think something will happen and if it will happen lots or very little. This topic shows you how to score real life 'EVENTS' so others and yourself can rate how 'LIKELY' that event will occur. This is useful in betting, games, weather prediction, government decisions ..to name just a few.



Some things that happen are more (or less) likely to occur if something else has already happened before. INDEPENDENT events are those that are not based on what has happened before (not affected by the outcome of a previous event) or are happening at the same time (2 simultaneous events).

Look below at the descriptions of some events that could happen. Choose the events that you think would not be affected by the outcome of other events.

I see a romance movie at the cinema because I liked the one I saw earlier

I drop and smash a glass on the floor, it be less likely to happen again?

I take a toffee flavour sweet from the bag, I get a toffee again.

I burn my toast at breakfast time, then I also burn my eggs!!

I win a race and get promoted on the same day.



2.

Calculate probabilities when events are dependent

Q... If a situation affects another then the likeliness of both events is different to any one of them separately. For example, getting a head on a throw of a coin and then getting heads again is more difficult now as you want it to happen not once but twice.

Probabilities are calculated as FRACTIONS. The top number of the fraction is the value for the number of ways the thing you are interested in will happening. The bottom number is the total number of ways something could happen. FRACTIONS are DECIMALS and PERCENTAGES so this fraction you create can be converted between systems, commonly to percentages.

If you want to see the probability score for 2 events you need to MULTIPLY PROBABILITY SCORES which just means times the fractions of the two event scores together.

Have a go multiplying the fractions below to practice multiplying fractions again.



$$\begin{array}{c} E1 \\ 7 \\ \hline 8 \end{array} \times \begin{array}{c} E2 \\ 3 \\ \hline 5 \end{array} =$$

$$\begin{array}{c} E1 \\ 6 \\ \hline 8 \end{array} \times \begin{array}{c} E2 \\ 5 \\ \hline 9 \end{array} =$$

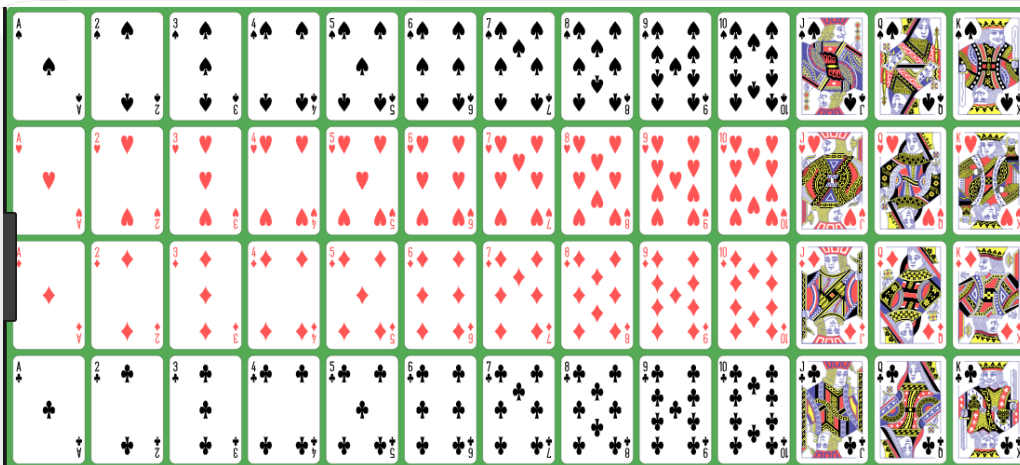
Hint... E1 and E2 just meant Event 1 and Event 2, the two situations you are interested in and finding their joint probability together. Multiply the top numbers of fractions and then multiply the bottom numbers to get your answers.

3.

Understand the implications of 'with or without replacement' problems

Q... If you take something away and do not put it back ...it's obvious.. !! there's LESS. That means that when calculating probabilities the bottom number of the fraction (that shows the total amount) will go down by one for each item removed (or increased if something is added). You need to remember this when calculating probabilities of events where situations change as they go along.

In the example below you are taking cards from a pack of 52 playing cards and finding each time the likelihood of getting an ACE at random when choosing a card. Try writing out the probability (fraction) each time when removing aces from the pack one after the other.

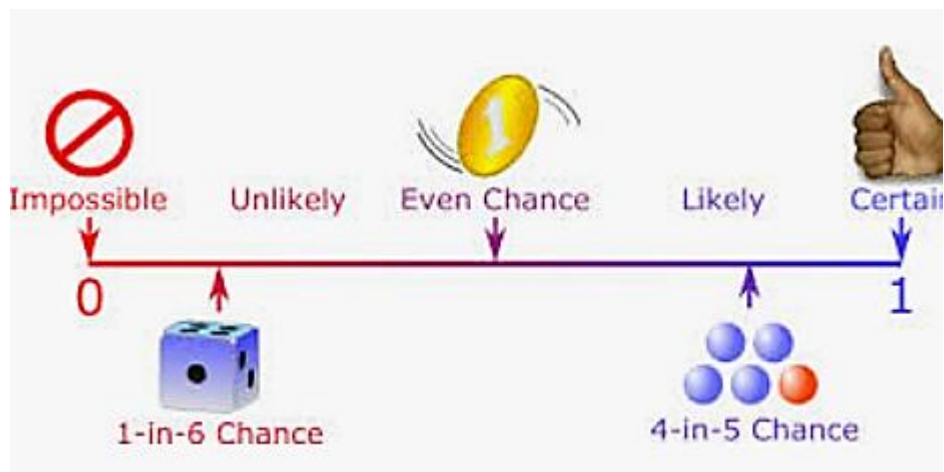


One ace= Two aces=..... Three aces=..... Four aces=.....

4.

Understand that the 'Sum of probabilities of all mutually exclusive outcomes' has to be the value '1'.

Q... All scores for probabilities of all the things that could happen have to add up to 1, the probability line below shows the scores for likely and unlikely events. These score are fractions between ZERO and ONE.



It is correct that if two cars are red and one is blue and you pick one at random to buy, two out of three chance or two thirds ($2/3$) are red so then the other must be the other one out of three or one third ($1/3$). Notice that these probabilities add to one $2/3 + 1/3 = 3/3 = 1$!

Practice adding the fractions below.

$$4/5 + 1/5 =$$

$$2/9 + 3/9 + 1/9 + 3/9 =$$

$$1/3 + 4/6 =$$

$$2/10 + ??? = 1$$

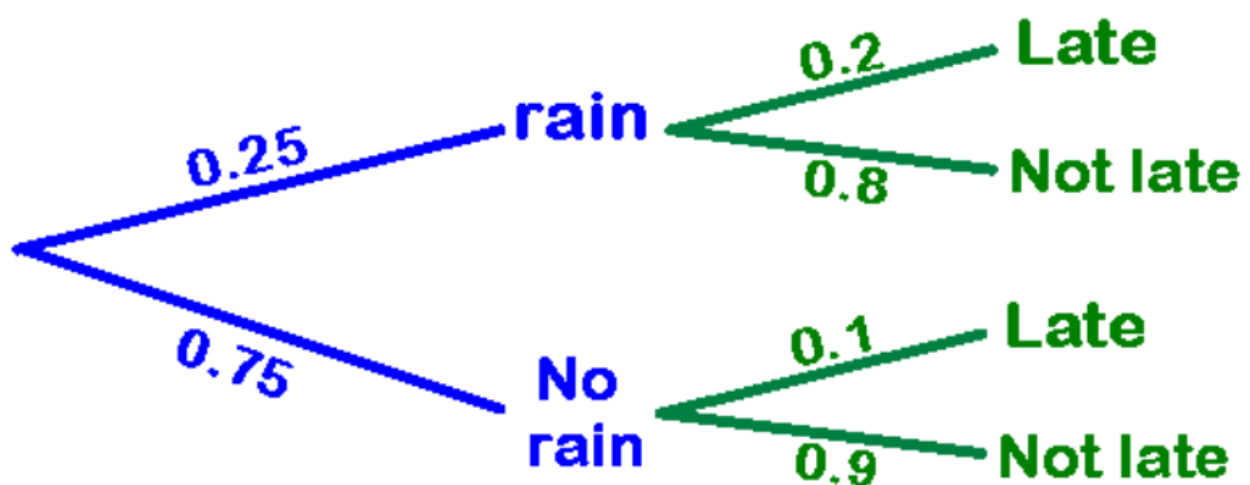
5.

Complete a tree diagram showing probabilities and use to calculate independent and dependent events

Q... When you want to keep track of an events different outcomes or there is more that one event taking place and it gets a bit more complex to see all the outcomes, a great tool is a PROBABILITY TREE.

This tree list the events and each line you follow shows a single outcome that could happen and the likeliness of it happening (as a decimal score on the line).

See if you can read this tree example and find the chance of it raining but you not being late.



What to do now....

1. Ensure you have marked in each box if you feel confident in each topic or not (this will inform you and your tutor which activities you should do in the session)
2. Bring this yellow assignment with you to your next session and check with your tutor answers given
3. Add this to your folder of work IN ORDER YELLOW...GREEN... (and any BLUE you achieve)!

