

Probability 1

chapter

1

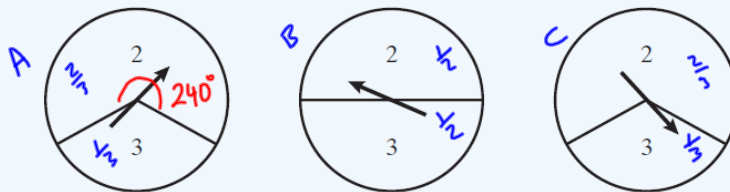
Test yourself 1

A Quesons
B Quesons
C Quesons



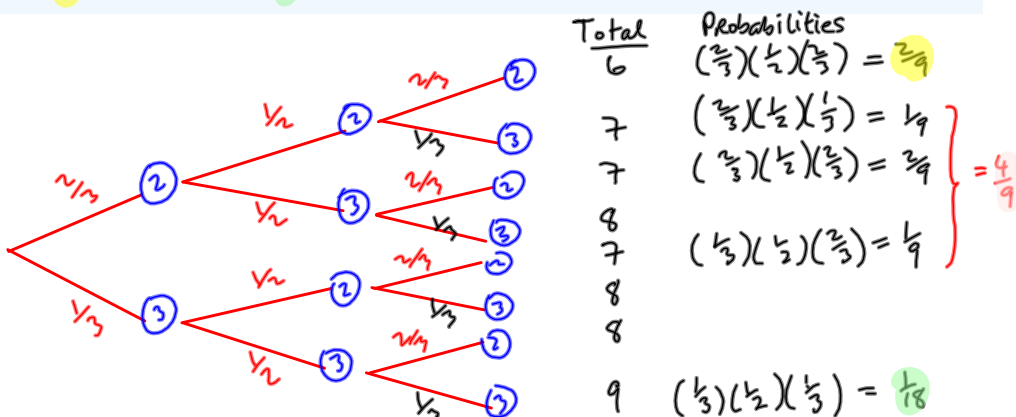
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4. A game is played by spinning each of 3 arrows which are freely pivoted at the centres of 3 circles as shown below. Each arrow may score either 2 or 3 points according to the sector to which it points on stopping, and it is equally likely to face in either direction. The sectors scoring 2 points are of 240° , 180° and 240° respectively.



Given that the game score is the sum of the points scored by the 3 arrows, calculate the probability of getting a game score of

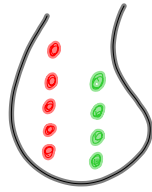
- (i) 6 (ii) 9 (iii) 7



C - questions

1. A bag contains 5 red and 4 green discs, identical in all but colour.
 Three discs are drawn at random from the bag **without replacement**.
 Find the probability that
- they are all the same colour
 - at least one is red
 - at most one is green.

Conditional probability



$$P(A \cap B) = P(A) * P(B|A)$$

• $P(\text{Same}) = ?$
 $P(R, R, R) = \left(\frac{5}{9}\right)\left(\frac{4}{8}\right)\left(\frac{3}{7}\right) = \frac{5}{42}$
 $P(G, G, G) = \left(\frac{4}{9}\right)\left(\frac{3}{8}\right)\left(\frac{2}{7}\right) = \frac{1}{21}$
 $P(\text{Same}) = \frac{5}{42} + \frac{1}{21} = \frac{1}{6}$

• $P(\text{At least 1 Red}) = 1 - P(\text{all green})$
 $= 1 - \frac{1}{21}$
 $= \frac{20}{21}$

• $P(\text{at most 1 green}) = P(1 \text{ green or no green})$
 $= P(1 \text{ green or all Red})$

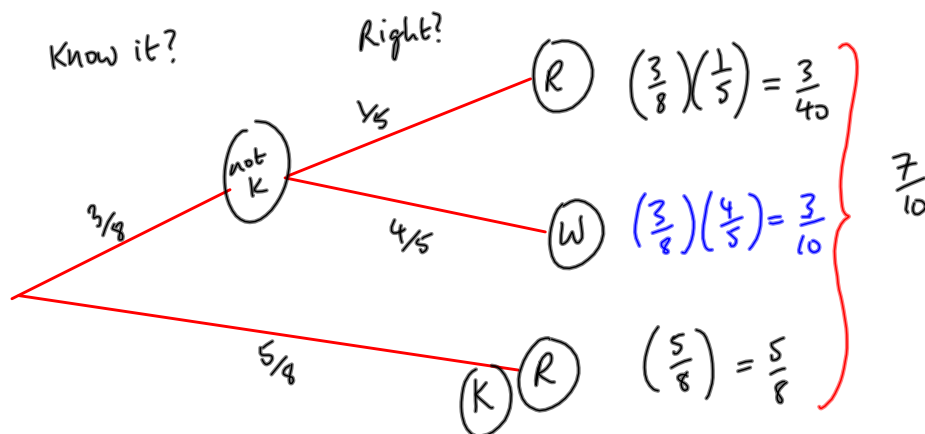
$$P(G, R, R) = \left(\frac{4}{9}\right)\left(\frac{5}{8}\right)\left(\frac{4}{7}\right) = \frac{10}{63}$$

3 arrangements of GRR $\Rightarrow P(1 \text{ green}) = 3\left(\frac{10}{63}\right) = \frac{10}{21}$

$$P(RRR) = \frac{5}{42}$$

$$\Rightarrow P(\text{at most 1 green}) = \frac{10}{21} + \frac{5}{42} = \frac{25}{42}$$

7. In a multiple-choice test, each question offers a choice of 5 answers, only one of which is correct. The probability that a student knows the correct answer is $\frac{3}{8}$. If he does not know which answer is correct, he selects one of the 5 answers at random. Find the probability that he selects the correct answer to a question.



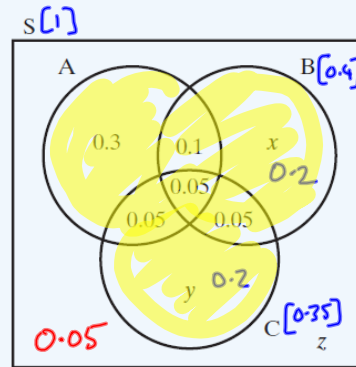
8. The given Venn diagram shows the probabilities of the events A, B and C happening.

- (i) Given that $P(B) = 0.4$ and $P(C) = 0.35$, find the values of x, y and z .

Now find each of these probabilities

- (ii) $P(A|B)$
 (iii) $P(B|C)$
 (iv) $P[(A \cup B)']$
 (v) $P(A \cup B \cup C)$

Now show that $P(A|B) = \frac{P(A \cap B)}{P(B)}$?



$$(ii) P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{0.15}{0.4} = \frac{3}{8}$$

$$(iii) P(B|C) = \frac{P(B \cap C)}{P(C)} = \frac{0.1}{0.35} = \frac{2}{7}$$

$$(iv) P[(A \cup B)'] = 0.25$$

$$(v) P(A \cup B \cup C) = 0.95$$