Chapter (3)

Elements of probability

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Sheet (1)

Q1 Let A & B be two events such that P(A∩ $\bar{B}$) = 0.2, P($\bar{A}$ ∩ B) = 0.3 & P $\overline{(A \cap B)}$ = 0.7, then Find the following:

1. P(A) 2. P(B) 3.P($\bar{A}$ ∪ B) 4. P(A\$\bar{B}$)

Solution:

1) P $\overline{(A \cap B)}$ = 1 - P(A ∩ B) → 0.7 = 1 - P(A ∩ B → P(A ∩ B) = 0.3

P(A∩ $\bar{B}$) = P(A) - P(A ∩ B) → 0.2 = P(A) – 0.3 → P(A) 0.5

2) P($\bar{A}$ ∩ B) = P(B) - P(A ∩ B) → 0.3 = P(B) – 0.3 → P(B) = 0.6

3) P($\bar{A}$ ∪ B) = P($\bar{A}$) + P(B) - P($\bar{A}$ ∩ B) = (1-0.5) + 0.6 – 0.3 = 0.8

4) $P(A\backslash\bar{B}) = \frac{P(A\cap\bar{B})}{P(\bar{B})} = \frac{0.2}{1-0.6} = 0.5$

Q2 If A & B are independent events , such that P(A) = P(B) , if P(A∩B) = 0.64 , then P($\bar{A}$ ∩ B)=

A) 0.21 B) 0.24 C) 0.09 D) 0.16 E) None

Solution:

If they are independent: P(A∩B) = P(A)*P(B) , but P(A) = P(B)

P(A∩B) = $P(A)^2$ = 0.64 → P(A) = 0.8

∴ P(B) = 0.8

Now, P($\bar{A}$ ∩ B) = P(B) - P(A ∩ B) = 0.8 – 0.64 = 0.16 → D

Q3 If A and B are two independent events in a given sample space with P(A) = 0.7 and P(A ∩ $\bar{B}$) = 0.3 . Then P(B) =

A)2/7 B)3/7 C)4/7 D)5/7 E)1/7

Solution:

A & B are independent → P(A∩B) = P(A) * P(B)

P(A∩ $\bar{B}$) = P(A) – P(A∩B) = P(A) – P(A) * P(B)

0.3 = 0.7 – 0.7 * P(B) → P(B) = 4/7 → C

Q4 If A & B are independent, p(A) = 0.6 & P(B) = 0.3, then find the following:
1) P(A∩ $\bar{B}$) 2) P($\bar{A}$ ∩B) 3) P(A\$\bar{B}$)

Solution:
Since they are independent → P(A∩B) = P(A) * P(B) = 0.6 * 0.3 = 0.18

1. P(A∩ $\bar{B}$) = P(A) - P(A∩B) =0.6 – 0.18 = 0.42
2. P($\bar{A}$ ∩B) = P(B) - P(A∩B) = 0.3 – 0.18 = 0.12
3. P(A\$\bar{B}$) = $\frac{P(A\cap\bar{B})}{P(\bar{B})} = \frac{0.42}{0.7}$ = 0.6 "which is P(A) , since they are independent"

Or using prob. table:

	A	**$\bar{A}$**	**Total**
B	0.18	0.12	0.3
$\bar{B}$	0.42	0.28	0.7
Total	0.6	0.4	1

1. P(A∩ $\bar{B}$) = 0.42 2. P($\bar{A}$ ∩B) = 0.12 3. P(A\$\bar{B}$) = $\frac{P(A\cap\bar{B})}{P(\bar{B})} = \frac{0.42}{0.7}$ = 0.6

Q5 Let A & B be two independent events such that P(A) = P(B) = 0.5, then P(A|$\grave{B}$) =

A)0.48 B) 0.06 C) 0.5 D) 0.12 E) 0.55

Solution:

Independent P(A∩B) = P(A)*P(B) = 0.5*0.5 = 0.25 → P(A∩B) = 0.25

P($\grave{B}$) = 1 – P(B) = 1 – 0.5= 0.5

P(A|$\grave{B}$) = $\frac{P(A\cap\grave{B})}{P(\grave{B})} = \frac{P(A)-P(A\cap B)}{P(\grave{B})} = \frac{0.5-0.25}{0.5}$ = 0.5 → C

Q6 Let A, B be independent events. Assume that P (A) = P (B) = 0.3. Then P(AUB) equals?

A)0.51 B)0.60 C)0.30 D)0.39 E)0.69

Solution:

A and B ind → P(A ∩ B) = P(A) × P(B) = 0.3 × 0.3 → P(A ∩ B) = 0.09

P(A ∪ B) = P(A) + P(B) − P(A ∩ B)

= 0.3 + 0.3 − 0.09 = 0.51 → A

Q7 In a particular school 82% of students have a computer. 47% have both computer & laptop, 3% of them do not have a computer or a laptop. A student is selected at random, the probability that this student has a laptop is:

A)0.97 B)0.62 C)0.79 D)0.47 E)0.35

Solution:

$P(C) = 0.82$, $P(L \cap C) = 0.47$, $P(\bar{L} \cap \bar{C}) = 0.03$

$P(\bar{L} \cap \bar{C}) = P\overline{(L \cup C)} = 1 - P(L \cup C) \rightarrow 0.03 = 1 - P(L \cup C)$

$\therefore P(L \cup C) = 0.97$

$P(L \cup C) = P(L) + P(C) - P(L \cap C)$

$0.97 = P(L) + 0.82 - 0.47 \rightarrow P(L) = 0.62 \rightarrow B$

Q8 let A & B be two independent events in a sample space of a random experiment if P(B) =0.4 & $P(A \cap B) = 0.1$,then P(A∪B)=

A) 0.65 B) 0.4 C) 0.55 D) 0.7 E) 0.5

Solution:

A and B ind $\rightarrow P(A \cap B) = P(A) \times P(B)$

$0.1 = P(A) \times 0.4$

$\rightarrow P(A) = 0.25$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.25 + 0.4 - 0.1 = 0.55 \rightarrow C$

Q9 Suppose that P(A) =0.3, $P(B|\bar{A})$ =0.6 & P(B|A) =0.4 Then P(B) =

A)0.54 B)0.69 C)0.2 D)0.8 E) NONE

Solution:

$P(B|\bar{A}) = \frac{P(B \cap \bar{A})}{P(\bar{A})} \Rightarrow 0.6 \times (1 - 0.3) = P(B \cap \bar{A})$

$\therefore P(B \cap \bar{A}) = 0.42$

$P(B|A) = \frac{P(A \cap B)}{P(\bar{A})} \rightarrow P(A \cap B) = 0.4 \times 0.3 = 0.12 \rightarrow P(A \cap B) = 0.12$

$\rightarrow P(B \cap \bar{A}) = P(B) - P(A \cap B) \rightarrow 0.42 = P(B) - 0.12 \rightarrow P(B) = 0.54 \rightarrow A$

Q10 Let A and B be 2 events such that P(A)=0.2 and P(B)=0.4 and P(A∪B) = 0.5 then the value of P(AlB)=

A)0.25 B)1/3 C)0.5 D)1/6 E)2/3

Solution:

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$0.5 = 0.2 + 0.4 - P(A \cap B) \rightarrow P(A \cap B) = 0.1$

$\rightarrow P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{0.1}{0.4} = 0.25 \rightarrow A$

Q11 Let A, B be two mutually exclusive (disjoint) events. If P(A)= 0.4 and P(B)= 0.3, them the probability that not A and not B will occur equals:

A) 0.3 B) 0.4 C) 0.7 D) 0.5 E) 1

Solution:

A and B Disjoint $\rightarrow P(A \cap B) = 0$

$P(A' \cap B') = P(A \cup B)' = 1 - P(A \cup B) = 1 - [P(A) + P(B) - P(A \cap B)]$

$= 1 - [0.4 + 0.3] = 0.3 \rightarrow A$

Q12 If A & B are independent events such that P(A)=P(B), if P(A∩ B) =0.81, then P(À ∩B)=

A)0.21 B) 0.24 C) 0.09 D) 0.16 E) none

Solution:

A and B ind $\rightarrow P(A \cap B) = P(A) \times P(B) = 0.81$

But $P(A) = P(B)$

$\therefore P(B) \times P(B) = 0.81 \rightarrow P(B)^2 = 0.81 \rightarrow P(B) = 0.9$

Now $P(A' \cap B) = P(B) - P(A \cap B) = 0.9 - 0.81 = 0.09 \rightarrow C$

Q13 Rolling a die two times. the probability of getting a product (حاصل ضرب) less than 10 is:

A) 16/35 B)17/35 C)19/35 D)17/36 E) 1

Solution:

$$\left\{\begin{matrix}(1,1),(1,2),(1,3),(1,4),(1,5),\\ (1,6),(2,1),(2,2),(2,3)\\ (2,4),(3,1),(3,2),(3,3),\\ (4,1),(4,2),(5,1),(6,1)\end{matrix}\right\} = \frac{17}{36} \rightarrow \mathrm{D}$$

Q14 Let A, B and C be events such that P(A)= 0.2, P(B)= 0.5, P(C)= 0.4, P(AUB)= 0.7, P(AUC)= 0.6 and P(BUC)= 0.7. Which of the events A, B, and C are independent?

A) The events A and B and the events A and C only.

B) Any two of A, B and C are independent.

C) The events B and C only.

D) The events A and C only.

Solution:

$\mathrm{A\ and\ B} \rightarrow\ \mathrm{P(A \cup B) = P(A) + P(B) - P(A \cap B)}$

$$0.7 = 0.2 + 0.5 - \mathrm{P(A \cap B)} \rightarrow \mathrm{P(A \cap B)} = 0\ \rightarrow \mathrm{(Disjoint)}$$

$\mathrm{A\ and\ C} \rightarrow\ \mathrm{P(A \cup C) = P(A) + P(C) - P(A \cap C)}$

$$0.6 = 0.2 + 0.4 - \mathrm{P(A \cap C)} \rightarrow \mathrm{P(A \cap C)} = 0\ \rightarrow \mathrm{(Disjoint)}$$

$\mathrm{B\ and\ C} \rightarrow\ \mathrm{P(B \cup C) = P(B) + P(C) - P(B \cap C)}$

$$0.7 = 0.5 + 0.4 - \mathrm{P(B \cap C)} \rightarrow \mathrm{P(B \cap C)} = 0.2$$

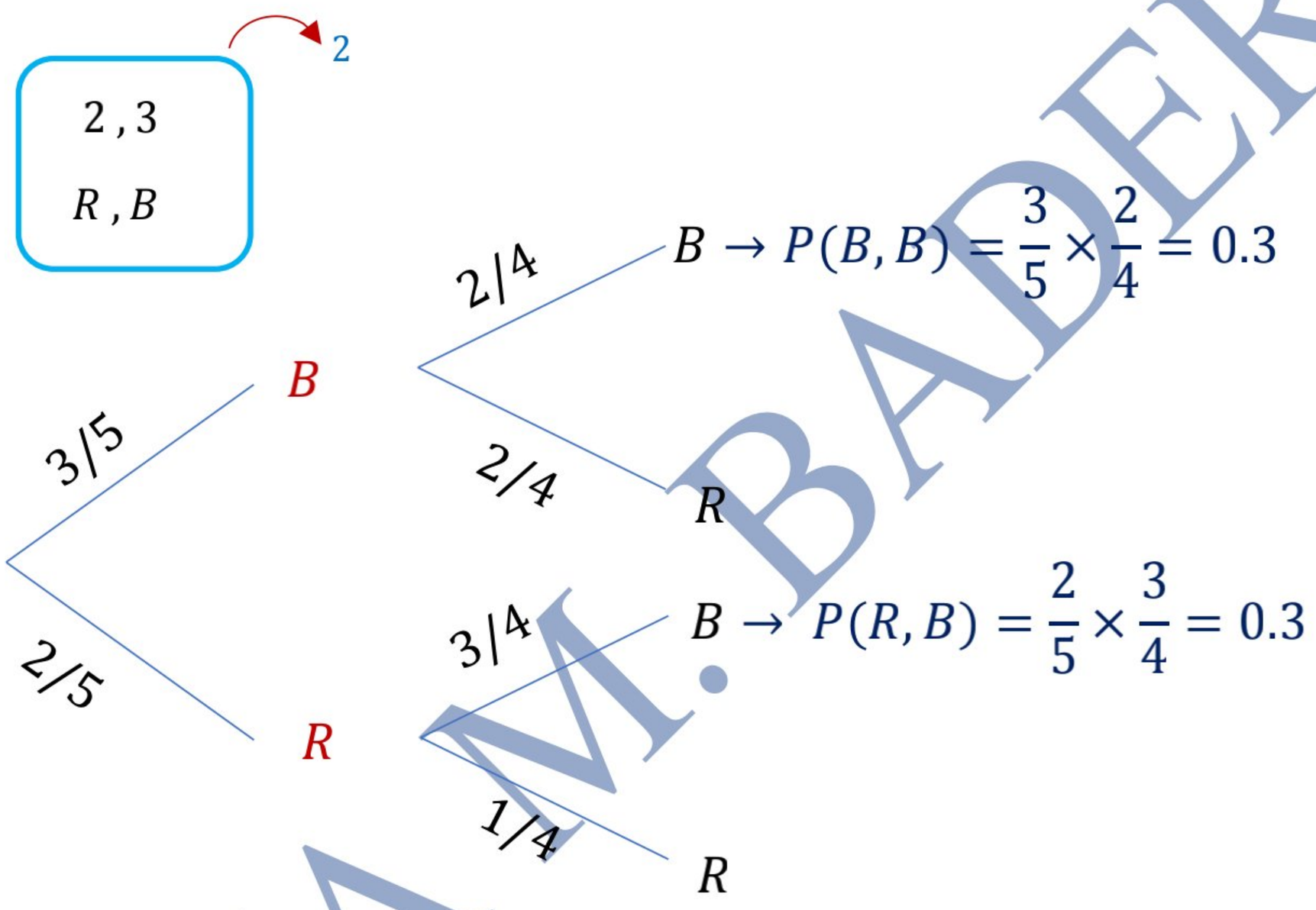
$$\mathrm{P(B \cap C) = P(B) \times P(C)} = 0.4 \times 0.5 = 0.2 \rightarrow \mathrm{B\ and\ C\ are\ independent}\ \rightarrow \mathrm{C}$$

Sheet (2)

Q1 A box contains 2 red and 3 black distinct balls. Two balls are randomly selected from this box without replacement. If the second ball is black, then the probability that the first ball was black is?

A)0.30 B)0.60 C)0.70 D)0.50 E)0.40

Solution:



$$P(1^{st}B|2^{nd}B) = \frac{P(B,B)}{P(R,B)+P(B,B)} = \frac{0.3}{0.3+0.3} = 0.5 \rightarrow D$$

Q2 A coin is flipped, and a die is rolled. Find the probability of getting a head on the coin and a 4 on the die?

A) 1\24 B) 5\12 C) 9\12 D) 5\12 E) 1\12

Solution

$$\text{For coin } \Omega = \{H.T\} \rightarrow P(\text{head}) = \frac{1}{2}$$

$$\text{For die } \Omega = \{1,2,3,4,5,6\} \rightarrow P(\text{getting } 4) = \frac{1}{6}$$

$$\text{Since they are independent} = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12} \rightarrow E$$

Q3 A corona virus is spreading through a city. A vaccination is available to protect against the virus. If a person has had the vaccination, the probability of catching this virus is 0.1; without the vaccination, the probability is 0.3. The probability of a randomly selected person catching this virus is 0.24. The probability that a randomly chosen person has been vaccinated is :

A) 0.55 B) 0 C)0.40 D)0.30 E)0.045

Solution:

$$P(C|V) = 0.1\ , P\left(C\middle|\grave{V}\right) = 0.3, P(C) = 0.24$$

$$P(C\backslash V) = \frac{P(C\cap V)}{P(V)} \rightarrow\ 0.1 = \frac{P(C\cap V)}{P(V)} \rightarrow P(C \cap V)\ =\ 0.1 * P(V) \ldots\ldots (1)$$

$$P(C\backslash \grave{V}) = \frac{P(C\cap \grave{V})}{P(\grave{V})}\ =\ \frac{P(C) - P(C\cap V)}{1 - P(V)} \rightarrow\ 0.3\ =\ \frac{0.24 - P(C\cap V)}{1 - P(V)} \ldots . (2)$$

Sub (1) in (2) to get:

$$0.3 = \frac{0.24 - 0.1*P(V)}{1 - P(V)} \rightarrow P(V) = 0.3 \rightarrow D$$

Or we can use tree diagram

Q4 A class contains 8 students .6 are Math & 2 are Physics. if we choose two students from this class, then the probability that the second is Physics student given that the first is Physics is:

A)2/7 B)1/6 C)1/4 D)1/7 E)1/8

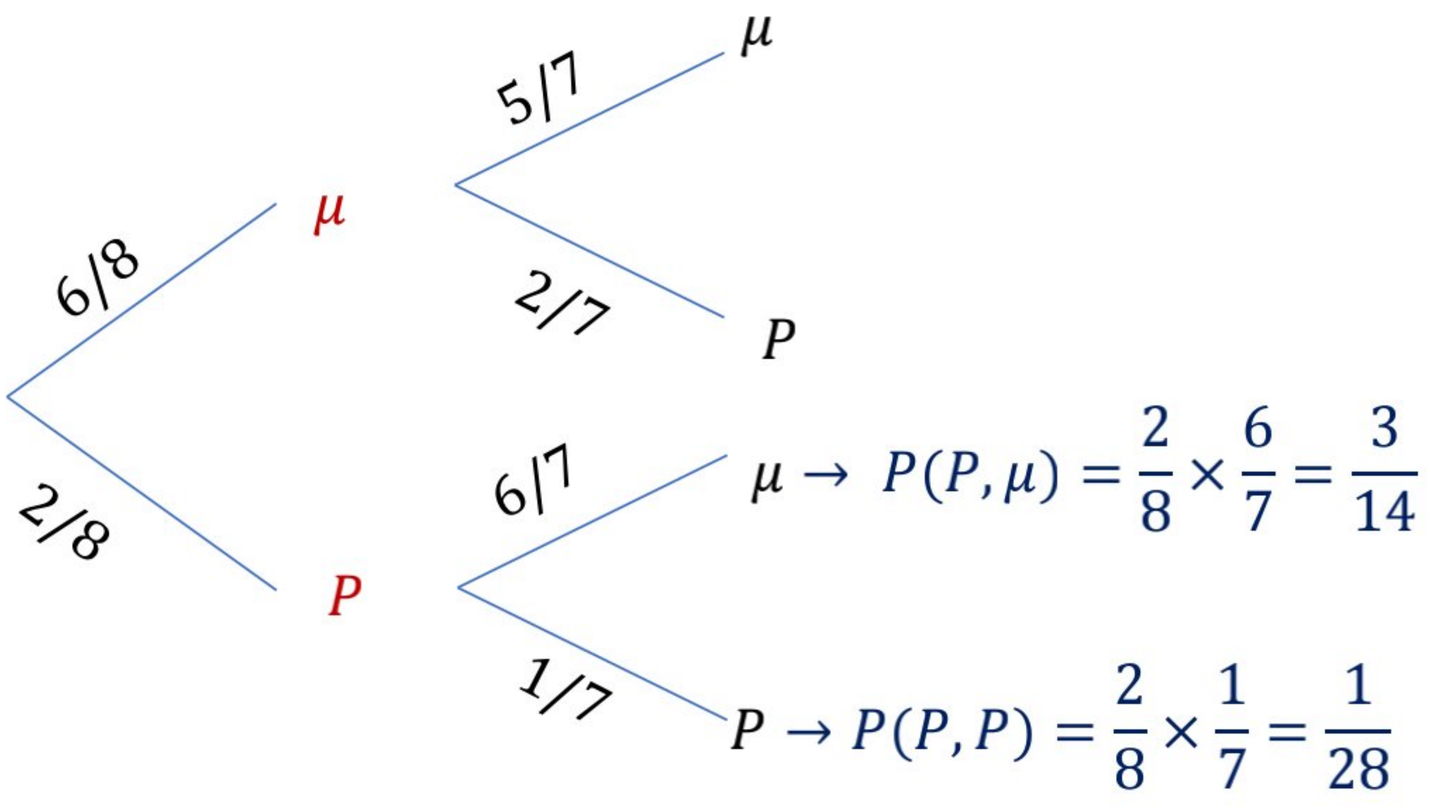
Solution:

$$P\left(2^{nd}P\middle|1^{st}P\right)$$

$$= \frac{P(P,P)}{P(P,\mu) + P(P,P)}$$

$$= \frac{\frac{1}{28}}{\frac{3}{14} + \frac{1}{28}}$$

$$= \frac{1}{7} \rightarrow D$$



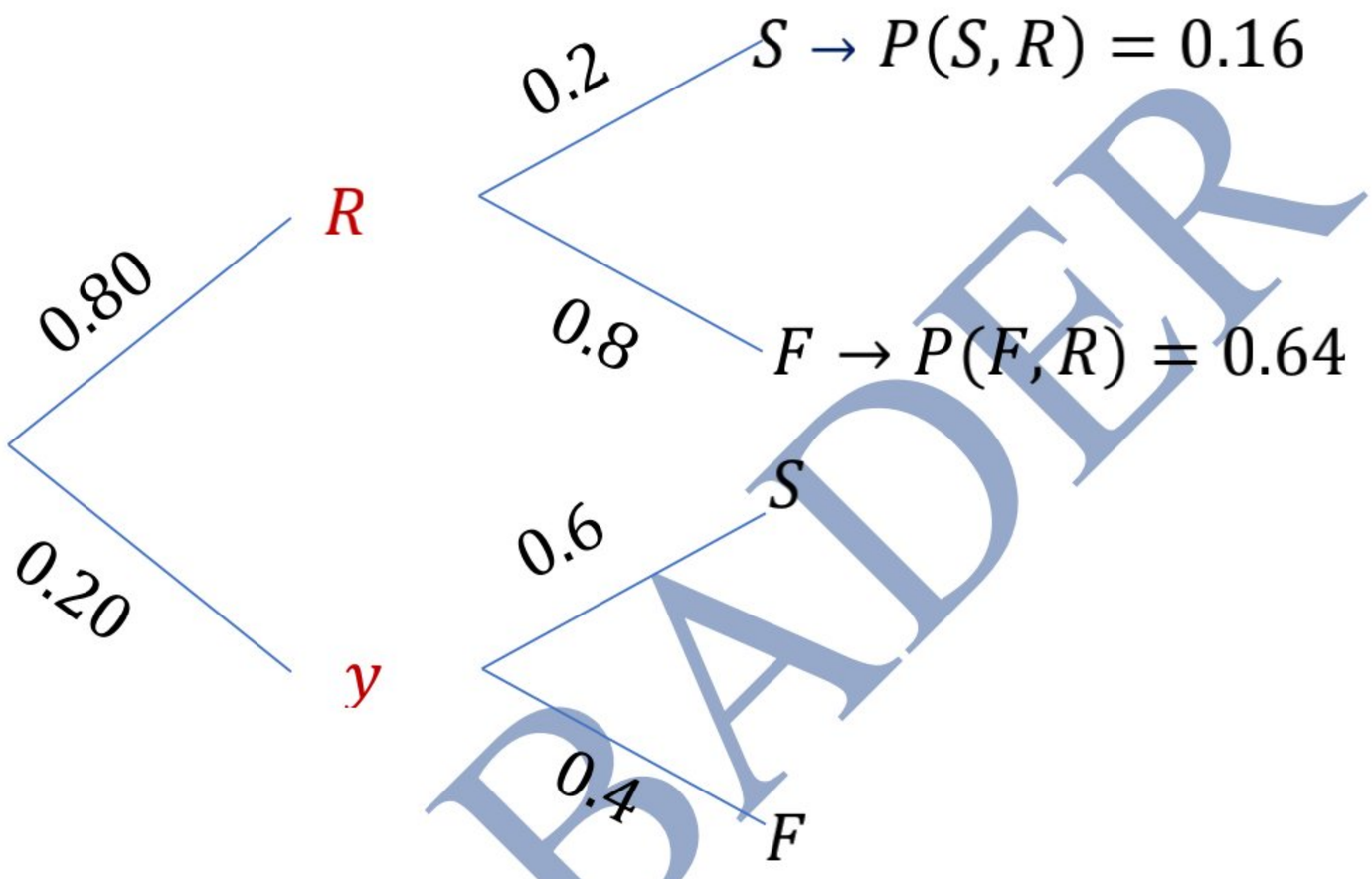
Q5 We want to plant a bag that contains 80% red seeds & 20% yellow seeds, the probability of success for red seeds is 0.2 & for yellow is 0.6, then the probability that they will success if they are red =

A)0.2 B) 0.523 C) 0.45 D)1 E) 0.98

Solution:

$$P(S|R) = \frac{P(S \cap R)}{P(S \cap R) + P(F \cap R)}$$

$$= \frac{0.16}{0.16+0.64} = 0.2 \rightarrow A$$



Q6 In a company 30% of the papers form supplier I and the rest are form supplier II. 65% of the papers supplied by I are white and 40% of the papers supplied by II are white. If we choose a paper randomly from this company, then the probability that it is white will be:

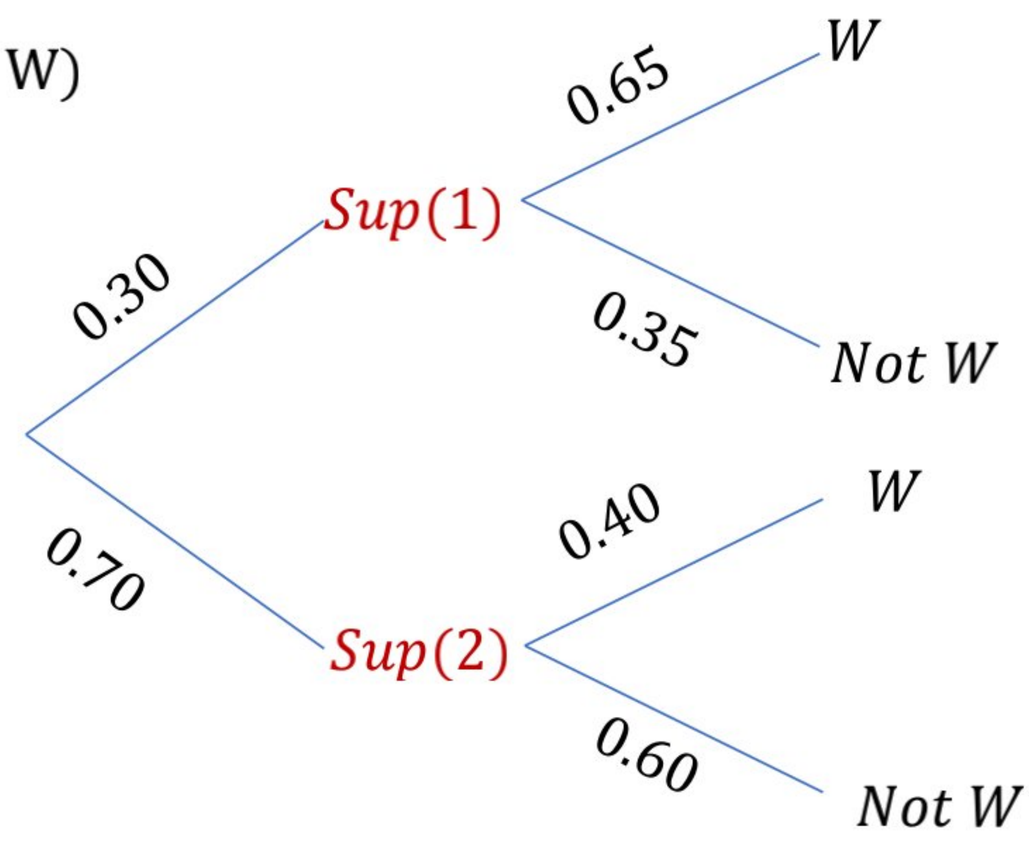
A)0.309 B)0.475 C)0.460 D)0.361 E)0.610

Solution:

$$P(W) = P(Sup(1), W) + P(Sup(2), W)$$

$$= 0.3 * (0.65) + 0.7 * (0.4)$$

$$= 0.475 \rightarrow B$$



Q7 A box contains 3 white and 7 black balls. If two balls are drawn, then find:

i) The probability that the drawn balls are BB is:

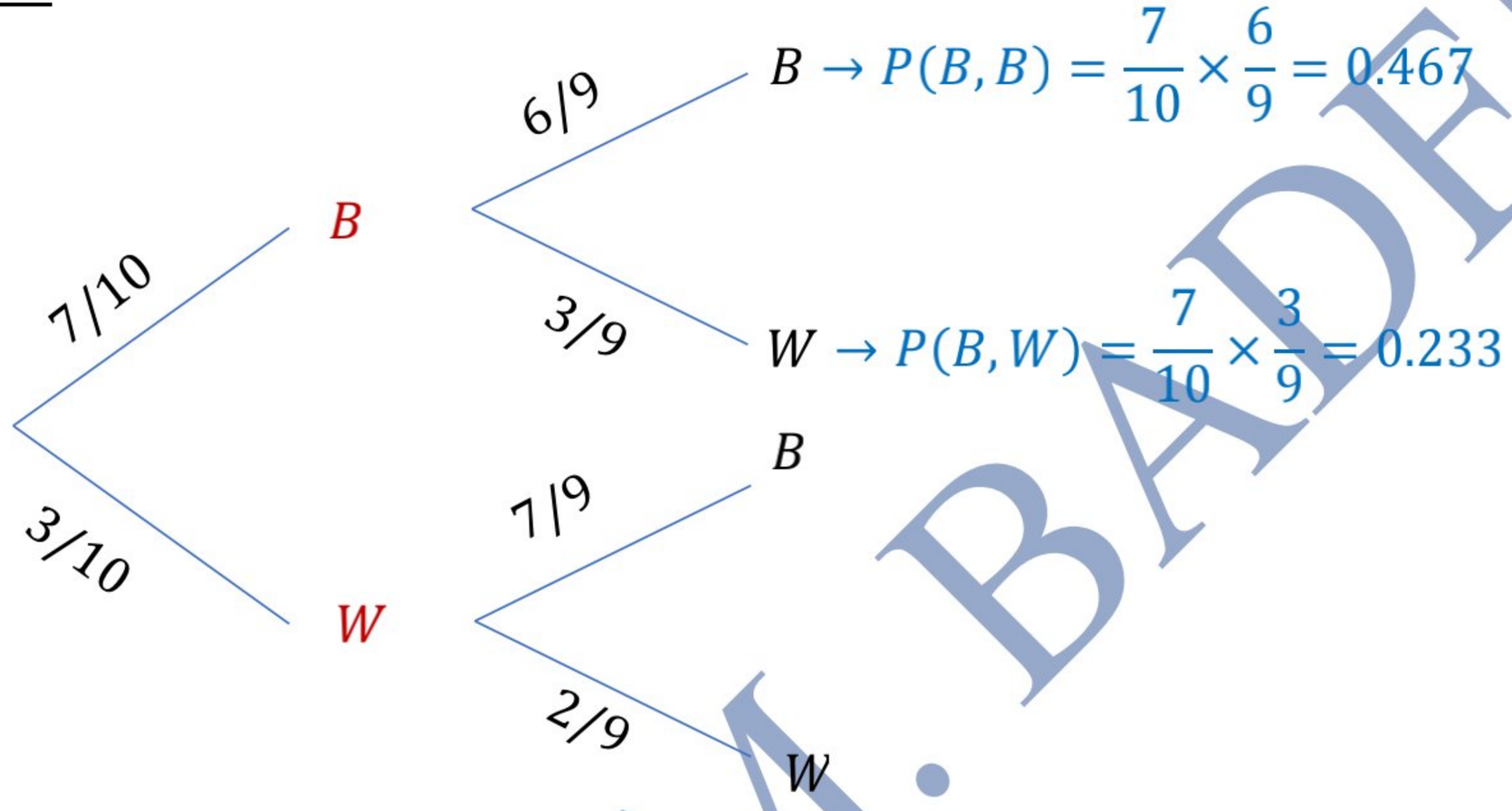
A) 0.125 B) 0.25 C) 0.467 D) 0.35 E) 0.067

ii) Given that the 1st is black, find the prob. that the two of the same color:

A) 0.125 B) 0.25 C) 0.467 D) 0.667 E) 0.35

Solution:

i)



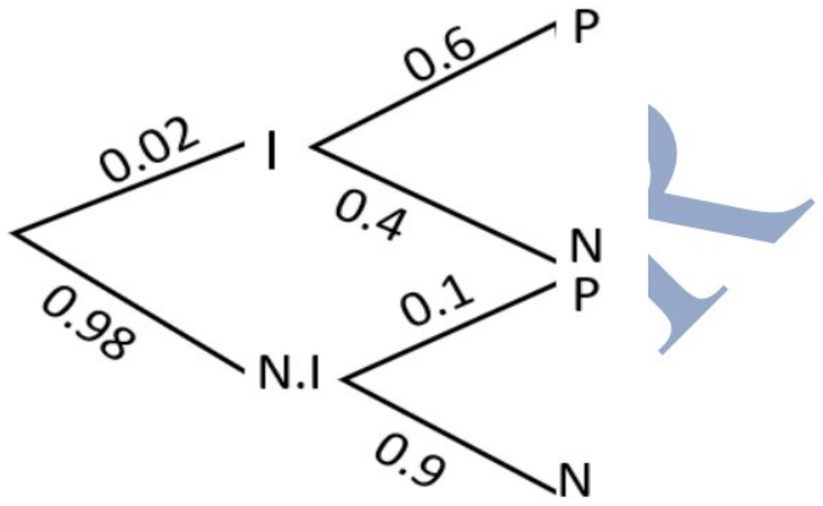
$P(B,B) = \frac{7}{10} \times \frac{6}{9} = 0.467 \rightarrow C$

ii) $P(\text{same colour} \mid 1^{st}\ B) = \frac{P(B,B)}{P(B,B)+P(B,W)} = \frac{0.467}{0.467+0.233} = 0.667 \rightarrow D$

Q8 If an infected person is tested for corona, the probability that the test will give a positive result is 0.60 and if this person is not infected the probability that it will give a positive result is 0.10. Suppose that 2% of the people are corona infected. If an infected random person is tested for corona using this test, then the probability that the test will give a positive result is?

A) 0.17 B) 0.06 C) 0.11 D) 0.60 E) 0.02

Solution:



$$P(P \setminus I) = \frac{P(\text{infected} \cap \text{positve})}{P(\text{infected})}$$

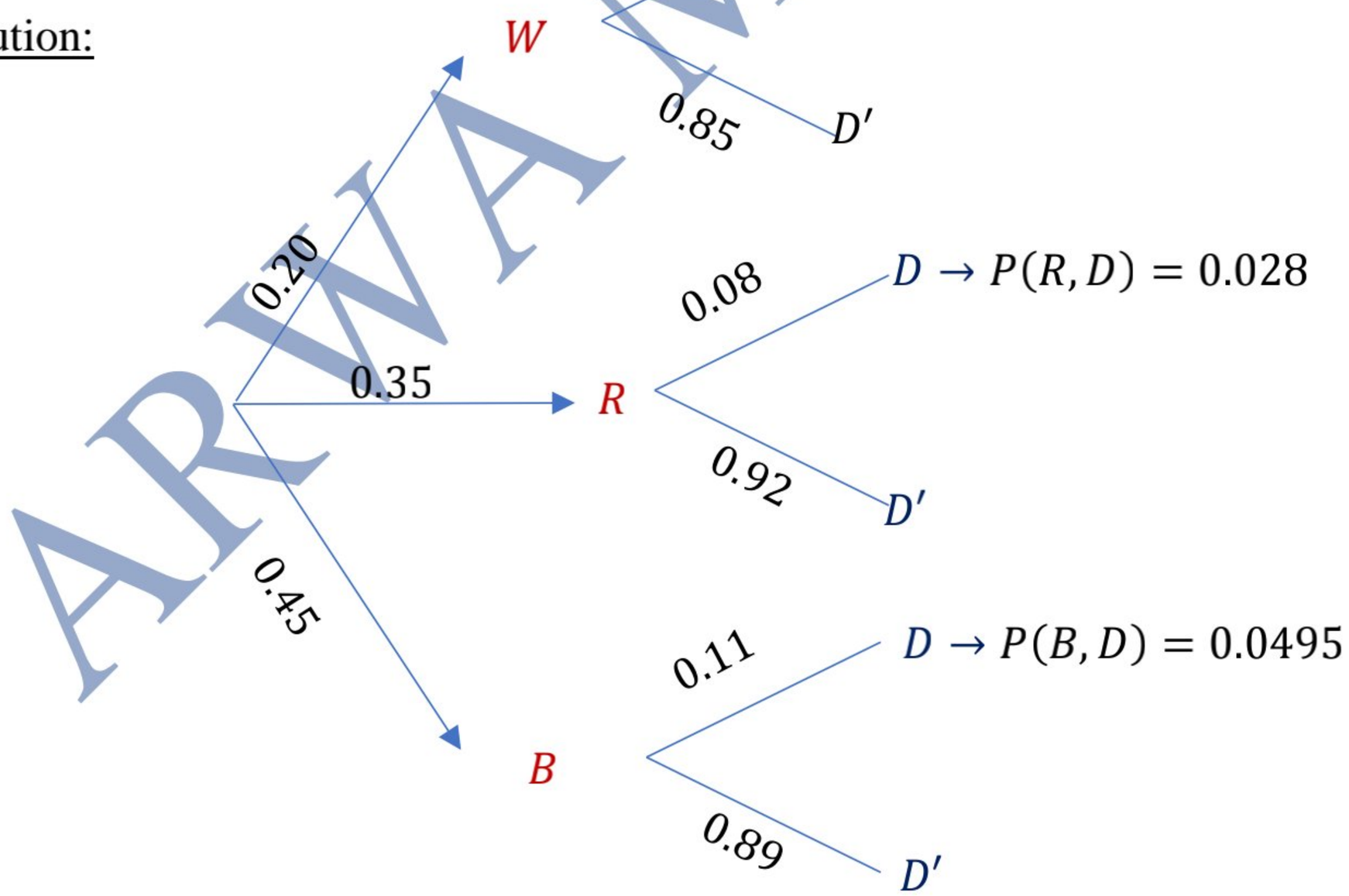
$$= \frac{P(I \cap P)}{P(I \cap P)+P(I \cap N)} = \frac{0.02*0.6}{0.02*0.6+0.02*0.4} = 0.6 \rightarrow \text{D}$$

Q9 A box containing balls, 20% of them are white, 35% are red and the rest are black. 15% of white balls are defected, 8% of red ball are defected and 11% of black are defected. If a ball is selected randomly then find the prob. That is black given that is defected:

A) 0.964 B) 0.11 C) 0.460 D) 1 E) None

B)

Solution:



$$P(B \mid D) = \frac{P(B,D)}{P(W,D)+P(R,D)+P(B,D)} = \frac{0.0495}{0.03+0.028+0.0495} = 0.46 \rightarrow \text{C}$$

Sheet (3)

Q1 A class contains of 5 students, in how many ways can we register their birthdays if three of them have the same birthday:

A) 365*364*363*362*20 **B) 365*364*363*100** **C) 578**

D)3944 **E) 365*364*363*10**

Solution:

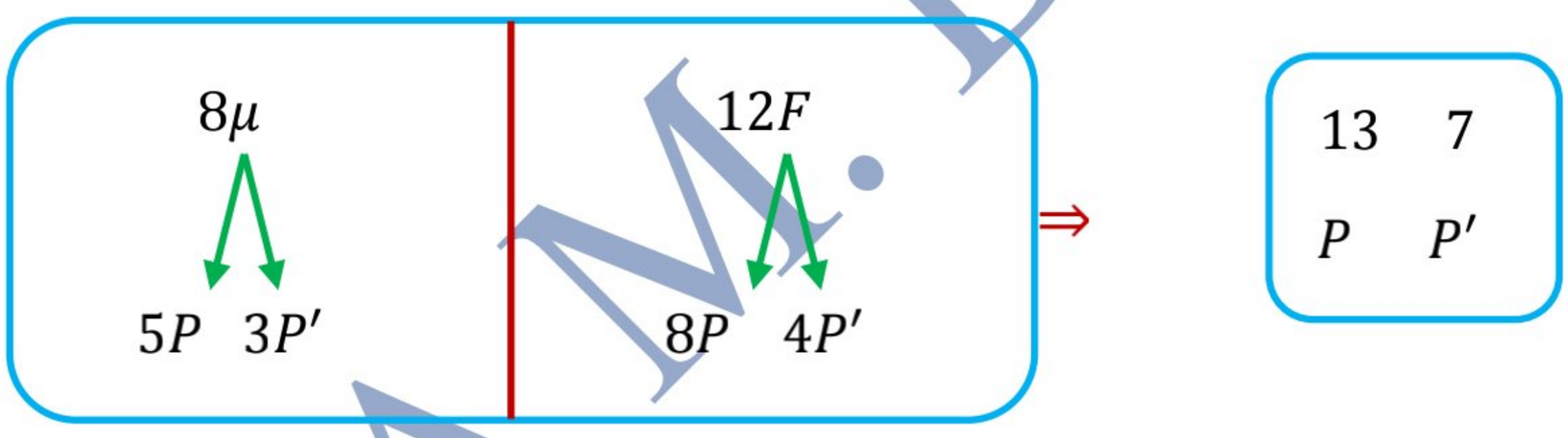
365	1	1	364	363

$\times \binom{5}{3} = 365 \times 364 \times 363 \times 10 \rightarrow \text{E}$

Q2 A class consists of 8 males & 12 females, where 5 males & 8 females passed the exam. if a student is selected randomly from the class, then the probability that this student passed the exam is:

A) 0.6 **B) 0.55** **C) 0.75** **D) 0.7** **E) 0.65**

Solution:

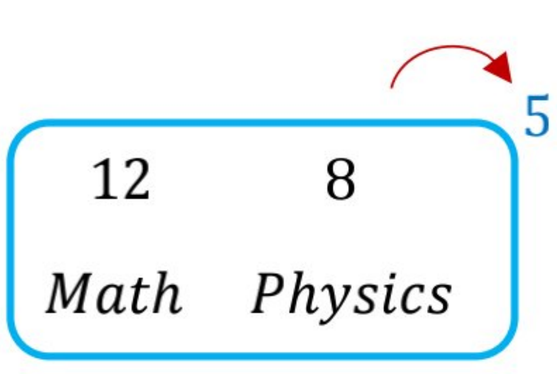


$\text{P(The Student pass)} = \frac{\binom{13}{1}\binom{7}{0}}{\binom{20}{1}} = 0.65 \rightarrow \text{E}$

Q3 A class of 12 math students and 8 physics students, if a random sample of 5 students is chosen from this class, then the probability of getting exactly 3 math students is:

A) $\frac{12*3*8*2}{20*5}$ **B)** $\frac{(12*11*10)\,(7*8)}{20*19*18*17*16}$ **C)** $\frac{12*8}{20}$ **D)** $\frac{\binom{12}{5}}{\binom{20}{5}}$ **E)** $\frac{\binom{12}{3}\binom{8}{2}}{\binom{20}{5}}$

Solution:

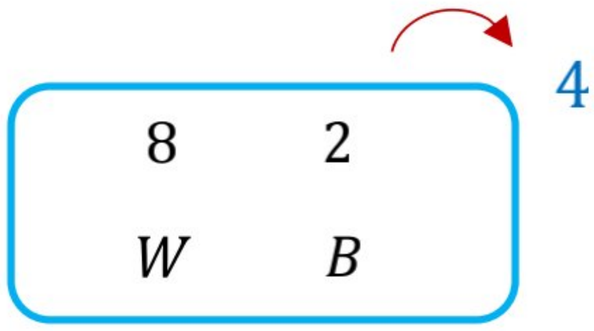


$\rightarrow \frac{\binom{12}{3}\binom{8}{2}}{\binom{20}{5}} \rightarrow E$

Q4 A box contains 10 balls, 8 are white & 2 are black, if we draw 4 balls together, the probability of getting 3 white balls is :

A) $\frac{\binom{4}{1}}{\binom{8}{3}}$ **B)** $\frac{\binom{8}{3}\binom{2}{1}}{\binom{10}{4}}$ **C)** $\frac{\binom{4}{3}}{\binom{10}{4}}$ **D)** $\frac{\binom{8}{3}}{\binom{10}{4}}$ **E) None of these**

Solution:

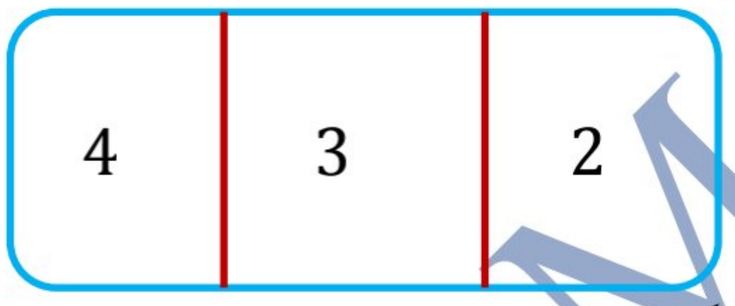


$$\rightarrow \frac{\binom{8}{3}\binom{2}{1}}{\binom{10}{4}} \rightarrow B$$

Q5 How many 3-digit even number can we form using {1, 2, 3, 4, 5} if repetition is not allowed?

A) 60 **B) 125** **C) 50** **D) 40** **E) 24**

Solution:



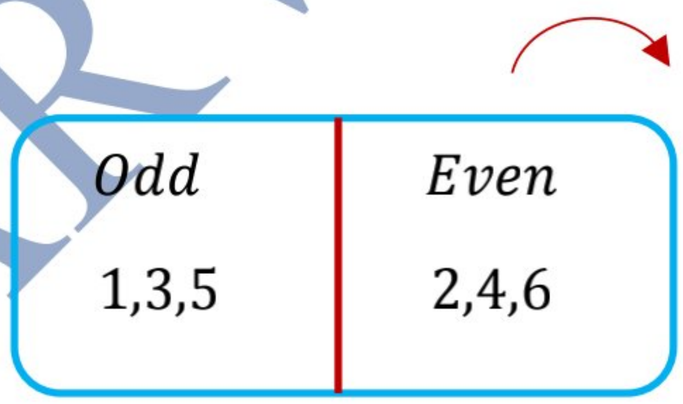
$$\rightarrow 4(3)(2) = 24 \rightarrow \text{E}$$

⚠ دائماً ابدأ بالخانة اللي عليها شرط وهي الآحاد هون.

Q6 Three numbers are selected randomly from the number {1,2,3,4,5,6} without replacement. the probability that two of them is odd =

A) 0.3 **B) 0.05** **C) 0.45** **D) 0.9** **E) 1**

Solution:



$$\rightarrow P(2\ Odd) = \frac{\binom{3}{2}\binom{3}{1}}{\binom{6}{3}} = 0.45 \rightarrow C$$

Q7 Method of counting outcomes in which number of outcomes determined without taking care of arrangement order is:

A) Permutation **B) factorial** **C) combination** **D) A+B**

Solution:

Combination $\rightarrow$ C

Q8 A box contains 11 balls numbered from 1-11 if three balls are chosen with replacement, then the probability that the three balls are different numbered is:

A)0.744 B)0.325 C)0.425 D) 0.480 E)0.556

Solution:

$\frac{11 \times 10 \times 9}{(11)^3} = 0.744 \rightarrow \text{A}$

Q9 A lot consists of 1100 distinct items, there are 4 percent defective items in the lot, what is the probability that a random sample of size 50 contains at most 2 defective items:

A) $\frac{\binom{44}{2}\binom{1056}{48}+\binom{44}{1}\binom{1056}{49}+\binom{44}{0}\binom{1056}{50}}{\binom{1100}{50}}$ **B)** $\frac{\binom{44}{2}\binom{1056}{47}+\binom{1056}{1}\binom{1056}{48}}{\binom{1010}{50}}$

B) 1990 **D) none of the above**

Solution:

4% defictive

44	1056
D	D'

$\#\text{ of defictive} = \frac{4}{100} \times 1100 = 44$

$\#\text{ of not defictive} = 1100 - 44 = 1056$

$P(D \leq 2) = P(D = 2) + P(D = 1) + P(D = 0) = \frac{\binom{44}{2}\binom{1056}{48}+\binom{44}{1}\binom{1056}{49}+\binom{44}{0}\binom{1056}{50}}{\binom{1100}{50}} \rightarrow \text{A}$

Q10 Arwa, Ala'a, Maram and 7 other friends are lining up for a picture. How many ways can all of them line up to take the picture if Arwa must be directly between Ala'a and Maram?

A)12 B)240 C)48 D)1440 E)80640

Solution:

Alaa , Arwa , Maram
Maram, Arwa , Alaa $\rightarrow 2\ Ways$

$\therefore 8! \times 2 = 80640 \rightarrow \text{E}$

Q11 Three sixth grade, two seventh grade, and five eighth grade students were randomly arranged in a row, then the probability that the eighth-grade students are next to each other is:

A) 1/42 B) 1/5 C) 1/15 D) 5/90 E) 15/90

Solution:

$$\frac{5!*6!}{10!} = \frac{1}{42} \rightarrow \text{A}$$

Q12 The number of ways we can form a 5-digit odd number from the numbers {1,2,3,4,5,6,7,8} if repetition is not allowed:

A) 25*36 B) 3360 C) 12005 D) 6720 E) 32768

Solution:

7 ×	6 ×	5 ×	4 ×	4

$\rightarrow 3360 \rightarrow \text{B}$

Q13 The number of ways we can award a 1^{st} , 2^{nd} and 3^{rd} place prize among eight contestants is:

A) 998 B) 567 C) 336 D) 512 E) 6

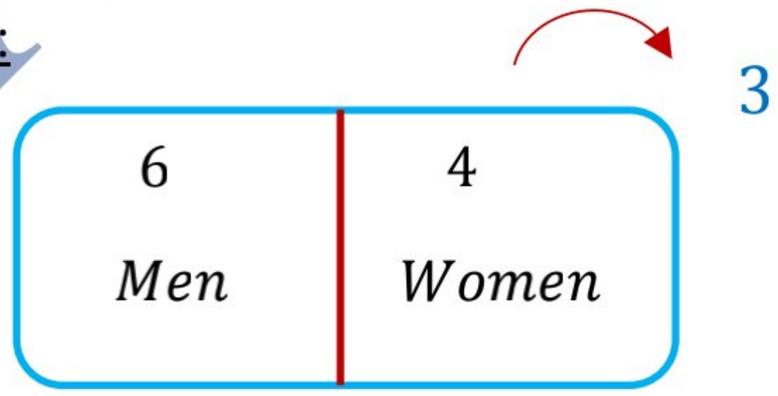
Solution:

$$\frac{8}{1^{\text{st}}} \times \frac{7}{2^{\text{nd}}} \times \frac{6}{3^{\text{rd}}} = 336 \rightarrow \text{C}$$

Q14 In how many ways we can make a team consists of two people, if we have 6 men and 4 woman such that the team has one man and one woman.

A) 48 B) 24 C) 34 D) 15 E) none

Solution:



$$\binom{6}{1}\binom{4}{1} = 24 \rightarrow B \quad or\ 6 \times 4 = 24$$

Q15 A businessman has 4 dress shirts and 7 ties, the number of ways that he can wear different out fits are:

A) $(7)^4$ **B) 28** **C)** $(4)^7$ **D) 4! * 7!** **E) 7.4**

Solution:

Multiplication principle: 4*7 = 28 → B

Q16 In how many ways can 3 children select toys, one toy for each child, from a box that contains 5 different toys?

A)10 ways **B) 60 ways** **C)6 ways** **D)120 ways** **E)3 ways**

Solution:

5 * 4 * 3 = 60 ways → B

Q17 In how many ways can we arrange 3 books out of 7 books in 3 places?

Solution:

$7 * 6 * 5 = {}^{7}P_3$

Q18 In a class of 5 students, the probability that no two students in the class have the same birthday is:

A) **0.1** **B) 0.983** **C) 0.88** **D) 0.973** **E) 0.323**

Solution:

$\frac{365*364*363*362*361}{(365)^5} = 0.973 \rightarrow$ D

Q19 A class of 12 math students and 8 physics students ,if a random sample of 5 students is chosen from this class ,then the probability of getting exactly 3 math students is:

A) $\frac{12*3*8*2}{20*5}$ **B)** $\frac{(12*11*10)\,(7*8)}{20*19*18*17*16}$ **C)** $\frac{12*8}{20}$ **D)** $\frac{\binom{12}{5}}{\binom{20}{5}}$ **E)** $\frac{\binom{12}{3}\binom{8}{2}}{\binom{20}{5}}$

Solution:

P(3 math , 2 physics) = $\frac{\binom{12}{3}\binom{8}{2}}{\binom{20}{5}}$ → E

Q20 let $\frac{(n+1)!}{(n-1)!}$ = 20, then the value of n is:

A) - 5 & 4 B) -4 & 5 C) 4 only D) 5 only E) 0

Solution:

$\frac{(n+1)!}{(n-1)!} = \frac{(n+1)*n*(n-1)!}{(n-1)!} \rightarrow n*(n+1) = 20 \rightarrow n^2 + n - 20 = 0 \rightarrow n = 4$ or $n = -5 \rightarrow C$

Q21 A group of four friends with different ages, what is the probability that they will have different birthdays (If the year is 365 days) : "*My lucky question* ☺"

A) 0.5 B) 0.358 C) 0.983 D) 0.111 E) 0.99

Solution:

P(having different birthdays) $= \frac{365}{365} * \frac{364}{365} * \frac{363}{365} * \frac{362}{365} = 0.983 \rightarrow C$

Q22 A family has 5 children's (3 Girls and 2 boys). Two of the girls and one boy wear glasses. The probability that two of them wearing glasses if two of them are selected is:

A) 1 B) 0.53 C) 6/5 D) 0.30 E) 0

Solution:

3 wear glasses & 2 do not wear glasses.$\rightarrow \frac{\binom{3}{2}\binom{2}{0}}{\binom{5}{2}} = 0.30 \rightarrow D$

Q23 Each year, 33 race cars start the Indianapolis 500. How many ways can the cars finish first, second, and third?

Solution: 33*32*31

Q24 A building contractor is planning to develop a subdivision. The subdivision is to consist of 6 one-story houses, 4 two-story houses, and 2 split-level houses. In how many distinguishable ways can the houses be arranged?

Solution: $\frac{12!}{4!*2!*6!}$

Q25 Find the probability of being dealt 5 diamonds from a standard deck of 52 playing cards?

Solution: $\frac{\binom{13}{5}}{\binom{52}{5}}$