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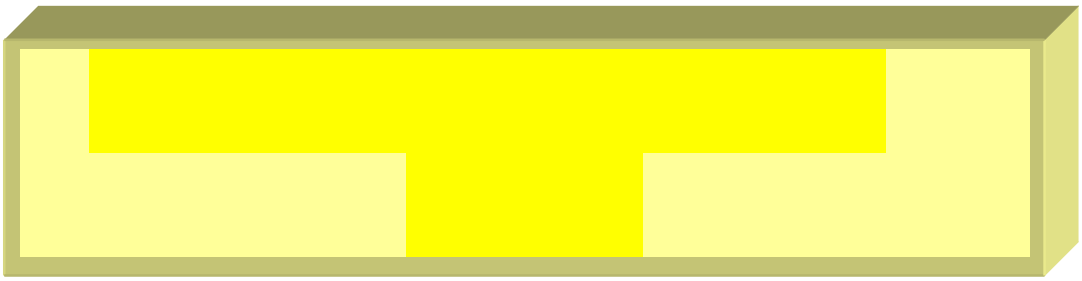
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2 ، 1

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1

01

6 5 4 3 2 1

6 3 3

02

03

9 7 5 3 1

04

05

4 6 4

1

2

06

5 3 3 2 2 1 1 6 15

3 3 3 1 4 2 2 1 1 1

3

6 3 3 3 2 3 1

3 4

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07

$C_n^3 + C_{2n}^2 = 8n$ $2(C_n^0 + C_n^2 + C_n^3) = 5n + 2$ n 1

$\begin{cases} C_{x+1}^{y} = C_x^{y-1} \\ C_{x+y}^{2} = 10 \end{cases}$ 2 2

08

$1\times 1! + 2\times 2! + \ldots\ldots + n\times n! = (n+1)! - 1$ $n \in$ 1

$2^n\left[1\times 3\times 5\times 7\times \ldots\ldots\times (2n-1)\right]n! = (2n)!$ $n \in$ * 2

09

3 4 10

3

X_n n n 2

.

$X_n = 10713$ $X_n = n^2 + 9n + 21$ $n \in$ *

10

6 1 6 4 1 4 18

8 1 8

3 1

4 3

3 2

3

4

11

3

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2

12

3 4 5 12

3

A

D

E

F

G

G F E D A

1

2

3

13

2 2 1 1 1 5 9

2 1 1 0 4

3

A

D

E

4 **F**

F E D A

1

2

3

14

4 6

3

B A

B **A**

P(B) P(A)

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15

3 5 8

1

2

16

( ) 900

	P	S	T	
E	250	200	150	600
I	100	120	80	300

1

2

3

4

17

3 3 4 U_1

3 U_2

6 1 6 (E)

U_1 3

U_2 3

B 1

U_1 2

18

3 10 7 13 20

C_2 4 3 C_1

C_2 C_1

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V **R**

1

R 2

3

19

2000 B A

800 B 1200 A

3 % B 4 % A

A A

B B

D

1

A			
B			

$P_D(A)$ $P(A \cap D)$ $P(D)$ 2

$P_{\overline{D}}(B)$ $P(\overline{D} \cap B)$ $P(\overline{D})$

20

M_3 M_2 M_1 L

M_2 40% M_1 25%

M_3 0.1% M_2 10% M_1 5% M_3

1

B 2

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21

60%

80%

B

22

0,5 0,7

1

2

23

6 5 4 3 2 1

4 **B** 2 **A**

E **D** 2 **C**

B A $P(A \cap B)$ P(B) P(A) 1

$P(A \cup B)$

P(D) P(C) C D 2

$P(D \cup E)$ E D 3

24

1

$(2x-3y)^5$ $(x-2)^4$ $(x+1)^3$

$\left(x^3-\frac{2}{x^2}\right)^{15}$ 2

10

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25

7 1

B A

" D C

26

2 1

3

1

6 A

C B

X 2

X

X

27

A

B

C

28

3 6 10

( )

1

" " E 2

E

F

. B A 3

A

B

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X 4

$E(X)$ X

29

6 5 4 3 2،1

P_6 P_5 P_4 P_3 P_2 P_1

$\frac{1}{2}$

P_6 P_5 P_4 P_3 P_2 P_1 **1**

3 **2**

X 3

30

الزهر1 / الزهر 2	1	2	2	3	4	4
1						
2						
2						
5						
5						
6						

$\{6,5,5,2,2,1\}$ $\{4,4,3,2,2,1\}$

x

x -1

x -2

-3

-4

$P(A)$ -

3 $P(B)$ -

3 $P(C)$ -

3 $P(D)$ -

1

20 $\{4,5\}$ 100 $\{2,3\}$

$\{9,10\}$ 45 $\{6,7,8\}$

	100	20	-45	0

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31

B A

D C

X

X

X

32

A

B

$(-\alpha)$ $(\alpha \in \quad)$

X

$E(X)$ X

$(n-3)$

$\frac{1}{4}$ A

33

A

B

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X

X

34

i p_i 6

$p_5 = 0,15$ $p_4 = 0,1$ $p_3 = 0,3$ $p_2 = 0,2$ $p_1 = 0,1$

6 -1

-2

4 -3

2019 -4

35

85 120 250

50

1

2

. 3

-4

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1 2019 36

6 1

1

6 2

3

2 4

2 2019 37

$(4x^2+3x-1)(x^2-5x+6)=0.....(E)$ 1

p_i 4 3 2 1 2

$p_4=2\alpha \quad p_3=\alpha \quad p_2=\alpha^2 \quad p_1=3\alpha^2$ i

α

$\alpha=\frac{1}{4}$ 3

A

4 B

3 C

(E) D

1 2018 38

50 % 70%

90 %

S F G

1

$P_S(G) \quad P_{\bar{S}}(F) \quad P(G\cap\bar{S}) \quad P(S)$ 2

$\bar{S}$ G 3

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2 2018 39

	A	I	T
	12 %	13 %	27 %
	16 %	12 %	20 %

F H
I A
T

$P(H) = 0,52$ 1

$P(F \cap I)$ $P(H \cap T)$ 2

3

4

2 2017 40

$P(A) = 0,4$ $P(A \cap B) = 0,03$ B A 1

$P(B) = 0,37$ $P(B) = 0,075$ $P(B) = 0,43$

$P_A(B) = \frac{1}{4}$ $P(A \cap B) = \frac{3}{100}$ B A 2

$P(A) = \frac{3}{400}$ $P(A) = \frac{4}{25}$ $P(A) = \frac{3}{25}$

$P(\overline{A \cup B}) = 0,55$ $P(B) = 0,5$ $P(A) = 0,4$ B A 3

$P(A \cap B) = 0,9$ $P(A \cap B) = 0,45$ $P(A \cap B) = 0,2$

4

x_i	2	1	α	3
$P(X = x_i)$	0,12	0,50	β	0,30

0,32 X β α

$\beta = 0,08$ $\alpha = 2$ $\beta = 0,03$ $\alpha = 2$ $\beta = 0,08$ $\alpha = 1$

1 2017 41

-

(G) (S) (L)

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35 (F) (M) 47

10 49

37

1

A 2

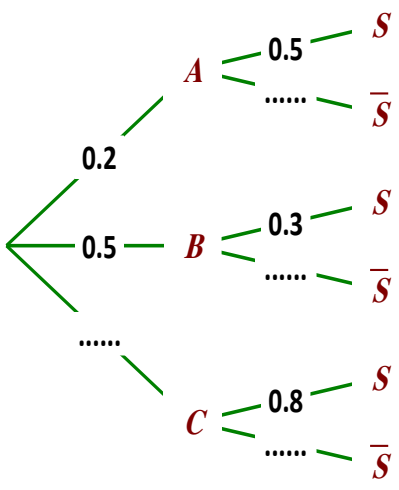
B

C

2 2016 42

A 20 C B A

C B 50



A 50

B 30

C 80

S

$\overline{S}$

1

$C \cap S$ $B \cap S$ $A \cap S$ 2

B 3

1 2012 43

15 35

75

60 10 15

F G

T

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M

V

1

V P(V) 2

$P_V(G)$ 3

4

1 2013 44

50 150

70 40

$\frac{1}{150}$ $\frac{2}{5}$ $\frac{3}{4}$ 1

2

0,21 0,475 0,24

3

0,3 0,4 0,15

4

$\frac{3}{10}$ $\frac{12}{19}$ $\frac{2}{75}$

2008 45

2 1 2 3 7

1 1 2 2 4

1

1

1

2

3

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1 2019 46

2 1

2 1

B A

B **A**

B $P(A)=\frac{31}{66}$ **A** 1

2

X 3

E(X) X

2 2019 47

0 10

2 1

X

E(X) X 1

$\frac{7}{24}$ 2

3

2018 48

1،2،2،3 10

3 3 2 3 2 2

A

B

B A P(B) P(A) 1

$P(A\cap B)=\frac{1}{20}$ $P_A(B)$ $P(A\cup B)$

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X 2

E(X) X

نموذج وزاري 2008 49

7 5

3 **1**

A

B

3 *C*

x 10

x

10 **2**

E *D*

G *F*

نموذج وزاري 2008 50

17 U_2 3 4 U_1

18

6 6 1

U_2 U_1

0,5 **1**

U_1 **2**

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1 2019 51

1،2 1،2،3

3

X

$\{0;1;2\}$ $\{0;2;3\}$ $\{1;2;3\}$ X 1

E(X) $\frac{11}{10}$ E(X) $\frac{6}{5}$ E(X) $\frac{4}{5}$ X E(X) 2

1 3

$\frac{3}{5}$ $\frac{9}{10}$ $\frac{7}{10}$

1 13 4

$\frac{3}{5}$ $\frac{3}{10}$ $\frac{2}{5}$

2 2019 52

4 3 2 1

2 1 3 2 1

1

A

B

C

X 2

X

$P(X^2 - X \leq 0)$

2018 53

4 3 7

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A I

B

α(DA) II

DA α

100 DA

X 50 DA

α

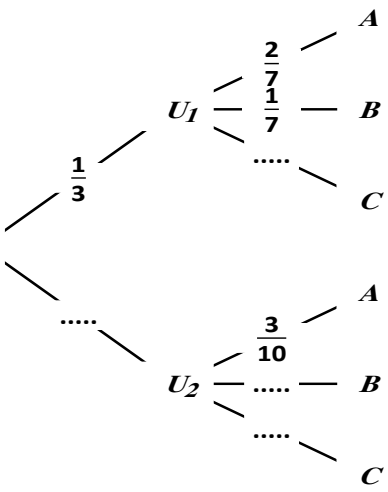
$\{ 100-\alpha;50-\alpha;-\alpha \}$ 1

$E(x)=-\alpha+\frac{300}{7}$ 2

α

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2019 55



4 U_1 U_2 U_1

U_2 3

3

4 2 6 1

U_1

U_2

C B A

A

B

C

1

C B A 2

X 3

X

X

E(X) 4

2018 56

9

1 3 2 3 2 2 2 1 1

4

1

A

B

C

X 2

X

X E(X)

$X^2 - X > 0$

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57 2009

6 4 10

3

3 1

X 2

E(X) X

58 2008 نموذج وزاري

2 1 1 3 12

3 2 2 2 1 5 2 2 1 1 4

B A 1

$A \cap B$ B A

B A

X **2**

X

X E(X)

δ(X) VAR(X)

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2002 59

10

4 3 3

1

–

X 2

X

X

2003 60

1 4 3

3 2 5

6 1

6 2

X 3

X

X

1996 61

3 2 1 A

3 2 1 B

4

1997 62

10 1 10

3

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1

3 2

3 3

3 4

3 5

1996 63

3 3 4 14

5

1

2

3

4

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64 (فرنسا 2019/ش.علوم/N-Calédonie/ت الأستاذ جبالي/بتصرّف)

1% 20%

10%

R " G

1

2

$p(R)=0,082$

3

100€

500€

X

X

25000€ 250

65 (فرنسا 2018/ش.علوم/Pondichéry/ت الأستاذ جبالي/بتصرّف)

$1kg$ V U

3% V U 30%

V 95% U

V V U U

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F

1

U 2

$P_F(U)=0,3$ U 30% 3

V U

2015 66

3 4 7 U_1

2 3 5 U_2



U_2 U_1

U_1 3 I

A

3 B

$P(B)=\frac{1}{7}$ $P(A)=\frac{12}{35}$

U_2 U_1 II

$P(C)=\frac{6}{35}$ 3 C

2003 67

2 1 1 0 0 0 6

1 0

B A 1

B A

X 2

X

2003 68

2 1 1 0 1 2 6

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1 A

S

$\frac{1}{5}$ S A

2004 69

9

2 1 1 1

2 2 1 1

1

A

B

C

3 $A \cap B$

2006 70

3 2 5 U_1

5 U_2

U_1

n U_2 n

U_1

X

X 1

X 2

2007 71

7

1 1 1 1 0 0 0

3

0 A

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3 B

C

P(B) P(A) 1

$P(C)=\frac{2}{7}$ 2

2007 72

4

6 5 4 3 2 1 3

6 6 4 4 2 2

1

B A

2

C

P(C) $P(C/B)=\frac{1}{8}$ $P(C/A)=1$

X 3

X

X

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73

5 3 25

3 4 4

4 1

4

4

X 2

X

X

74

3 4 5 12

3

75

$n \geq 2$ n 8

X

I

2 X 1

$E(X) = 0$ n $E(x)$ 3

3 $n = 6$ II

2 X 1

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76

$\frac{1}{3}$

$\frac{1}{4}$

1

2

77

3 n 2 n

n 1

X 2

X

E(X) X n

$E(X)=1$ n

78

1 0 0 1 5 1 1 1 0 1 5

3 1

B A

3 A 3 C

3 F

X

X 1

X 2

79

3 7 1 7 10 -1

3 1

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$\frac{7}{15}$ **A** **A** -2

B B

B **A**

X -3

E(X) X

80

3 10 7 13 20

B A

X A 3 1

$E(X)$ X X

2

A

81

$P(B)$ $P(A)=\frac{33}{100}$

m m

m

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82

1 4 7

0 2

1

A

0 B

3 C

3

3 X 2

X

83

2 1 6 A

4 B 4 4 2 2

4 2 1 0

B y A x

$x = y$ 1

x^y y x X 2

$P(X \le 4)$ $P(X = 4) = \frac{5}{24}$ X

$\frac{209}{8}$ X

84

5 3 U_1

U_2

( ) 3 U_3

(1

U_2 (2

(3

13

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16

X 3

X

X $\delta(X)$ V(X)

85

6 1 6

1

2 1 A

1 B

5 " C

X 2

$E(X)$ X X

$(E): x^2$ x 0 (E) 3

(E) Y

Y

Y

$E(Y)$

86

U_1 U_2 U_1

1 n 3 n

U_2

U_1 U_2 U_2 U_1 E

E A 1

$p(A)$ $\frac{3}{4}(\frac{n}{n}\frac{2}{3})$ A $p(A)$

n $p(A)$

U_2 E B 2

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$p(B)$ $\frac{6}{4(n \quad 3)}$ ✓

E 20 3

$2n$ U_2 (*

n U_2 (*

3 U_2 (*

10 n ✓

X n 10 4

X $2n$ 20

X ✓

$E(X)$ ✓

25 U_1 ✓

87

3 5

3 1

❖

A

B

C

D

(n 2) n 2

(5) (10) ❖

X

$E(X)$ X

n

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88

(B)

(J) (V)

50% (R) 75%

(C) 25%

1

2

A ❖

B ❖

C ❖

	B	V	J	
R				
C				
				24

3

24 4

89

R 3 N V A

I

1

$P(C) = \frac{7}{18}$ C -2

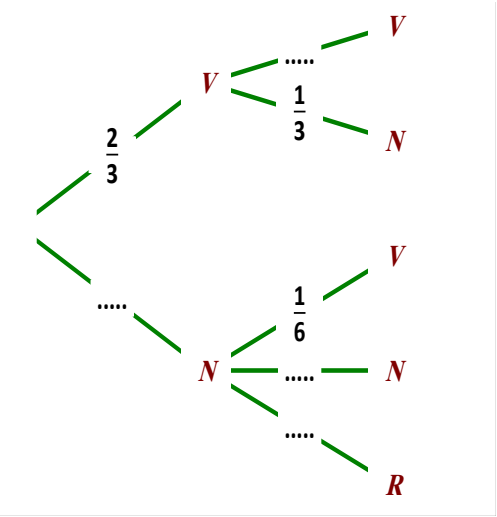
-3

B N V 4 B - II

B

A

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1

$\frac{4}{9}$

-2

-3

-4

X

-5

5

α

α

90

3 5 (n 2) n

1

p(n) 2

p(n) $\frac{n^2 \quad n \quad 26}{(n \quad 8)(n \quad 7)}$

$\lim_{n} p(n)$

$n \quad 4$

$40DA$ $30DA$

$5DA$

X

X 1

X 2

$n \quad 2$

1

2

B A

3

91

p_k 6 1

$(1 \quad k \quad 6) \quad k$

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r p_6 p_5 p_4 p_3 p_2 p_1 ✓

q p_4 p_2 p_1 ✓

1 k 6 p_k $\frac{k}{21}$ 1

2

❖ A

❖ B 3

❖ C 4 3

3

C A B A

92

2;1 2;1;1 3

B A

B

$p(\overline{A \quad B})$ $p(A \quad B)$ $p(B)$ $p(A)$

B A

X

. $E(X)$ 2 X 1

93

4 6

3

X **1**

X

X

2

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A_2 A_1 A_0

4 **3**

B_2 B_1 B_0

$P(B_0)$ $P_{A_2}(B_0)$ $P_{A_1}(B_0)$ $P_{A_0}(B_0)$

94

3 10 7 13 20

B A

X A 3 1

A

$E(X)$ X X

2

A

95

4 3 2 1 0 5 10

9 8 7 6 5 3

1

A

C B

X 2

y x $\ln|x+y|$

X

X

96

5 3 U_1 3

U_3 U_2

( ) 3

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(1

U_2 (2

(3

α α

5DA 10DA

X

α

α X

97

0.6

.0.4

0.2 -

(1

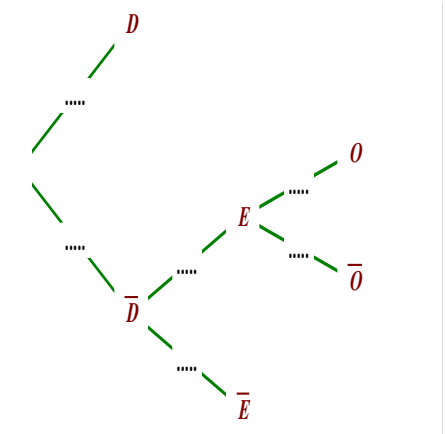
(2

$P(M)=0.32$ (3

98

. 15 % 15

. % 60



3

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15 D -

E -

O -

A -

-1

$P(E)$ $P(O)$ -2

$P(A)=0,32$ -3

99

B 3 A C B A

C 4

A 3 2 ،1 -

B 5 4 -

C 6 -

-1

. B -2

6 -3

3 -4

C -5

100

3 5 10 20

2

-1

P(A) -2

P(E) -6

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****



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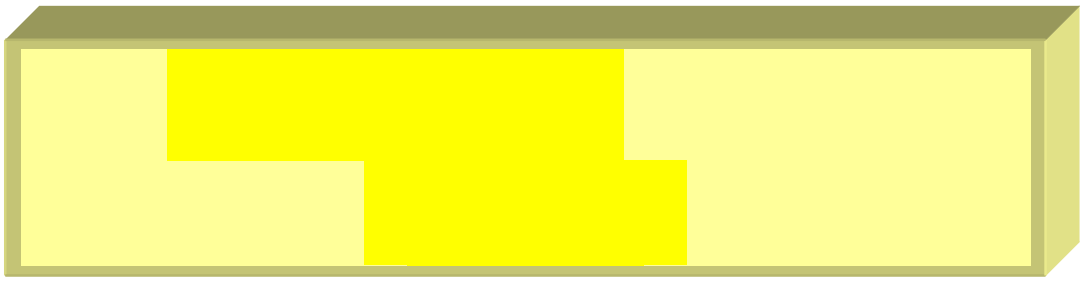
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1

01

6 5 4 3 2 1

$\Omega = \{1;2;3;4;5;6\}$

$6^3 = 216$ Ω 3 3

$A_6^3 = 6 \times 5 \times 4 = 120$ Ω 3 3

$A_6^6 = 6! = 720$ Ω 3 6

02

$3!.2! = 12$

03

$A_5^4 = \dfrac{5!}{(5-4)!} = 5! = 120$ 9 7 5 3 1

04

$5! = 120$

$(5-1)! = 4! = 24$

05

1

C_{10}^4 210

2

C_4^4 1

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$C_4^1 \quad C_6^3 \quad 80$

$C_4^1 \quad C_6^3 \quad C_4^2 \quad C_6^2 \quad C_4^3 \quad C_6^1 \quad C_4^4 \quad 195$

$C_{10}^4 \quad C_6^4 \quad 210 \quad 15 \quad 195$

$C_6^2 \quad C_4^2 \quad C_6^1 \quad C_4^3 \quad C_4^4 \quad 115$

06

3

$C_6^3 \quad C_5^3 \quad C_4^3 \quad 20 \quad 10 \quad 4 \quad 34$ **3 1**

$C_6^3 \quad C_5^3 \quad C_4^3 \quad 20 \quad 10 \quad 4 \quad 34$ **3 2**

3 2 3 **6** **3**

$C_4^3 \quad (C_5^1 \quad C_4^1 \quad C_6^1) \quad 4 \quad 120 \quad 124$

3 4

3

3

$(C_{11}^1 \quad C_4^2) \quad (C_{11}^2 \quad C_4^1) \quad C_{11}^3 \quad 451$

07

n **1**

$2(C_n^0 + C_n^2 + C_n^3) = 5n + 2$

2 1 $\frac{n!}{(n \quad 2)! \quad 2!} \quad \frac{n!}{(n \quad 3)! \quad 3!}$ 5n 2 $2(C_n^0 \quad C_n^2 \quad C_n^3)$ 5n 2

2 1 $\frac{n(n \quad 1)}{2} \quad \frac{n(n \quad 1)(n \quad 2)}{6}$ 5n 2

n 4 n 0 $n(n^2 \quad 16) \quad 0$ $n^3 \quad 16n \quad 0$

$C_n^3 + C_{2n}^2 = 8n$

$\frac{n!}{(n \quad 3)! \quad 3!} \quad \frac{2n!}{(2n \quad 2)! \quad 2!}$ 8n $C_n^3 \quad C_{2n}^2$ 8n

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$n^3 \quad 9n^2 \quad 52n \quad 0$ $\frac{n(n \quad 1)(n \quad 2)}{} \quad \frac{2n(2n \quad 1)}{2} \quad 8n$

$n \quad 13 \quad n \quad 4 \quad n \quad 0 \qquad n(n^2 \quad 9n \quad 52) \quad 0$

$\begin{cases} C^{y}_{x+1} = C^{y-1}_{x} \\ C^{2}_{x+y} = 10 \end{cases}$ ^{2} **2**

$\frac{(x \quad 1)!}{(x \quad 1 \quad y)! \quad y!} \quad \frac{x!}{(x \quad y \quad 1)! \quad (y \quad 1)!} \quad 1 \qquad C^{y}_{x \quad 1} \quad C^{y \quad 1}_{x} \ldots\ldots(1)$

$C^{2}_{x \quad y} \quad 10 \ldots\ldots\ldots(2)$

$\frac{(x \quad 1)n!}{(x \quad 1 \quad y)! \quad y(y \quad 1)!} \quad \frac{x!}{(x \quad y \quad 1)! \quad (y \quad 1)!}$

$x \quad 1 \quad y \ldots\ldots(1) \qquad \frac{x \quad 1}{y} \quad 1$

$\frac{(x \quad y)(x \quad y \quad 1)(x \quad y \quad 2)!}{(x \quad y \quad 2)! \quad 2} \quad 10 \qquad \frac{(x \quad y)!}{(x \quad y \quad 2)! \quad 2!} \quad 10 \qquad 2$

$(x \quad y)(x \quad y \quad 1) \quad 20 \ldots\ldots(2)$

$2x^2 \quad x \quad 10 \quad 0 \qquad (2x \quad 1)(2x) \quad 20 \qquad 2 \quad 1$

$y \quad 3 \quad x \quad 2 \qquad x_1 \quad \frac{5}{2} \quad x_1 \quad 2$

08

$1\times1!+2\times2!+\ldots\ldots+n\times n!=(n+1)!-1 \quad n\in$ **1**

$(0 \quad 1)! \quad 1 \quad 0 \qquad 0 \quad 0! \quad 0 \qquad n \quad 0$

$1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad n \quad n! \quad (n \quad 1)! \quad 1 \qquad n$

$1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad (n \quad 1) \quad (n \quad 1)! \quad (n \quad 2)! \quad 1 \qquad n \quad 1$

$(n \quad 1)(n \quad 1)! \qquad 1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad n \quad n! \quad (n \quad 1)! \quad 1$

$1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad n \quad n! \quad (n \quad 1)(n \quad 1)! \quad (n \quad 1)! \quad 1 \quad (n \quad 1)(n \quad 1)!$

$1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad n \quad n! \quad (n \quad 1)(n \quad 1)! \quad (n \quad 1)! \quad (n \quad 1 \quad 1) \quad 1$

$1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad n \quad n! \quad (n \quad 1)(n \quad 1)! \quad (n \quad 1)! \quad (n \quad 2) \quad 1$

$1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad n \quad n! \quad (n \quad 1)(n \quad 1)! \quad (n \quad 2)! \quad 1$

$1 \quad 1! \quad 2 \quad 2! \quad \ldots. \quad n \quad n! \quad (n \quad 1)! \quad 1 \qquad n$

$2^n \quad 1 \quad 3 \quad 5 \quad 7 \quad \ldots. \quad (2n \quad 1) \quad n! \quad (2n)! \qquad n \quad ^{*}$ **2**

$2 \quad 2 \qquad 2^1 \quad 1 \quad 1! \quad (2 \quad 1)! \qquad n \quad 1$

$2^n \quad 1 \quad 3 \quad 5 \quad 7 \quad \ldots. \quad (2n \quad 1) \quad n! \quad (2n)! \qquad n$

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$2^{n\ 1}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ (n\ \ 1)!\ \ \ (2n\ \ 2)!\ \ \ \ \ \ n\ \ 1$

$2^{n\ 1}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ \ (2n\ \ 1)\ (n\ \ 1)!\ \ 2^{n}\ \ 2\ 1\ \ 3\ \ 5\ \ ...\ \ (2n\ \ 1)\ (2n\ \ 1)(n\ \ 1)\ \ n!$

$2^{n\ 1}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ (n\ \ 1)!\ \ \ 2^{n}\ 1\ \ 3\ \ 5\ \ ...\ \ (2n\ \ 1)\ n!\ \ 2(2n\ \ 1)(n\ \ 1)$

$2^{n}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ n!\ \ \ (2n)!$

$2^{n\ 1}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ (n\ \ 1)!\ \ \ (2n)!\ \ (2n\ \ 1)\ \ 2(n\ \ 1)$

$2^{n\ 1}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ (n\ \ 1)!\ \ \ (2n)!\ \ (2n\ \ 1)\ \ (2n\ \ 2)$

$2^{n\ 1}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ (n\ \ 1)!\ \ \ (2n\ \ 2)!$

$2^{n}\ 1\ \ 3\ \ 5\ \ 7\ \ ....\ \ (2n\ \ 1)\ n!\ \ \ (2n)!\ \ \ \ \ \ n\ \ ^{*}$

09

$$C_6^1 \times C_4^2 = 36$$

$$C_{10}^3 - C_4^3 = 120 - 4 = 116$$

3

$$C_6^1 \times C_4^2 + C_6^2 \times C_4^1 = 36 + 60 = 96$$

$X_n = n^2 + 9n + 21 \quad n \in {}^{*}$ **2**

X_n

$(n+4)$ $(n+6)$

$$X_n = C_{n+6}^2 + C_{n+4}^2 = \frac{(n+6)!}{2!(n+4)!} + \frac{(n+4)!}{2!(n+2)!}$$

$$X_n = \frac{(n+6)(n+5)(n+4)!}{2!(n+4)!} + \frac{(n+4)(n+3)(n+2)!}{2!(n+2)!} = \frac{(n+6)(n+5)+(n+4)(n+3)}{2}$$

$$X_n = \frac{(n+6)(n+5)+(n+4)(n+3)}{2} = \frac{2n^2+18n+42}{2} = n^2+9n+21$$

$X_n = 10713$

$n^2 + 9n - 10692 = 0$ $\quad n^2 + 9n + 21 = 10713$ $\quad X_n = 10713$

$\Delta = 42849$

$n_1 = 99$ $\quad n_1 = -108 \notin$

10

3 **1**

3

2 3 1 4 1 4

3 5 3 1 6 1 6

4 7 5 3 1 8 1 8

9

$$C_9^3 = \frac{9!}{3!.6!} = 84$$

4

$$C_{18}^3 - C_{14}^3 = \frac{18!}{3!.15!} - \frac{14!}{3!.11!} = 816 - 364 = 452$$

4

3 4

$$C_3^1 \times C_{15}^2 = \frac{3!}{1!.2!} \times \frac{15!}{2!.13!} = 3 \times 105 = 315$$

3 **2**

$9^3 = 729$ **3**

$18^3 - 14^3 = 5832 - 2744 = 3088$

$3^1 \times 15^2.3 = 2025$ **4**

11

3

$(3! \times 2! \times 4!)3! = 1728$

$(5! \times 4!)2! = 5760$

$9! = 362880$

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2

12

G F E D A

1

$$C_{12}^{3}=\frac{12!}{3!.9!}=220$$

$P(A)=\frac{10}{220}$ A $\quad C_5^3=10$ A

$P(D)=\frac{15}{220}$ D $\quad C_4^3+C_5^3+C_3^3=15$ D

$P(E)=\frac{60}{220}$ E $\quad C_4^1\times C_5^1\times C_3^1=60$ E

$P(F)=\frac{70}{220}$ F $\quad C_5^2\times C_7^1=70$ F

$P(G)=\frac{185}{220}$ G $\quad C_{12}^3-C_7^3=185$ G

2

$$12^3=1728$$

$P(A)=\frac{125}{1728}$ A $\quad 5^3=125$ A

$P(D)=\frac{216}{1728}$ D $\quad 4^3+5^3+3^3=216$ D

$P(E)=\frac{360}{1728}$ E $\quad 4\times5\times3.6=360$ E

$P(F)=\frac{525}{1728}$ F $\quad 5^2\times7.3=525$ F

$P(G)=\frac{1385}{1728}$ G $\quad 12^3-7^3=1385$ G

3

$$A_{12}^{3}=1320$$

$P(A)=\frac{60}{1320}$ A $\quad A_5^3=60$ A

$P(D)=\frac{90}{1320}$ D $\quad A_4^3+A_5^3+A_3^3=90$ D

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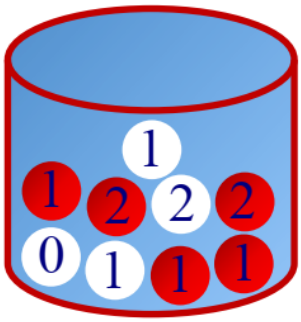
$P(E)=\frac{360}{1320}$ E $\quad A_4^1\times A_5^1\times A_3^1.3!=360$ E

$P(F)=\frac{420}{1320}$ F $\quad A_5^2\times A_7^1.3=420$ F

$P(G)=\frac{1110}{1320}$ G $\quad A_{12}^3-A_7^3=1110$ G

13

F E D A



1

$C_9^3=\frac{9!}{3!.6!}=84$

$C_5^3+C_4^3=14$ A

$P(A)=\frac{14}{84}$ A

$P(D)=\frac{80}{84}$ D $\quad C_9^3-C_4^3=80$ D

$P(E)=\frac{11}{84}$ E $\quad C_1^3+C_5^3+C_3^3=11$ E

$P(F)=\frac{33}{84}$ F $\quad C_5^2\times C_3^1+C_1^1\times C_3^2=33$ F

2

$9^3=729$

$P(A)=\frac{189}{729}$ A $\quad 5^3+4^3=189$ A

$P(D)=\frac{665}{729}$ D $\quad 9^3-4^3=665$ D

$P(E)=\frac{152}{729}$ E $\quad 5^3+3^3=152$ E

$P(F)=\frac{252}{729}$ F $\quad 5^2\times 3^1.3+1^1\times 3^2.3=252$ F

3

$A_9^3=504$

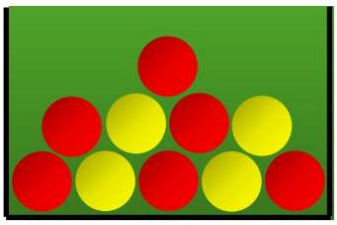
$P(A)=\frac{84}{504}$ A $\quad A_5^3+A_4^3=84$ A

$P(D)=\frac{480}{504}$ D $\quad A_9^3-A_4^3=480$ D

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$P(E)=\frac{66}{504}$ E $A_5^3+A_3^3=66$ E

$P(F)=\frac{198}{504}$ F $A_5^2\times A_3^1.3+A_1^1\times A_3^2.3=198$ F



14

P(B) P(A)

$$A_{10}^3=\frac{10!}{(10-3)!}=720$$

A P(A)

3 $A_6^2\times A_4^1.3+A_6^1\times A_4^2.3=576$ A

$$P(A)=\frac{576}{720}=\frac{4}{5}$$

B P(B)

$P(B)=\frac{144}{720}=\frac{1}{5}$ $A_6^3+A_4^3=144$ B

1

$P(B)=1-P(A)=1-\frac{4}{5}=\frac{1}{5}$ A B 2

15

1

$8^2=64$

A

$5^2+3^2=25+9=34$ A

$P(A)=\frac{34}{64}=\frac{17}{32}$ A

B

2 $(5^1.3^1)2=30$ B

$P(B)=\frac{30}{64}=\frac{15}{32}$ B

1

A B 2

$P(B)=1-P(A)=1-\frac{17}{32}=\frac{15}{32}$

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16

900

1

$P(E)=\frac{600}{900}=\frac{2}{3}$ 600

2

$P(I)=\frac{350}{900}=\frac{7}{18}$ 350

3

$P(I\cap E)=\frac{250}{900}=\frac{5}{18}$ 250

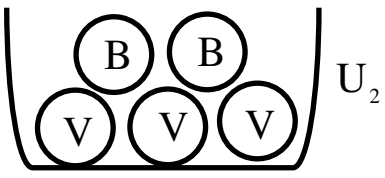
4

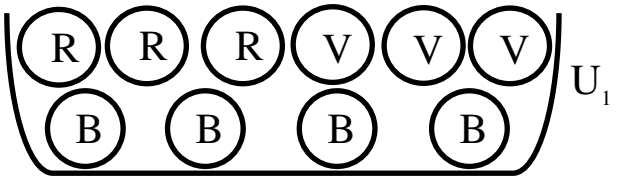
$P(I/E)=P_E(I)=\frac{P(I\cap E)}{P(E)}=\frac{5}{12}$

17

3 3 4 U_1

3 U_2





B **1**

U_2 U_1

$\frac{4}{6}=\frac{2}{3}$ $\frac{2}{6}=\frac{1}{3}$ 3

$\frac{2}{5}$ U_2 $\frac{4}{10}=\frac{2}{5}$ U_1

$$P(B)=P(B\cap U_1)+P(B\cap U_2)=\frac{1}{3}.\frac{2}{5}+\frac{2}{3}.\frac{2}{5}=\frac{6}{15}=\frac{2}{5}$$

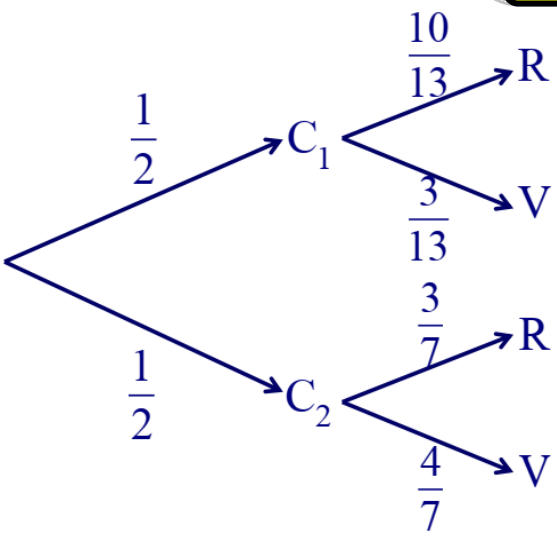
U_1 **2**

$P_B(U_1)=\frac{P(B\cap U_1)}{P(B)}=\frac{2}{15}\times\frac{5}{2}=\frac{1}{3}$

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18

1



$P(C_1)=\frac{1}{2}$ C_1

$P(C_2)=\frac{1}{2}$ C_2

R 2

R

$$P(R)=P(R\cap C_1)+P(R\cap C_2)=\frac{1}{2}.\frac{10}{13}+\frac{1}{2}.\frac{3}{7}=\frac{109}{182}$$

$P_R(C_2)$ 3

$P_R(C_1)$

$$P(R\cap C_1)=\frac{1}{2}.\frac{10}{13}=\frac{5}{13} \qquad P_R(C_1)=\frac{P(R\cap C_1)}{P(R)}=\frac{5}{13}.\frac{182}{109}=\frac{70}{109}$$

19

1

A	**48**	**1152**	**1200**
B	**24**	**776**	
	72	**1928**	**2000**

$P_D(A)$ $P(A\cap D)$ $P(D)$ 2

B A D $P(D)$ *

$$P(D)=\frac{48+24}{2000}=\frac{72}{2000}=\frac{9}{250}$$

A $A\cap D$ $P(A\cap D)$ *

$$P(A\cap D)=\frac{48}{2000}=\frac{6}{250}$$

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A $P_D(A)$ *

$$P_D(A) = \frac{P(A \cap D)}{P(D)} = \frac{6}{250} \cdot \frac{250}{9} = \frac{2}{3}$$

$P_{\overline{D}}(B)$ $P(\overline{D} \cap B)$ $P(\overline{D})$

$$P(\overline{D}) = 1 - P(D) = 1 - \frac{9}{250} = \frac{241}{250}$$

D $P(\overline{D})$ *

B $P(\overline{D} \cap B)$ *

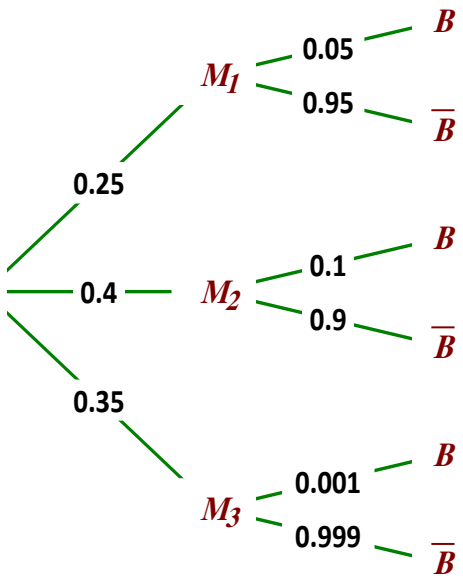
$$P(\overline{D} \cap B) = \frac{776}{2000} = \frac{97}{250}$$

B $P_{\overline{D}}(B)$ *

$$P_{\overline{D}}(B) = \frac{P(\overline{D} \cap B)}{P(\overline{D})} = \frac{97}{250} \cdot \frac{250}{241} = \frac{97}{241}$$

20

1



2 B

B

M_1

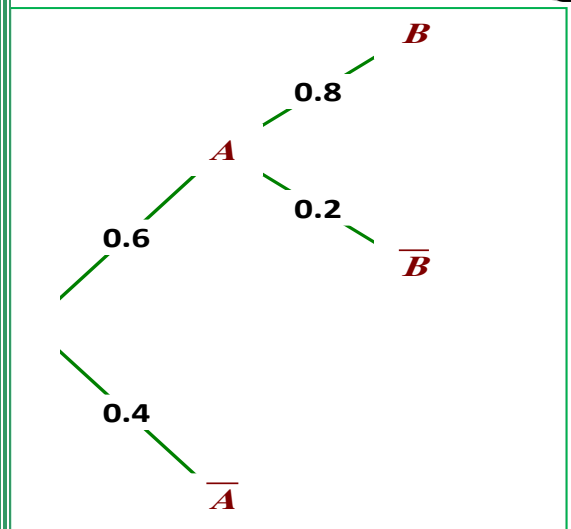
M_3 M_2

$$P(B) = P(M_1 \cap B) + P(M_2 \cap B) + P(M_3 \cap B)$$

$$P(B) = 0,25 \times 0,05 + 0,40 \times 0,1 + 0,35 \times 0,001$$

$$P(B) = 0,05285$$

21



B

A

B

B

$$P(B) = 0,6 \times 0,8 = 0,48$$

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22

1

B A

$P(A \cap B) = P(A) \times P(B)$ B A

$P(A \cap B) = 0,7 \times 0,5 = 0,35$

2

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

$P(A \cup B) = 0,7 + 0,5 - 0,35 = 0,85$

23

B A $P(A \cap B)$ $P(B)$ $P(A)$ **1**

$P(A) = \frac{2}{6}$ 2 $A = \{1;2\}$

$P(B) = \frac{2}{6}$ 4 $B = \{5;6\}$

B A $P(A \cap B) = 0$ $A \cap B = \phi$

$P(A \cap B) \neq P(A) \times P(B)$ B A

$P(A \cup B)$

$P(A \cup B) = \frac{4}{6} = \frac{2}{3}$ $P(A \cup B) = P(A) + P(B)$

C D **2**

$P(D) = \frac{3}{6}$ $D = \{2;4;6\}$

$P(C) = \frac{3}{6}$ $C = \{1;3;5\}$

$P(D) \times P(C) = \frac{1}{2}.\frac{1}{2} = \frac{1}{4}$ $P(D \cap C) = 0$ $D \cap C = \phi$

$P(D \cap C) \neq P(D) \times P(C)$ C D

$P(D)$ $P(C)$

$P(D) = \frac{3}{6} = \frac{1}{2}$ $P(C) = \frac{3}{6}$

$P(D \cup C) = P(D) + P(C)$ $P(D)$

$P(D \cup C) = 1$ $(D \cup C) = \{1;2;3;4;5;6\}$

$P(D) = P(D \cup C) - P(C) = 1 - \frac{3}{6} = \frac{3}{6} = \frac{1}{2}$

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$P(D \cup E)$ **E D** **3**

$$P(E) = \frac{3}{6} \qquad E = \{2;3;5\}$$

$$P(D) \times P(E) = \frac{1}{2}.\frac{1}{2} = \frac{1}{4} \qquad P(D \cap C) = \frac{1}{6} \qquad D \cap E = \{2\}$$

$$P(D \cap E) \neq P(D) \times P(E)$$

E D

$P(D \cup E)$

$$P(D \cup E) = \frac{1}{2} + \frac{1}{2} = 1 \qquad P(D \cup E) = P(D) + P(E)$$

24

1

$$(a+b)^n = \sum_{p=0}^{p=n} C_n^p a^{n-p}.b^p$$

$$(x+1)^3 = \sum_{p=0}^{p=3} C_3^p (x)^{3-p}(1)^p = C_3^0(x)^3(1)^0 + C_3^1(x)^2(1)^1 + C_3^2(x)^1(1)^2 + C_3^3(x)^0(1)^3$$

$$(x+1)^3 = (x)^3 + 3(x)^2 + 3(x) + 1$$

$$(x-2)^4 = \sum_{p=0}^{p=4} C_4^p (x)^{4-p}(1)^p = C_4^0(x)^4(-2)^0 + C_4^1(x)^3(-2)^1 + C_4^2(x)^2(-2)^2 + C_4^3(x)^1(-2)^3 + C_4^4(x)^0(-2)^4$$

$$(x-2)^4 = x^4 - 12x^3 + 32x^2 - 12x + 16$$

$$(2x-3y)^5 = \sum_{p=0}^{p=5} C_5^p (2x)^{5-p}(-3y)^p = 32x^5 - 30(x)^4(y)^1 + 720(x)^3(y)^2 - 1040(x)^2(y)^3 + 810(x)^1(y)^4 - 243(y)^5$$

10 **2**

$$\left(x^3 - \frac{2}{x^2}\right)^{15} = \sum_{p=0}^{p=15} C_{315}^p (x^3)^{15-p}(-\frac{2}{x^2})^p = \sum_{p=0}^{p=15} (-2)^p C_{315}^p x^{-5p+45}$$

$p = 1 \qquad -5p + 15 = 10$

$(-2)^1 C_{15}^1 x^{40} = -30x^{40}$ 10

$(-2)^8 C_{15}^8 = 9884160$ $p = 8$

$p = 3 \qquad -5p + 15 = 0$ 0

$(-2)^3 C_{15}^3 x^0 = -3640$

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25

$7^2 = 49$

A

$4^2 = 16$ 7 4

$P(A) = \frac{16}{49}$ **A**

B

7 3

2 $3^1.2^1.2 = 12$

$P(B) = \frac{12}{49}$ B

C

7 5 3 2 7 4

2 $4^2 + 4^1.3^1.2 = 16 + 24 = 40$

$P(C) = \frac{40}{49}$ C

C $\overline{C}$ $P(C) = 1 - P(\overline{C}) = 1 - \frac{3^2}{49} = \frac{40}{49}$ 2

" **D**

2 $4^1.3^1.2 = 24$

$P(D) = 1 - \frac{24}{49} = \frac{25}{49}$ D

26

1

6 **A**

3 2 1

$C_{10}^3 = 120$

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3 2 1 6

$$C_5^1 \times C_3^1 \times C_2^1 = 30 \quad A$$

$$P(A) = \frac{30}{120} = \frac{1}{4} \quad A$$

B

3 2 1 3 1 4 9

1 1

2 1 3

$$C_5^3 + C_5^1 \times C_3^2 + C_5^1 \times C_2^2 = 10 + 15 + 5 = 30 \quad B$$

$$P(B) = \frac{30}{120} = \frac{1}{4} \quad B$$

C

2 1 3 2 1 3

2 1 3 3

$$P(C) = \frac{50}{120} \quad C \qquad C_5^2 \times C_3^1 + C_5^2 \times C_2^1 = 50 \quad C$$

X **2**

$X = \{1;2;3;4;6;8;9;12;18\}$ X

1 $P(X=1) = \frac{C_5^3}{120} = \frac{10}{120}$

2 1 $P(X=2) = \frac{C_5^2 \times C_3^1}{120} = \frac{30}{120}$

3 1 $P(X=3) = \frac{C_5^2 \times C_2^1}{120} = \frac{20}{120}$

1 2 $P(X=4) = \frac{C_5^1 \times C_3^2}{120} = \frac{15}{120}$

3 1 2 $P(X=6) = \frac{C_5^1 \times C_3^1 \times C_2^1}{120} = \frac{30}{120}$

2 $P(X=8) = \frac{C_3^3}{120} = \frac{1}{120}$

1 3 $P(X=9) = \frac{C_5^1 \times C_2^2}{120} = \frac{5}{120}$

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3 2 $P(X=12)=\frac{C_3^2\times C_2^1}{120}=\frac{6}{120}$

2 $P(X=18)=\frac{C_3^1\times C_2^2}{120}=\frac{3}{120}$

x_i X X

$P(X \quad x_i)$

x_i	1	2	3	4	6	8	9	12	18	
$P(x_i)$	$\frac{10}{120}$	$\frac{30}{120}$	$\frac{20}{120}$	$\frac{15}{120}$	$\frac{30}{120}$	$\frac{1}{120}$	$\frac{5}{120}$	$\frac{6}{120}$	$\frac{3}{120}$	1

X

$$E(X)\quad \sum_{i\ 0}^{i\ 8} x_i.P_i$$

$$E(X)\quad \sum_{i\ 0}^{i\ 8} x_i.P_i \quad \frac{1\ 10\ 2\ 30\ 3\ 20\ 4\ 15\ 6\ 30\ 8\ 1\ 9\ 5\ 12\ 6\ 18\ 3}{120} \quad \frac{193}{40}$$

27

A_5^2 5.4 20

A **1**

$P(A)=\frac{8}{20}=\frac{2}{5}$ A A_2^2 A_3^2 8 A

B **2**

$P(B)=\frac{6}{20}=\frac{3}{10}$ B $A_2^1.A_3^1$ 6 B

C **3**

$P(C)=\frac{12}{20}=\frac{3}{5}$ C $A_2^1.A_3^1$ $A_3^1.A_2^1$ 12 C

28

1

3 6 10 16

$$C_{16}^3=\frac{16!}{3!.13!}=560$$

E **2**

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3 3 " " E

$$C_{10}^3 + C_6^3 = 120 + 20 = 140$$

$$P(E) = \frac{140}{560} = \frac{1}{4}$$ E

F

E F

$$P(F) = 1 - \frac{1}{4} = \frac{3}{4}$$ F

3

B A

2 **B** 2 **A**

$$C_1^1 \times C_{15}^2 + C_1^1 \times C_{15}^2 - \left(C_{10}^3 + C_6^3\right) = 105 + 105 - 140 = 70$$

$$P(E) = \frac{70}{560} = \frac{1}{8}$$

4 X $E(X)$

$X = \{0;1;2;3\}$ X

$$P(X=0) = \frac{C_{10}^3}{560} = \frac{120}{560}$$

$$P(X=1) = \frac{C_6^1 \times C_{10}^2}{560} = \frac{270}{560}$$

2 $$P(X=2) = \frac{C_6^2 \times C_{10}^1}{560} = \frac{150}{560}$$

3 $$P(X=3) = \frac{C_6^3}{560} = \frac{20}{560}$$

X

x_i	0	1	2	3	
$P(x_i)$	$\frac{120}{560}$	$\frac{270}{560}$	$\frac{150}{560}$	$\frac{20}{560}$	1

$$E(X) = \sum_{i=0}^{3} x_i.P_i = \frac{0 \quad 120 \quad 1 \quad 270 \quad 2 \quad 150 \quad 3 \quad 20}{560} = \frac{63}{56}$$

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$P_6\ P_5\ P_4\ P_3\ P_2\ P_1$ **1**

$\sum_{i\ 1}^{i\ 6} P_i \quad 1$

1

$\frac{1}{2}$ $P_6\ P_5\ P_4\ P_3\ P_2\ P_1$

$$P_6=\frac{1}{64}P_1 \quad P_5=\frac{1}{32}P_1 \quad P_4=\frac{1}{16}P_1 \quad P_3=\frac{1}{8}P_1 \quad P_3=\frac{1}{4}P_1 \quad P_2=\frac{1}{2}P_1$$

$$P_1=\frac{32}{63} \qquad 2P_1\left(1-\left(\frac{1}{2}\right)^6\right)=1 \qquad P_1\left[\frac{1-\left(\frac{1}{2}\right)^6}{1-\frac{1}{2}}\right]=1 \qquad \sum_{i\ 1}^{i\ 6} P_i \quad 1$$

$$P_6=\frac{1}{63} \quad P_5=\frac{2}{63} \quad P_4=\frac{4}{63} \quad P_3=\frac{8}{63} \quad P_2=\frac{16}{63}$$

3

$$P_6\ P_4\ P_2=\frac{16}{63}+\frac{4}{63}+\frac{1}{63}=\frac{25}{63}$$

3

$$P_6+P_3=\frac{16}{63}+\frac{8}{63}=\frac{24}{63}=\frac{8}{21}$$

$X=\{1;2;3;4;5;6\}$ X

x_i X X

$P(X \quad x_i)$

x_i	1	2	3	4	5	6	
$P(x_i)$	$\frac{32}{63}$	$\frac{16}{63}$	$\frac{8}{63}$	$\frac{4}{63}$	$\frac{2}{63}$	$\frac{1}{63}$	1

$$E(X) \qquad \sum_{i\ 1}^{i\ 6} x_i.P_i$$

$$E(X) \qquad \sum_{i\ 1}^{i\ 6} x_i.P_i \qquad \frac{1\ \ 32\ \ 2\ \ 16\ \ 3\ \ 8\ \ 4\ \ 4\ \ 5\ \ 2\ \ 6\ \ 1}{63} \qquad \frac{40}{21}$$

$$Var(X) \qquad \sum_{i\ 0}^{i\ 6} (x_i \quad E(X))^2.P_i$$

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$$\text{Var(X)} \quad \frac{(1 \quad \frac{40}{21})^2 \quad 32 \quad (2 \quad \frac{40}{21})^2 \quad 16 \quad (3 \quad \frac{40}{21})^2 \quad 8 \quad (4 \quad \frac{40}{21})^2 \quad 4 \quad (5 \quad \frac{40}{21})^2 \quad 2 \quad (6 \quad \frac{40}{21})^2 \quad 1}{63} \quad 1.42$$

$$(X) \quad \sqrt{\text{Var}(X)} \quad \sqrt{1,42} \quad 1,2$$

30

الزهر 1 / الزهر 2	1	2	2	3	4	4
1	2	3	3	4	5	5
2	3	4	4	5	6	6
2	3	4	4	5	6	6
5	6	7	7	8	9	9
5	6	7	7	8	9	9
6	7	8	8	9	10	10

1

2

$$\Omega = \{2,3,4,5,6,7,8,9,10\}$$

3

x_i	2	3	4	5	6	7	8	9	10	
$P(x_i)$	$\frac{1}{36}$	$\frac{4}{36}$	$\frac{5}{36}$	$\frac{4}{36}$	$\frac{6}{36}$	$\frac{5}{36}$	$\frac{4}{36}$	$\frac{5}{36}$	$\frac{2}{36}$	1

-4

$$P(A) = \frac{1}{36} + \frac{4}{36} = \frac{5}{36} \qquad P(A)$$

$$P(B) = \frac{5}{36} + \frac{4}{36} = \frac{9}{36} = \frac{1}{4} \quad 3 \qquad P(B)$$

$$P(C) = \frac{5}{36} + \frac{2}{36} = \frac{7}{36} \quad 3 \qquad P(C)$$

$$P(A \cup B) = P(A) + P(B) - P(C) = \frac{7}{36} \quad 3 \qquad P(D)$$

1 5

---

20 $\{4,5\}$ 100 $\{2,3\}$

$\{9,10\}$ -45 $\{6,7,8\}$

	100	20	-45	0
	$\frac{5}{36}$	$\frac{9}{36}$	$\frac{15}{36}$	$\frac{7}{36}$

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$$E(X)=100\times\frac{5}{36}+20\times\frac{9}{36}+(-45)\times\frac{15}{36}+0\times\frac{7}{36} \quad 0.14$$

$$\sigma(X)=\sqrt{\sum_{i=1}^{n}\left(x_i-E(X)\right)^2 p_i}$$

$$\sigma(X)=\sqrt{\left(100-\frac{5}{36}\right)^2\times\frac{5}{36}+\left(20-\frac{5}{36}\right)^2\times\frac{9}{36}+\left(-45-\frac{5}{36}\right)^2\times\frac{15}{36}+\left(0-\frac{5}{36}\right)^2\times\frac{7}{36}}$$

$$=\sqrt{2332.62}=48.3$$

31

$$C_{12}^3=\frac{12!}{3!.9!}=220$$

A

$$C_8^3=\frac{8!}{3!.5!}=56$$

$$P(A)=\frac{56}{220}=\frac{14}{55} \quad A$$

B

$$C_8^1\times C_4^2=8.\frac{4!}{2!.2!}=48$$

$$P(B)=\frac{48}{220}=\frac{12}{55} \quad B$$

C

$$C_1^1\times C_{10}^2=1.\frac{10!}{2!.8!}=45$$

$$P(C)=\frac{45}{220}=\frac{9}{44} \quad C$$

D

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$$C_1^1 \times C_{10}^2 + C_1^1 \times C_{10}^2 = 2.\frac{10!}{2!.8!} = 90$$

$$P(D) = \frac{90}{220} = \frac{9}{22} \qquad D$$

X **2**

X

$$X = \{0;1;2;3\}$$

$$P(X=0) = \frac{C_4^3}{220} = \frac{4}{220}$$

2 $$P(X=1) = \frac{C_8^1 \times C_4^2}{220} = \frac{48}{220}$$

$$P(X=2) = \frac{C_8^2 \times C_4^1}{220} = \frac{112}{220}$$

3 $$P(X=3) = \frac{C_8^3}{220} = \frac{56}{220}$$

x_i X X

$P(X \quad x_i)$

x_i	0	1	2	3	
$P(x_i)$	$\frac{4}{220}$	$\frac{48}{220}$	$\frac{112}{220}$	$\frac{56}{220}$	1

X

$$E(X) \quad \sum_{i\ 0}^{i\ 3} x_i.P_i$$

$$E(X) \quad \sum_{i\ 0}^{i\ 3} x_i.P_i \quad \frac{0 \quad 4 \quad 1 \quad 48 \quad 2 \quad 112 \quad 3 \quad 56}{220} \quad \frac{440}{220} \quad 2$$

$$Var(X) \quad \sum_{i\ 0}^{i\ 3} (x_i \quad E(X))^2.P_i$$

$$Var(X) \quad \frac{(0 \quad 2)^2 \quad 4 \quad (1 \quad 2)^2 \quad 48 \quad (2 \quad 2)^2 \quad 112 \quad (3 \quad 2)^2 \quad 56}{220} \quad \frac{120}{220} \quad \frac{6}{11}$$

$$(X) \quad \sqrt{Var(X)}$$

$$(X) \quad \sqrt{Var(X)} \quad \sqrt{\frac{6}{11}}$$

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A

10^2 100

7^2 49

$$P(A)=\frac{49}{100}$$

B

7^2 3^2 49 9 58

$$P(B)=\frac{58}{100}=\frac{29}{50}$$

$E(X)$ X **2**

X

$(-\alpha)$ $(\alpha \in \ )$

$$X=\{-2\alpha;0;2\alpha\}$$

$$P(X=-2\alpha)=\frac{3^2}{100}=\frac{9}{100}$$

$$P(X=0)=\frac{2\times 3^1\times 7^1}{100}=\frac{42}{100}$$

$$P(X=2\alpha)=\frac{7^2}{100}=\frac{49}{100}$$

x_i X X

P(X x_i)

x_i	-2α	0	2α	
$P(x_i)$	$\frac{9}{100}$	$\frac{42}{100}$	$\frac{49}{100}$	1

$$E(X)=\sum_{i=0}^{2} x_i.P_i$$

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$$E(X) \quad \sum_{i\ 0}^{i\ 2} x_i.P_i \quad \frac{2 \quad 9 \quad 0 \quad 42 \quad 2 \quad 49}{100} \quad \frac{80}{100} \quad \frac{4}{5}$$

$$0 \quad \frac{4}{5} \quad 0 \quad E(X) \quad 0$$

$\frac{1}{4}$ A

7 n $(n+7)$ $(n-3)$

$(n \quad 7)^2$

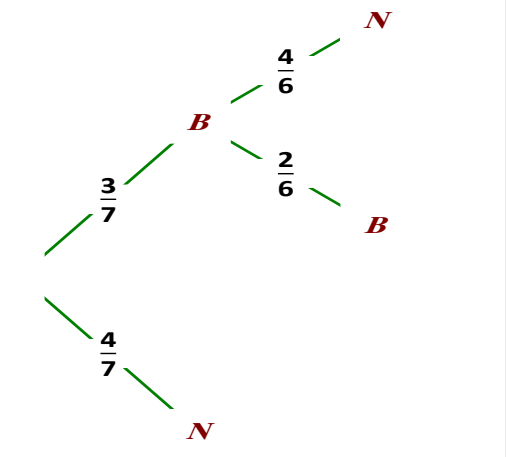
$7^2 \quad 49$

$$P(A)=\frac{1}{4} \qquad P(A)=\frac{49}{(n+7)^2}$$

$$n=7 \qquad n+7=14 \qquad \frac{7}{(n+7)}=\frac{1}{2} \qquad \frac{49}{(n+7)^2}=\frac{1}{4}$$

$$n=7-3=4$$

33



A

$$P(A)=\frac{4}{7}$$

B

$$P(B)=\frac{3}{7}\times\frac{4}{6}=\frac{2}{7}$$

C

C

$$P(C)=P(A)+P(B)=\frac{4}{7}+\frac{2}{7}=\frac{6}{7}$$

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X **2**

$X = \{1;2;3;4\}$ X

$$P(X=1) = P(A) = \frac{4}{7} = \frac{20}{35}$$

$$P(X=2) = P(B) = \frac{2}{7} = \frac{10}{35}$$

$$P(X=3) = \frac{C_3^1}{C_7^1} \times \frac{C_2^1}{C_6^1} \times \frac{C_4^1}{C_5^1} = \frac{4}{35}$$

$$P(X=4) = \frac{C_3^1}{C_7^1} \times \frac{C_2^1}{C_6^1} \times \frac{C_4^1}{C_5^1} \times \frac{C_4^1}{C_4^1} = \frac{1}{35}$$

x_i X X

$P(X \quad x_i)$

x_i	1	2	3	4	
$P(x_i)$	$\frac{20}{35}$	$\frac{10}{35}$	$\frac{4}{35}$	$\frac{1}{35}$	1

$$E(X) \quad \sum_{i=1}^{4} x_i.P_i$$

$$E(X) \quad \sum_{i=1}^{4} x_i.P_i \quad \frac{1 \quad 20 \quad 2 \quad 10 \quad 3 \quad 4 \quad 4 \quad 1}{35} \quad \frac{56}{35}$$

34

6 **-1**

$$P_6 \quad 1 \quad \sum_{i=1}^{5} P_i \quad 1 \quad (0,1 \quad 0,2 \quad 0,3 \quad 0,1 \quad 0,15) \quad 0,15 \quad \sum_{i=1}^{6} P_i \quad 1$$

-2

$P_1 \quad P_3 \quad P_5 \quad 0,1 \quad 0,3 \quad 0,15 \quad 0,55$

4 **-3**

4

$$\sum_{i=5}^{6} P_i \quad P_5 \quad P_6 \quad 0,15 \quad 0,15 \quad 0,30$$

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2019 **-4**

2019 673 3 1 2019 2019 3 673

3 1 6 2019

P_1 P_3 0,1 0,3 0,40 2019

35

B C

	$\overline{C}$	C	
85	35	50	B
165	95	70	$\overline{B}$
250	130	120	

1

$$P(C) = \frac{120}{250} = \frac{12}{25}$$

2

$$P(B \cap C) = \frac{50}{250} = \frac{1}{5}$$

. **3**

$$P(B \cup C) = P(B) + P(C) - P(B \cap C) = \frac{85}{250} + \frac{120}{250} - \frac{50}{250} = \frac{155}{250} = \frac{31}{50}$$

-4

$$P(\overline{B} \cap \overline{C}) = \frac{95}{250} = \frac{19}{50}$$

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1 2019 36

	1	2	3	4	5	6
1	(1;1)	(1;2)	(1;3)	(1;4)	(1;5)	(1;6)
2	(2;1)	(2;2)	(2;3)	(2;4)	(2;5)	(2;6)
3	(3;1)	(3;2)	(3;3)	(3;4)	(3;5)	(3;6)
4	(4;1)	(4;2)	(4;3)	(4;4)	(4;5)	(4;6)
5	(5;1)	(5;2)	(5;3)	(5;4)	(5;5)	(5;6)
6	(6;1)	(6;2)	(6;3)	(6;4)	(6;5)	(6;6)

1

A 36

9 $A=\{(2;2);(2;4);(2;6);(4;2);(4;6);(6;4);(6;6);(6;2);(4;4)\}$

$P(A)=\frac{9}{36}=\frac{1}{4}$ A

6 **2**

6 B

$P(B)=\frac{4}{36}=\frac{1}{9}$ B 4 $B=\{(1;6);(2;3);(6;1);(3;2)\}$

3

C

6 $C=\{(1;2);(2;4);(3;6);(2;1);(4;2);(6;3)\}$

$P(C)=\frac{6}{36}=\frac{1}{6}$ C

2 **4**

2 D

5 $D=\{(2;2);(2;4);(2;1);(4;2);(1;2)\}$

$P(D)=\frac{5}{36}$ C

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$(4x^2+3x-1)(x^2-5x+6)=0.....(E)$ **1**

$(4x^2+3x-1)=0....(2)$ $(x^2-5x+6)=0.....(1)$ (E)

$x_2=3$ $x_1=2$ $\Delta=25$ $(x^2-5x+6)=0.....(1)$

$x_2=\frac{1}{4}$ $x_1=-1$ $\Delta=25$ $(4x^2+3x-1)=0....(2)$

$S=\left\{2;3;-1;\frac{1}{4}\right\}$ (E)

α **2**

$p_4=2\alpha$ $p_3=\alpha$ $p_2=\alpha^2$ $p_1=3\alpha^2$

$4\alpha^2+3\alpha-1=0$ $3\alpha^2+\alpha^2+\alpha+2\alpha=1$ $\sum_{i\ 1}^{i\ 6} P_i \quad 1$

$\alpha=\frac{1}{4}$ $\alpha=-1$

3

A

A

$P(A)=3\alpha^2+\alpha=3\frac{1}{16}+\frac{1}{4}=\frac{7}{16}$

4 B

4 B

$P(B)=2\alpha=\frac{1}{2}$

3 C

3 C

$P(C)=p_1+p_2+p_3=4\alpha^2+\alpha=\frac{1}{2}$

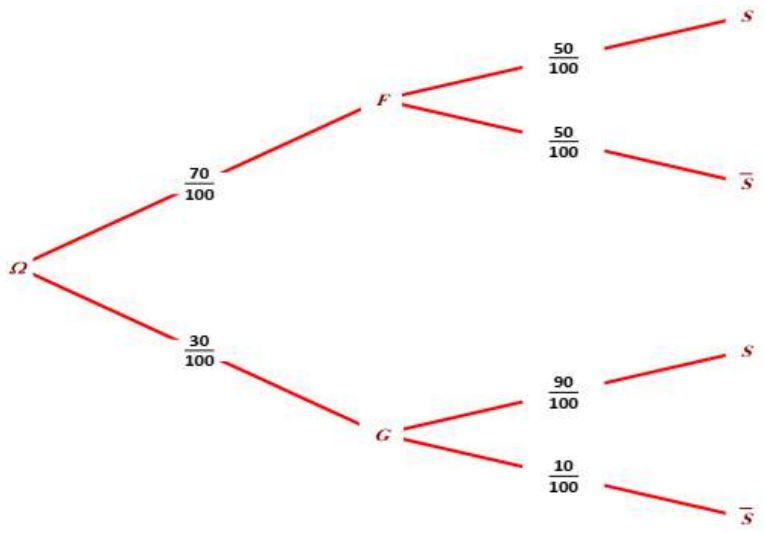
(E) D

(E) D

$P(D)=p_2+p_3=\alpha^2+\alpha=\frac{1}{16}+\frac{1}{4}=\frac{5}{16}$

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1



$P_S(G)$ $P_{\bar{S}}(F)$ $P(G\cap\bar{S})$ $P(S)$ 2

*$P(S)$هو احتمال ان يكون التلميذ من هذا القسم يمارس هذه الرياضة

أي التلميذ المختار انثى تمارس هذه الرياضة أو ذكر يمارس هذه الرياضة وعليه:

$$p(S)=p(F\cap S)+p(G\cap S)=\frac{70}{100}\times\frac{50}{100}+\frac{30}{100}\times\frac{90}{100}=\frac{100(35+27)}{10^4}=\frac{62}{10^2}=0,62$$

*$P(G\cap\bar{S})$ هو احتمال ان يكون التلميذ من هذا القسم ذكر ويمارس هذه الرياضة

وعليه $P(G\cap\bar{S})=P(G)\times P_G(\bar{S})=\frac{30}{100}\times\frac{10}{100}=\frac{3}{100}=0,03$

*$P_{\bar{S}}(F)$ هو احتمال ان يكون التلميذ من هذا القسم انثى علما انها **لا** تمارس هذه الرياضة

وعليه $P_{\bar{S}}(F)=\frac{P(F\cap\bar{S})}{P(\bar{S})}=\frac{P(F\cap\bar{S})}{1-P(S)}=\frac{\frac{70}{100}\times\frac{50}{100}}{1-\frac{6200}{10^4}}=\frac{3500}{3800}=0,92$

*$P_S(G)$ هو احتمال ان يكون التلميذ من هذا القسم ذكرا علما انه تمارس هذه الرياضة

وعليه $P_S(G)=\frac{P(G\cap S)}{P(S)}=\frac{30\times90}{6200}=\frac{27}{62}=0,44$

3-استقلالية الحدثين G و $\bar{S}$

الحادثتان G و $\bar{S}$ غير مستقلتين لأن: $P(G\cap\bar{S})\neq P(G)\times P(\bar{S})$

لأن: $P(G\cap\bar{S})=0,03$ و $P(G)\times P(\bar{S})=0,3\times0,01=0.003$

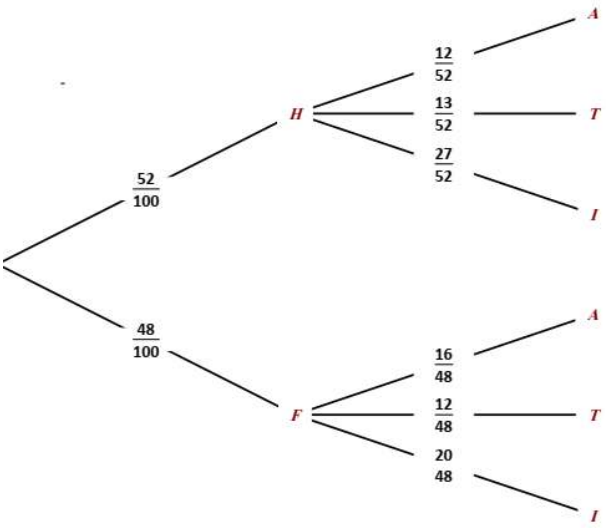
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1-أ) تبيّان أن احتمال ان يكون الموظف رجلا هو: $P(H)=0,52$

	الاداريون A	المهندسون I	العمال T	المجموع
رجال	12 %	13 %	27 %	52 %
نساء	16 %	12 %	20 %	48 %
المجموع	28 %	25 %	47 %	100 %

احتمال ان يكون الموظف رجلا هو: $P(H)=\frac{12+13+27}{100}=\frac{52}{100}=0,52$

انجاز شجرة الاحتمالات التي تنمذج هذه الوضعية .



حساب $P(H\cap T)$ و $P(F\cap I)$.

$P(H\cap T)$ هو احتمال ان يكون الموظف المختار رجلا وعاملا أي:

$$P(H\cap T)=P(H)\times P_H(T)=\frac{52}{100}\times\frac{27}{52}=\frac{27}{100}$$

$P(F\cap I)$ هو احتمال ان يكون الموظف المختار امرأة و مهندسة أي:

$$P(F\cap I)=P(F)\times P_F(I)=\frac{48}{100}\times\frac{12}{48}=\frac{12}{100}$$

3- حساب احتمال ان يكون الموظف مهندسا.

احتمال ان يكون الموظف مهندسا هو ان يكون رجلا مهندسا أو إمراة مهندسة

$$P(I)=P(H\cap I)+P(F\cap I)=P(H)\times P_H(I)+P(F)\times P_F(I)=\frac{13}{100}+\frac{12}{100}=\frac{25}{100}=0,25$$

4-حساب احتمال ان يكون الموظف رجلا علما انه إداري.

احتمال ان يكون الموظف رجلا علما انه إداري هو الإحتمال الشرطي $P_H(A)=\frac{P(H\cap A)}{P(A)}$

حيث: $P(H\cap A)=P(H)\times P_H(A)=\frac{52}{100}\times\frac{3}{13}=0;12$

$$P(A)=P(H\cap A)+P(F\cap A)=P(H)\times P_H(A)+P(F)\times P_F(A)=\frac{12}{100}+\frac{16}{100}=\frac{28}{100}=0,28$$

ومنه: $P_H(A)=\frac{P(H\cap A)}{P(A)}=\frac{12}{28}=\frac{3}{7}$

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2 2017 40

$p(A \quad B) \quad p(A) \quad p(B)$ $B \quad A$ (1

$p(B) \quad \frac{p(A \quad B)}{p(A)} \quad \frac{0,03}{0,4} \quad 0,075$

$p_A(B) \quad \frac{p(A \quad B)}{p(B)}$ $p_A(B) \quad \frac{1}{4} \quad p(A \quad B) \quad \frac{3}{100}$ $B \quad A$ 2

$p(B) \quad \frac{p(A \quad B)}{p_A(B)} \quad \frac{\frac{3}{100}}{\frac{1}{4}} \quad \frac{3 \quad 4}{100} \quad \frac{3}{25}$

$p(\overline{A \quad B}) \quad 0,55 \quad p(B) \quad 0,5 \quad p(A) \quad 0,4$ $B \quad A$ 3

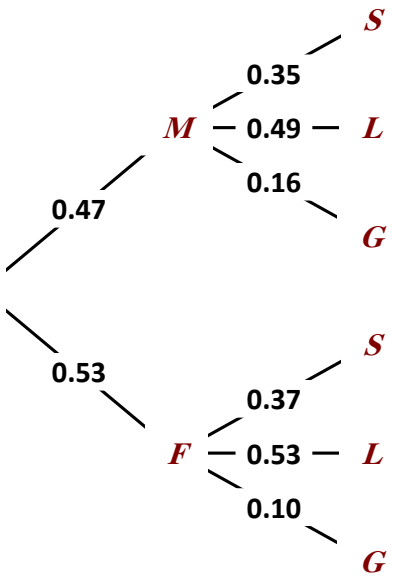
$p(A \quad B) \quad p(A) \quad p(B) \quad p(A \quad B)$ $p(A \quad B) \quad 1 \quad p(\overline{A \quad B}) \quad 1 \quad 0,55 \quad 0,45$

$p(A \quad B) \quad 0,4 \quad 0,5 \quad 0,45 \quad 0,45$ $p(A \quad B) \quad p(A) \quad p(B) \quad p(A \quad B)$

$1 \quad 0,12 \quad 0,50 \quad 0,30 \quad 0,08$ $0,12 \quad 0,50 \quad 0,30 \quad 1$ 4

$\frac{0,32 \quad 0,74 \quad 0,9}{0,08}$ 2 (2)0,12 (1)0,50 ( )0,08 (3)0,3 0,32

1 2017 41



1

2

$p(A) \quad p(F \quad G) \quad 0,53 \quad 0,10 \quad 0,053$

$p(B) \quad p(M \quad G) \quad p(F \quad G)$

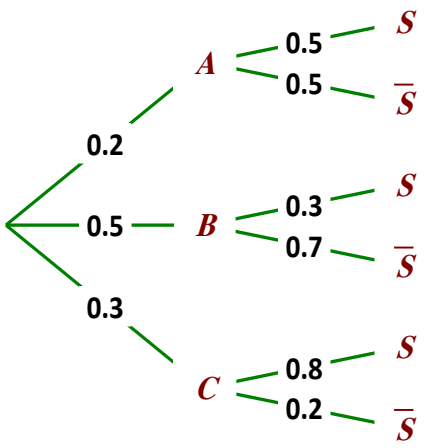
$p(B) \quad p(G) \quad 0,0752 \quad 0,053 \quad 0,1282$

$p(M \quad G) \quad 0,47 \quad 0,16 \quad 0,0752$

$p(C) \quad \frac{0,053}{0,1282} \quad 0,4134$ $p(C) \quad p_G(F) \quad \frac{p(F \quad G)}{p(G)}$

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2 2016 42



1

2

$p(A \quad S)$ $p(A)$ $p_A(S)$ $0,2$ $0,5$ $0,10$

$p(B \quad S)$ $p(B)$ $p_B(S)$ $0,5$ $0,3$ $0,15$

$p(C \quad S)$ $p(C)$ $p_C(S)$ $0,3$ $0,8$ $0,24$

$p(S)$ $p(A \quad S)$ $p(A \quad S)$ $p(C \quad S)$

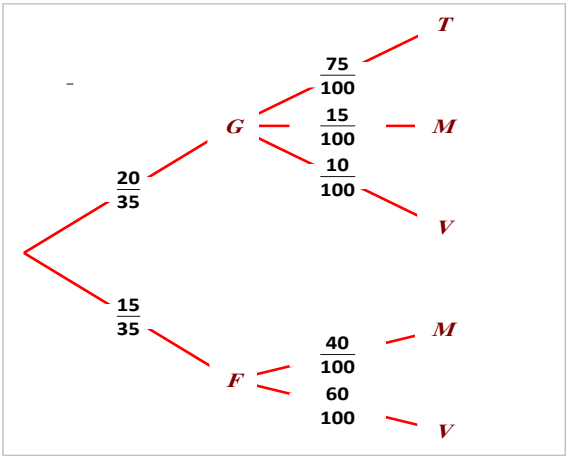
$p(S)$ $0,10$ $0,15$ $0,24$ $0,49$

3 $p_{\overline{S}}(B)$

$$P_{\overline{S}}(B) = \frac{P(B \cap \overline{S})}{P(\overline{S})} = \frac{P(B \cap \overline{S})}{1-P(S)} = \frac{0.5 \times 0.7}{1-0.49} = 0.686$$

$p(B \quad \overline{S})$ $p(B)$ $p_B(\overline{S})$ $0,5$ $0,49$ $0,245$ $p(\overline{S})$ 1 $p(S)$ 1 $0,49$ $0,51$

1 2012 43



1

2 V $p(V)$

$p(V)$ $p(G \quad V)$ $p(F \quad V)$

$p(V)$ $\frac{11}{35}$ $p(V)$ $\frac{2}{35}$ $\frac{9}{35}$ $\frac{11}{35}$

3 $p_V(G)$

$p_V(G)$ $\frac{2}{11}$ $p_V(G)$ $\frac{\frac{2}{35}}{\frac{11}{35}}$ $\frac{2}{11}$ $p_V(G)$ $\frac{p(G \quad V)}{p(V)}$

4

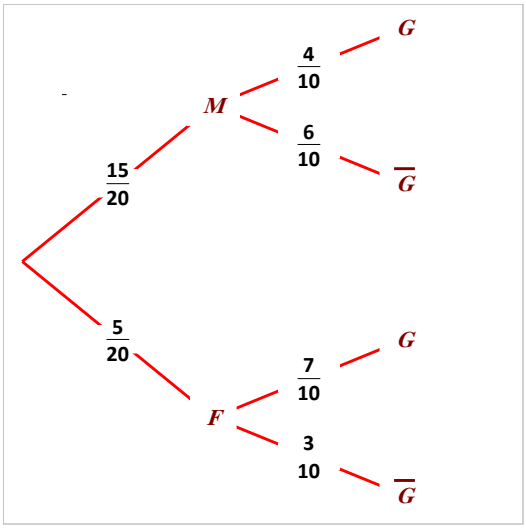
$p(\overline{T})$

$p(\overline{T})$ 1 $\frac{3}{7}$ $\frac{7 \quad 3}{7}$ $\frac{4}{7}$ $p(\overline{T})$ 1 $p(T)$

$\frac{4}{7}$

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1 2013 44



1

$p(M)$ $\frac{15}{20}$ $\frac{3}{4}$

2

$p(G)$ $p(M \quad G)$ $p(M \quad G)$ $(\frac{3}{4} \quad \frac{4}{10})$ $(\frac{1}{4} \quad \frac{7}{10})$

$p(G)$ $\frac{12}{40}$ $\frac{7}{40}$ $\frac{19}{40}$ $0,475$

3

$p(M \quad G)$ $\frac{3}{10}$ $0,3$ ، $p(M \quad G)$ $p(M)$ $p(G)$ $\frac{3}{4}$ $\frac{4}{10}$

. $p_G(M)$ **4**

$p_G(M)$ $\frac{p(M \quad G)}{p(G)}$ $\frac{\frac{3}{10}}{\frac{19}{40}}$ $\frac{12}{19}$

2008 45

1 **1**

P(A) $\frac{C_3^1}{C_7^1}$ $\frac{3}{7}$ 1 A

1

B

1 A B

P(A B) $\frac{C_2^1}{C_7^1}$ $\frac{2}{7}$ 2 1

$P_A(B)$ $\frac{P(A \quad B)}{P(A)}$ $\frac{2}{7}$ $\frac{7}{3}$ $\frac{2}{3}$

2

C

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7 3

A_3^2 6

A_7^2 42

P(C) $\frac{A_3^2}{A_7^2}$ $\frac{1}{7}$

D

A_3^2 A_4^2 6 12 18

P(D) $\frac{A_3^2 \quad A_4^2}{A_7^2}$ $\frac{3}{7}$

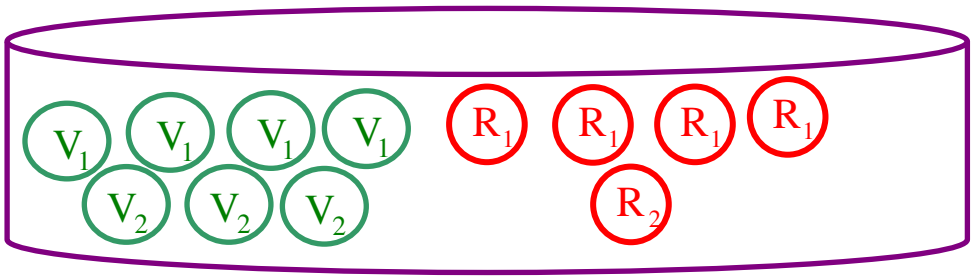
3

3 E

A_3^1 A_3^1 9 3

P(E) $\frac{A_3^1 \quad A_3^1}{A_7^2}$ $\frac{3}{14}$

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1 **A** $P(A)=\frac{31}{66}$ **B**

A 12

$$C_{12}^2=\frac{12!}{2!(10)!}=66$$ 12

$$C_5^2+C_7^2=\frac{5!}{2!(3)!}+\frac{7!}{2!(5)!}=10+21=31$$

$$\boxed{P(A)=\frac{31}{66}}$$ A

B 12

8

1 4 2

$$\boxed{P(B)=\frac{34}{66}}$$ A $$C_8^2+C_4^2=\frac{8!}{2!(6)!}+\frac{4!}{2!(2)!}=28+6=34$$

2

$$P_A(B)=\frac{P(A\cap B)}{P(A)}$$

$A\cap B$

1 1 2

$$\boxed{P_A(B)=\frac{15}{66}}$$ $$C_4^2+C_4^2+C_3^2=\frac{4!}{2!(2)!}+\frac{4!}{2!(2)!}+\frac{3!}{2!(1)!}=15$$

3 **X** $E(X)$

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X

4 3

5

$X = \{3;4;5\}$ X

x_i X X

$P(X \quad x_i)$

x_i	3	4	5	
$P(X \quad x_i)$	$\frac{10}{66}$	$\frac{35}{66}$	$\frac{21}{66}$	1

$P(X \quad 3) \quad \frac{C_5^2}{C_{12}^2} \quad \frac{10}{66}$

$P(X \quad 4) \quad \frac{C_5^1 \quad C_7^1}{C_{12}^2} \quad \frac{35}{66}$

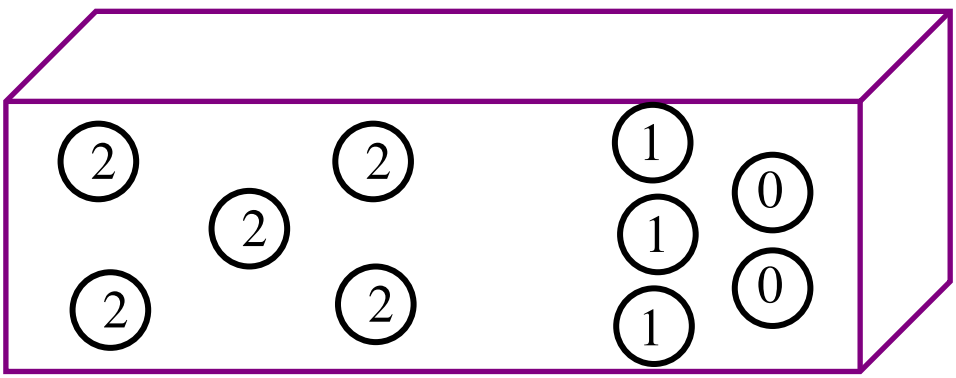
$P(X \quad 5) \quad \frac{C_7^2}{C_{12}^2} \quad \frac{21}{66}$

X

$E(X) \quad \sum_{i \ 0}^{i \ 3} x_i.P_i$

$E(X) \quad \sum_{i \ 0}^{i \ 2} x_i.P_i \quad \frac{3 \quad 10 \quad 4 \quad 35 \quad 5 \quad 21}{66} \quad \frac{275}{66}$

2 2019 47



X 1

X

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8 4 2 1 0

$\boxed{X=\{0;1;2;4;8\}}$ X

x_i X X

$P(X \quad x_i)$

0

0 0 0 0

$P(X \quad 0) \quad \frac{C_2^2 \quad C_8^1 \quad C_2^1 \quad C_8^2}{C_{10}^3} \quad \frac{8 \quad 56}{120} \quad \frac{64}{120}$

1

$P(X \quad 1) \quad \frac{C_3^3}{C_{10}^3} \quad \frac{1}{120} \quad 1$

2

$P(X \quad 2) \quad \frac{C_3^2 \quad C_5^1}{C_{10}^3} \quad \frac{15}{120} \quad 2 \quad 1$

4

$P(X \quad 4) \quad \frac{C_3^1 \quad C_5^2}{C_{10}^3} \quad \frac{30}{120} \quad 1 \quad 2$

8

$P(X \quad 8) \quad \frac{C_5^3}{C_{10}^3} \quad \frac{10}{120} \quad 2$

x_i	0	1	2	4	8	
$P(X \quad x_i)$	$\frac{64}{120}$	$\frac{1}{120}$	$\frac{15}{120}$	$\frac{30}{120}$	$\frac{10}{120}$	1

X

$E(X) \quad \sum_{i \ 0}^{i \ 4} x_i.P_i$

$E(X) \quad \sum_{i \ 0}^{i \ 4} x_i.P_i \quad \frac{0 \quad 64 \quad 1 \quad 1 \quad 2 \quad 15 \quad 4 \quad 30 \quad 8 \quad 10}{120} \quad \frac{231}{120} \quad \frac{77}{40}$

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$\frac{7}{24}$ **2**

5 0 7

C_7^3 $\frac{7!}{3!\ 4\ !}$ 35 2

$\frac{C_7^3}{C_{10}^3}$ $\frac{35}{120}$ $\frac{7}{24}$

3

A_{10}^2 $\frac{10!}{10\quad 2\ !}$ 90

B

C

$P_c(B)$

$$P_c(B)=\frac{P(B\cap C)}{P(C)}$$

$P(B\cap C)$

1 2 1 0 $B\cap C$

$$P(B\cap C)=\frac{(A_2^1\times A_3^1+A_3^1\times A_5^1)2}{A_{10}^2}=\frac{(2\times 3+3\times 5)2}{90}=\frac{42}{90}$$

C

$$P_c(B)=\frac{42}{90}.\frac{90}{84}=\frac{1}{2}\qquad P(C)=\frac{A_7^2+A_3^1\times A_7^1\times 2}{A_{10}^2}=\frac{42+42}{90}=\frac{84}{90}$$

2018 48

B A P(B) P(A) **1**

1،2،2،3 10

3 3 2 3 2 2

C_{10}^3 $\frac{10!}{3!.7!}$ 120

C_4^1 C_3^1 C_3^1 4 3 3 36 A

$$P(A)=\frac{36}{120}=\frac{3}{10}$$ A

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C_4^3 C_5^3 4 10 14 B

$$\boxed{P(B)=\frac{14}{120}=\frac{7}{60}}$$ B

$P(A\cup B)$ $P_A(B)$ $P(A\cap B)=\frac{1}{20}$

$A\cap B$

3 3 3

2 2 2

C_1^1 C_2^1 C_1^1 C_2^1 C_2^1 C_1^1 2 4 6

$$\boxed{P(A\cap B)=\frac{6}{120}=\frac{1}{20}}$$ B

$$P_A(B)=\frac{6}{120}\times\frac{120}{36}=\frac{1}{6} \qquad P_A(B)=\frac{P(A\cap B)}{P(A)}$$

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

$$P(A\cup B)=\frac{36}{120}+\frac{14}{120}-\frac{6}{120}=\frac{36+14-6}{120}=\frac{44}{120}=\frac{11}{30}$$

X **2**

5 5

X

$$\boxed{X=\{0;1;2;3\}}$$ X

x_i X X

$P(X \quad x_i)$

$$P(X \quad 0) \quad \frac{C_5^0 \quad C_5^3}{C_{10}^3} \quad \frac{10}{120}$$

$$P(X \quad 1) \quad \frac{C_5^1 \quad C_5^2}{C_{10}^3} \quad \frac{50}{120}$$

$$P(X \quad 2) \quad \frac{C_5^2 \quad C_5^1}{C_{10}^3} \quad \frac{50}{120}$$

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$$P(X \quad 3) \quad \frac{C_5^0 \quad C_5^3}{C_{10}^3} \quad \frac{10}{120}$$

x_i	0	1	2	3	
$P(X \quad x_i)$	$\frac{10}{120}$	$\frac{50}{120}$	$\frac{50}{120}$	$\frac{10}{120}$	1

X

$$E(X) \quad \sum_{i \ 0}^{i \ 3} x_i.P_i$$

$$E(X) \quad \sum_{i \ 0}^{i \ 3} x_i.P_i \quad \frac{0 \quad 10 \quad 1 \quad 50 \quad 2 \quad 50 \quad 3 \quad 10}{120} \quad \frac{180}{120} \quad \frac{3}{2}$$

نموذج وزاري 2008 49

C B A **1**

A

7 5

$$C_5^1 \quad C_7^2 \quad 5 \quad 21 \quad 105$$

$$P(A) \quad \frac{105}{220} \quad \frac{21}{44} \quad C_{12}^3 \quad 220$$

5 B

7

$$C_5^2 \quad C_7^1 \quad 10 \quad 7 \quad 70$$

$$P(B) \quad \frac{70}{220} \quad \frac{7}{22} \quad C_{12}^3 \quad 220$$

5 3 C

$$C_5^3 \quad 10$$

$$P(C) \quad \frac{10}{220} \quad \frac{1}{22} \quad C_{12}^3 \quad 220$$

X

X

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X 0;10;20;30 X

x_i	0	10	20	30
$P(X \quad x_i)$	$\frac{35}{220}$	$\frac{105}{220}$	$\frac{70}{220}$	$\frac{10}{220}$

$P(X \quad 0) \quad \frac{C_7^3}{C_{12}^3} \quad \frac{35}{220}$

$P(X \quad 10) \quad \frac{C_5^1 \quad C_7^2}{C_{12}^3} \quad \frac{105}{220}$

$P(X \quad 20) \quad \frac{C_5^2 \quad C_7^1}{C_{12}^3} \quad \frac{70}{220}$

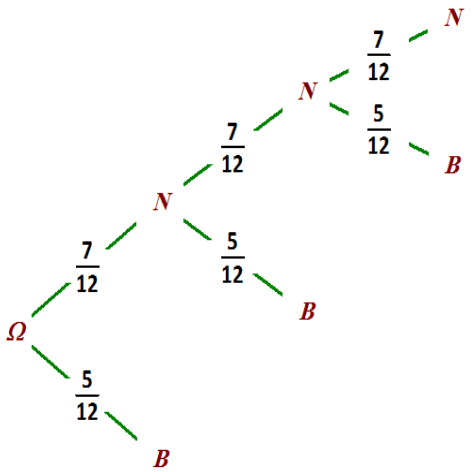
$P(X \quad 30) \quad \frac{C_5^3}{C_{12}^3} \quad \frac{10}{220}$

X

$E(X) \quad \sum_{i \quad 1}^{i \quad 4} x_i.P_i$

$E(X) \quad \sum_{i \quad 1}^{i \quad 4} x_i.P_i \quad \frac{0 \quad 35 \quad 10 \quad 105 \quad 20 \quad 70 \quad 30 \quad 10}{220} \quad \frac{2750}{220} \quad \frac{275}{22} \quad 12,5$

2



G F E D

D

$P(D) = \frac{5}{12}$

E

$P(E) = \frac{7}{12} \times \frac{5}{12} = \frac{35}{144}$

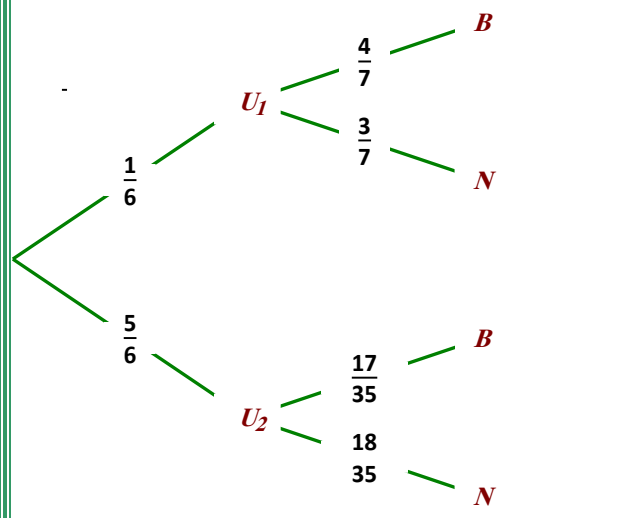
F

$P(F) = \frac{7}{12} \times \frac{7}{12} \times \frac{5}{12} = \frac{245}{1728}$

$P(G) = \frac{7}{12} \times \frac{7}{12} \times \frac{7}{12}$ G

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0,5



1

$$P(\mathrm{B}) = \frac{1}{6}\times\frac{4}{7}+\frac{5}{6}\times\frac{17}{35} = \frac{4}{42}+\frac{17}{42} = 0.5$$

2

U_1

$$P_{\mathrm{B}}(\mathrm{U}_1) = \frac{P(\mathrm{B}\cap \mathrm{U}_1)}{P(\mathrm{B})} = \frac{\frac{1}{6}\times\frac{4}{7}}{\frac{1}{2}} = \frac{2}{21}\times\frac{2}{1} = \frac{4}{21}$$

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1 2019 51

1 3 2 1

2

X

1

$X=\{0;1;2\}$ 2 1 0 2

2

x_i X X

$P(X \quad x_i)$

x_i	0	1	2	
$P(X \quad x_i)$	$\frac{1}{10}$	$\frac{6}{10}$	$\frac{3}{10}$	1

$P(X \quad 0) \quad \frac{C_3^3}{C_5^3} \quad \frac{1}{10}$

$P(X \quad 1) \quad \frac{C_2^1 \quad C_3^2}{C_5^3} \quad \frac{6}{10}$

$P(X \quad 2) \quad \frac{C_2^2.C_3^1}{C_5^3} \quad \frac{3}{10}$

X

$E(X) \quad \sum_{i \ 0}^{i \ 2} x_i.P_i$

$E(X) \quad \sum_{i \ 0}^{i \ 2} x_i.P_i \quad \frac{0 \quad 1 \quad 1 \quad 6 \quad 2 \quad 3}{10} \quad \frac{12}{10} \quad \frac{6}{5}$

1 **3**

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1 B A

$P(A \cap B)$ 1

$$P(A \cap B) = \frac{C_1^1 . C_4^2}{C_5^3} = \frac{6}{10} = \frac{3}{5}$$ 1

4

1 13

C

1 13

1 13 14 $1^2 + 2^2 + 3^2 = 14$

$$C_2^1 \times C_2^1 \times C_1^1 = 4$$

$$P(C) = \frac{C_2^1 \times C_2^1 \times C_1^1}{C_5^3} = \frac{4}{10} = \frac{2}{5}$$

2 2019 52

1

$$C_9^3 = \frac{9!}{3!.6!} = 84$$

A

$C_4^1 \times C_5^2 = 4 \times 10 = 40$ A

$$P(A) = \frac{40}{84} = \frac{10}{21}$$ A

B

$C_4^2 \times C_5^1 + C_4^1 \times C_5^2 + C_5^3 = 30 + 40 + 10 = 80$ B

$$P(B) = \frac{80}{84} = \frac{20}{21}$$ B

C

$C_4^3 = 4$ C 4 4 1

$$P(C) = \frac{4}{84} = \frac{1}{21}$$ C

X **2**

X

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$X = \{0;1;2;3\}$

x_i X X

$P(X \quad x_i)$

$P(X \quad 0) \quad \frac{C_5^0 \quad C_4^3}{84} \quad \frac{4}{84}$

$P(X \quad 1) \quad \frac{C_5^1 \quad C_4^2}{84} \quad \frac{30}{84}$

$P(X \quad 2) \quad \frac{C_5^2 \quad C_4^1}{84} \quad \frac{40}{84}$

$P(X \quad 3) \quad \frac{C_4^0 \quad C_5^3}{84} \quad \frac{10}{84}$

x_i	0	1	2	3	
$P(X \quad x_i)$	$\frac{4}{84}$	$\frac{30}{84}$	$\frac{40}{84}$	$\frac{10}{84}$	1

$P(X^2 - X \leq 0)$

$P(X=0)+P(X=1) \quad P(0 \leq X \leq 1) \quad P(X^2 - X) \leq 0$

$$P(X^2 - X) \leq 0 = P(X=0)+P(X=1) = \frac{10+30}{84} = \frac{40}{84} = \frac{10}{21}$$

2018 53

A **I**

$C_7^2 = 21$ 7

$C_4^1 \times C_3^1 = 12$

$$P(A) = \frac{12}{21} = \frac{4}{7} \quad A$$

B

$C_4^2 + C_3^2 = 6+3 = 9$

$$P(B) = \frac{9}{21} = \frac{3}{7} \quad A$$

$\{ 100-\alpha; 50-\alpha; -\alpha \}$ **1 III**

$X = 100-\alpha$ 100DA α(DA)

$X = -\alpha$ α(DA)

$X = 50-\alpha$ 50DA α(DA)

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$$E(x) = -\alpha + \frac{300}{7}$$

X

$$P(X \quad 100 \quad) \quad \frac{C_3^2}{21} \quad \frac{3}{21} \quad \frac{1}{7}$$

$$P(X \quad) \quad \frac{C_4^2}{21} \quad \frac{6}{21} \quad \frac{2}{7}$$

$$P(X \quad 50 \quad) \quad \frac{C_3^1 \quad C_4^1}{21} \quad \frac{12}{21} \quad \frac{4}{7}$$

x_i	$100-\alpha$	$-\alpha$	$50-\alpha$	
$P(X \quad x_i)$	$\frac{1}{7}$	$\frac{2}{7}$	$\frac{4}{7}$	1

$$E(X) \quad \sum_{i \ 0}^{i \ 3} x_i.P_i$$

$$E(X) \quad \sum_{i \ 0}^{i \ 3} x_i.P_i \quad \frac{(100 \quad) \ 1 \ (\quad) \ 2 \ (50 \quad) \ 4}{7} \quad \frac{300}{7}$$

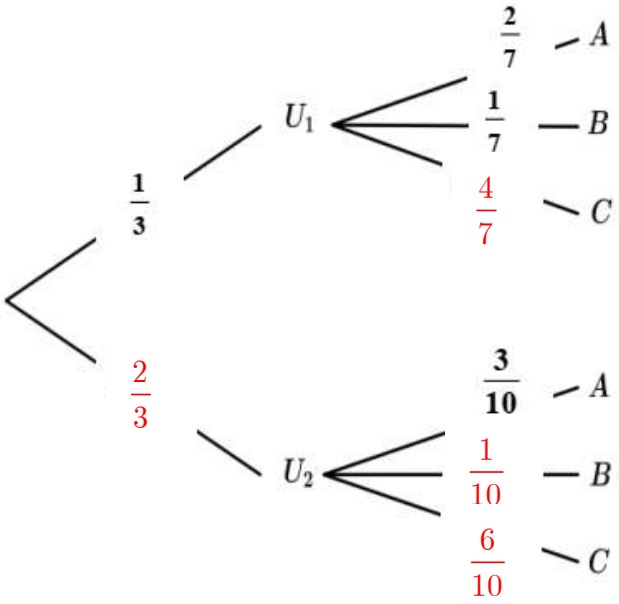
α

$42,85 \quad \frac{300}{7} \quad \frac{300}{7} \quad 0 \quad E(X) \quad 0$

42

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1



$P_{U_2}(B)$ $P_{U_2}(C)$ $P_{U_1}(C)$ $P(U_2)$

$P_{U_1}(C)$ 1 $P_{U_1}(A)$ $P_{U_1}(B)$ 1 $\frac{3}{7}$ $\frac{4}{7}$

$P(U_2)$ 1 $P(U_1)$ $\frac{2}{3}$

$P_{U_2}(B)$ $\frac{C_2^2}{C_5^2}$ $\frac{1}{10}$ $P_{U_2}(C)$ $\frac{C_3^1 \quad C_2^1}{C_5^2}$ $\frac{6}{10}$

C B A 2

$P(A)$ $P(U_1 \quad A)$ $P(U_2 \quad A)$ $P(U_1).P_{U_1}(A)$ $P(U_2).P_{U_2}(A)$

$P(A)$ $\frac{1}{3}.\frac{2}{7}$ $\frac{2}{3}.\frac{3}{10}$ $\frac{2}{21}$ $\frac{1}{5}$ $\frac{31}{105}$

$P(B)$ $P(U_1 \quad B)$ $P(U_2 \quad B)$ $P(U_1).P_{U_1}(B)$ $P(U_2).P_{U_2}(B)$

$P(B)$ $\frac{1}{3}.\frac{1}{7}$ $\frac{2}{3}.\frac{1}{10}$ $\frac{1}{21}$ $\frac{1}{15}$ $\frac{12}{105}$

$P(C)$ $P(U_1 \quad C)$ $P(U_2 \quad C)$ $P(U_1).P_{U_1}(C)$ $P(U_2).P_{U_2}(C)$

$P(C)$ $\frac{1}{3}.\frac{4}{7}$ $\frac{2}{3}.\frac{6}{10}$ $\frac{4}{21}$ $\frac{2}{5}$ $\frac{62}{105}$

X 3

X

X $0;1;2$ X

X

5 7

$U_2 = \{3R + 2N\}$ $U_1 = \{4R + 3N\}$

$P(X \quad 0)$ $P(B)$ $\frac{12}{105}$

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$P(X \quad 2) \quad P(A) \quad \frac{31}{105}$

$P(X \quad 1) \quad P(C) \quad \frac{62}{105}$

x_i	0	1	2	
$P(x_i)$	$\frac{12}{105}$	$\frac{62}{105}$	$\frac{31}{105}$	1

4 $E(X)$

$$E(X) \quad \sum_{i \ 1}^{i \ 4} x_i.P_i$$

$$E(X) \quad \sum_{i \ 0}^{i \ 2} x_i.P_i \quad \frac{0 \quad 12 \quad 1 \quad 62 \quad 2 \quad 31}{105} \quad \frac{124}{105}$$

2018 56

1

A

$U = \{5R + 3V + 1B\}$ 9

$C_9^4 = 126$ 9 4

$P(A) \quad \frac{5}{126}$ $C_5^4 = 5$ A

B

$C_1^1 \times C_8^3 + C_1^0 \times C_8^4 = C_9^4 = 126$ B

$P(B) \quad \frac{126}{126} \quad 1$

C

3 2 4 1

1 3

$0 = -1 - 3 + 2 + 2 \quad 0 = -3 + 3 - 1 + 1$

$C_1^1 \times C_1^1 \times C_4^2 + C_1^1 \times C_1^1 \times C_1^1 \times C_2^1 = 8$ C

$P(C) \quad \frac{8}{126} \quad \frac{4}{63}$

X **2**

X

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X 0;1;2;3 X

x_i X X

P(X x_i)

x_i	0	1	2	3
P(X x_i)	$\frac{6}{126}$	$\frac{45}{126}$	$\frac{60}{126}$	$\frac{15}{126}$

3 P(X 0) $\frac{C_3^3 \quad C_6^1}{126}$ $\frac{6}{126}$

P(X 1) $\frac{C_3^2 \quad C_6^2}{126}$ $\frac{45}{126}$

P(X 2) $\frac{C_3^1 \quad C_6^3}{126}$ $\frac{60}{126}$

P(X 3) $\frac{C_3^0 \quad C_6^4}{126}$ $\frac{15}{126}$

X E(X)

$$E(X) \quad \sum_{i\ 0}^{i\ 3} x_i.P_i$$

$$E(X) \quad \sum_{i\ 0}^{i\ 3} x_i.P_i \quad \frac{0 \quad 6 \quad 1 \quad 45 \quad 2 \quad 60 \quad 3 \quad 15}{126} \quad \frac{210}{126} \quad \frac{5}{3}$$

$X^2 - X > 0$

$X \in \{2;3\}$ $X > 1$ $X < 0$ $X(X-1) > 0$ $X^2 - X > 0$

P(X 2) P(X 3) $\frac{60 \quad 15}{126}$ $\frac{75}{126}$ $\frac{25}{42}$ $X^2 - X > 0$

2009 57

3 **1**

$U = \{6R + 4B\}$ 6 4 10

$C_{10}^3 = 120$ 10 3

$C_4^3 = 4$ 3 A

P(A) $\frac{4}{120}$ $\frac{1}{30}$

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A B

$P(B) \quad 1 \quad P(A) \quad 1 \quad \frac{1}{30} \quad \frac{29}{30}$ B

E(X) **X** **2**

X

3

3 2 1 0 X

x_i X X

x_i	0	1	2	3
$P(X \quad x_i)$	$\frac{30}{120}$	$\frac{60}{120}$	$\frac{36}{120}$	$\frac{4}{120}$

$P(x_i)$

$P(X \quad 0) \quad \frac{C_6^3}{C_{10}^3} \quad \frac{30}{120}$

$P(X \quad 1) \quad \frac{C_4^1 \quad C_6^2}{C_{10}^3} \quad \frac{60}{120}$

$P(X \quad 2) \quad \frac{C_4^2 \quad C_6^1}{C_{10}^3} \quad \frac{36}{120}$

$P(X \quad 3) \quad \frac{C_4^3}{C_{10}^3} \quad \frac{4}{120}$

X

$E(X) \quad \sum_{i \ 0}^{i \ 3} x_i.P_i \quad \frac{0 \quad 30 \quad 1 \quad 60 \quad 2 \quad 36 \quad 3 \quad 4}{120} \quad \frac{144}{120} \quad 1,2$

نموذج وزاري **2008** **58**

A B **B** **A** **1**

A

$P(A) \quad \frac{C_3^2 \quad C_4^2 \quad C_5^2}{C_{12}^2} \quad \frac{3 \quad 6 \quad 10}{66} \quad \frac{19}{66}$

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B

$$P(B) \quad \frac{C_5^1 \quad C_7^1 \quad C_5^2}{C_{12}^2} \quad \frac{35 \quad 10}{66} \quad \frac{45}{66}$$

A B

$$P(A \quad B) \quad \frac{C_5^2}{C_{12}^2} \quad \frac{10}{66}$$

B A

P(A B) P(A) P(B) B A

$$P(A \quad B) \quad \frac{10}{66} \ldots\ldots(1)$$

$$P(A) \quad P(B) \quad \frac{19}{66} \quad \frac{15}{66} \quad \frac{19.5}{66.22} \quad \frac{95}{1452} \ldots(2)$$

B A 2 1

X **2**

X

X $2;3;4;5$ X

x_i X X

$P(X \quad x_i)$

x_i	2	3	4	5
$P(X \quad x_i)$	$\frac{10}{66}$	$\frac{30}{66}$	$\frac{20}{66}$	$\frac{6}{66}$

1 2

$$P(X \quad 2) \quad \frac{C_5^2}{C_{12}^2} \quad \frac{10}{66}$$ 1 5

5 1 3

$$P(X \quad 3) \quad \frac{C_5^1 \quad C_6^1}{C_{12}^2} \quad \frac{30}{66}$$ 6 2

5 1 4

2 6 2 3

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$$P(X \quad 4) \quad \frac{C_1^1 \quad C_5^1 \quad C_6^2}{C_{12}^2} \quad \frac{5 \quad 15}{66} \quad \frac{20}{66}$$

6 2 5

$$P(X \quad 5) \quad \frac{C_1^1 \quad C_6^1}{C_{12}^2} \quad \frac{6}{66} \quad 3$$

X

$$E(X) \quad \sum_{i \ 1}^{i \ 4} x_i.P_i$$

$$E(X) \quad \sum_{i \ 1}^{i \ 4} x_i.P_i \quad \frac{2 \quad 10 \quad 3 \quad 30 \quad 4 \quad 20 \quad 5 \quad 6}{66} \quad \frac{220}{66} \quad \frac{10}{3}$$

$\sigma(X)$ Var(X)

$$Var(X) \quad \sum_{i \ 0}^{i \ n} (x_i \quad E(X))^2.P_i$$

$$Var(X) \quad \frac{(2 \quad \frac{10}{3})^2 \quad 10 \quad (3 \quad \frac{10}{3})^2 \quad 30 \quad (4 \quad \frac{10}{3})^2 \quad 20 \quad (5 \quad \frac{10}{3})^2 \quad 6}{66} \quad \frac{420}{66.9} \quad \frac{70}{99} \quad 0,70$$

$$(X) \quad \sqrt{Var(X)}$$

$$(X) \quad \sqrt{Var(X)} \quad \sqrt{\frac{70}{99}} \quad \sqrt{0.70} \quad 0.83$$

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1

C_{10}^{3} 120

A

P(A) $\frac{6}{120}$ $\frac{1}{12}$ C_{3}^{3} C_{3}^{3} C_{4}^{3} 1 1 4 6

B

P(B) $\frac{36}{120}$ $\frac{3}{10}$ C_{3}^{1} C_{3}^{1} C_{4}^{1} 3 3 4 36

C

P(C) $\frac{100}{120}$ $\frac{5}{6}$ C_{4}^{1} C_{6}^{2} C_{4}^{2} C_{6}^{1} C_{4}^{3} 100

2

X

3 2 1 0 X

x_i	0	1	2	3
P_i	$\frac{30}{120}$	$\frac{60}{120}$	$\frac{36}{120}$	$\frac{4}{120}$

P(X 0) $\frac{C_{6}^{3}}{C_{10}^{3}}$ $\frac{30}{120}$

P(X 1) $\frac{C_{4}^{1} \quad C_{6}^{2}}{C_{10}^{3}}$ $\frac{60}{120}$

P(X 2) $\frac{C_{4}^{2} \quad C_{6}^{1}}{C_{10}^{3}}$ $\frac{36}{120}$

P(X 3) $\frac{C_{4}^{3}}{C_{10}^{3}}$ $\frac{4}{120}$

X

E(X) $\sum_{i\ 0}^{i\ 3} x_i.P_i$ $\frac{0 \quad 30 \quad 1 \quad 60 \quad 2 \quad 36 \quad 3 \quad 4}{120}$ $\frac{144}{120}$ 1,2

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6 1

6 A

C_7^2 21

$1,5,5,2,2,3,3$

5 5 10 5 3 8 5 2 7 6

C_2^2 C_2^1 C_2^1 C_2^1 C_2^1 9

P(A) $\frac{9}{21}$ $\frac{3}{7}$ A

6 2

B

P(B) $\frac{C_3^2}{21}$ P(A B) $\frac{C_2^2}{21}$ $P_B(A)$ $\frac{P(A \quad B)}{P(B)}$ $\frac{C_2^2}{C_3^2}$ $\frac{1}{3}$

X 3

10 8 7 6 5 4 3 X

X

P(X 3) $\frac{C_2^1 \quad C_1^1}{C_7^2}$ $\frac{2}{21}$ 3

P(X 4) $\frac{C_2^1 \quad C_1^1 \quad C_2^2}{C_7^2}$ $\frac{3}{21}$ 4

P(X 5) $\frac{C_2^1 \quad C_2^1}{C_7^2}$ $\frac{4}{21}$ 5

P(X 6) $\frac{C_2^1 \quad C_1^1 \quad C_2^2}{C_7^2}$ $\frac{3}{21}$ 6

P(X 7) $\frac{C_2^1 \quad C_2^1}{C_7^2}$ $\frac{4}{21}$ 7

P(X 8) $\frac{C_2^1 \quad C_2^1}{C_7^2}$ $\frac{4}{21}$ 8

P(X 10) $\frac{C_2^2}{C_7^2}$ $\frac{1}{21}$ 10

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x_i	3	4	5	6	7	8	10
$P(X \quad x_i)$	$\frac{2}{21}$	$\frac{3}{21}$	$\frac{4}{21}$	$\frac{3}{21}$	$\frac{4}{21}$	$\frac{4}{21}$	$\frac{1}{21}$

X

$$E(X) \quad \sum_{i\ 0}^{i\ 3} x_i.P_i \quad \frac{3\ 2\ 4\ 3\ 5\ 4\ 6\ 3\ 7\ 4\ 8\ 4\ 10\ 1}{21} \quad 6$$

1996 61

$C_6^1 \quad C_6^1 \quad 36$

A

$P(A) \quad \frac{8}{36} \quad \frac{2}{9}$ A $C_2^1 \quad C_4^1 \quad 8$

B

$P(B) \quad \frac{8}{36} \quad \frac{2}{9}$ A $C_2^1 \quad C_4^1 \quad 8$

A

$P(A) \quad \frac{8}{36} \quad \frac{2}{9}$

B

$P(B) \quad \frac{8}{36} \quad \frac{2}{9}$

	1	2	2	3	3	3
1	(1;1)	(1;2)	(1;2)	(1;3)	(1;3)	(1;3)
2	(2;1)	(2;2)	(2;2)	(2;3)	(2;3)	(2;3)
2	(2;1)	(2;2)	(2;2)	(2;3)	(2;3)	(2;3)
3	(3;1)	(3;2)	(3;2)	(3;3)	(3;3)	(3;3)
4	(4;1)	(4;2)	(4;2)	(4;3)	(4;3)	(4;3)
4	(4;1)	(4;2)	(4;2)	(4;3)	(4;3)	(4;3)

1997 62

1

$C_{10}^3 \quad 120$

3 **2**

$A = \{2;4;6;8;10\}$ 3 A

$P(A) \quad \frac{10}{120} \quad \frac{1}{12}$ A $C_5^3 \quad 10$

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3 3

$B=\{2;3;5;7\}$ 3 B

P(B) $\frac{4}{120}$ $\frac{1}{30}$ B C_4^3 4

3 4

$C=\{1;4;6;8;9;10\}$ 3 C

P(C) $\frac{20}{120}$ $\frac{1}{6}$ C C_6^3 20

5

$P(\overline{C})$ 1 P(C) 1 $\frac{1}{6}$ $\frac{5}{6}$

1996 63

1

C_{14}^5 2002

A

P(A) $\frac{144}{2002}$ C_4^1 C_3^1 C_3^1 C_2^1 C_2^1 144 A

2

B

P(B) $\frac{252}{2002}$ C_{10}^5 252 B

3

$P(\overline{B})$ 1 P(B) 1 $\frac{252}{2002}$ $\frac{1750}{2002}$ B

4

C

C

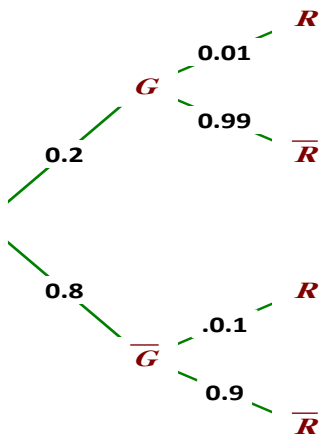
P(B) $\frac{910}{2002}$ C_4^2 C_{10}^3 C_4^3 C_{10}^2 C_4^4 C_{10}^1 910

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N-Calédonie/علوم.ش/2019 فرنسا) 64

1

2



$$P(R \cap G) = 0.2 \times 0.01 = 0.002$$

$$p(R) = 0,082$$

$$P(R) = P(R \cap G) + P(R \cap \overline{G}) = 0.002 + 0.8 \times 0.1 = 0.082$$

$$P_R(G) = \frac{P(R \cap G)}{P(R)} = \frac{0.002}{0.82} = 0.024$$

X 3

X 0;100;500 X

P(X 500) P(X 100) P(X 0)

$$P(X = 0) = P(G) = 0.2$$

$$P(X = 100) = P(\overline{R} \cap \overline{G}) = 0.8 \times 0.9 = 0.72$$

$$P(X = 500) = P(R \cap \overline{G}) = 0.8 \times 0.1 = 0.08$$

x_i X X

x_i	0	100	500	
P(X x_i)	$\frac{20}{100}$	$\frac{72}{100}$	$\frac{8}{100}$	1

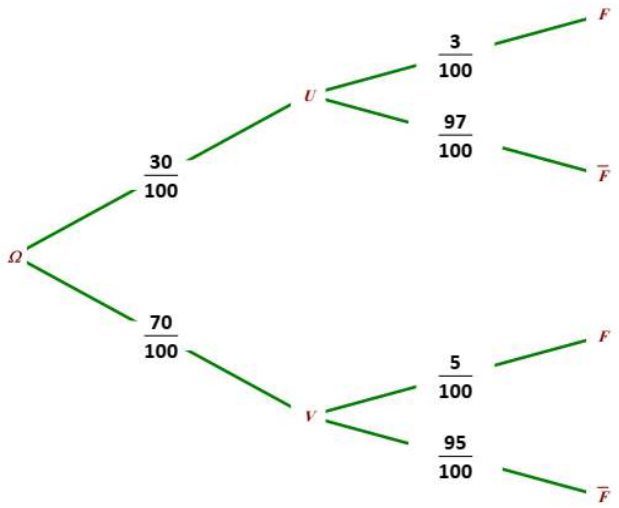
$$E(X) = 0 \times 0.2 + 100 \times 0.72 + 500 \times 0.08 = 112$$

$$Pr = 112 \times 250 = 28000$$

28000 25000

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للإجابة على الأسئلة يمكن تشكيل الشجرة التالية



1) حساب احتمال أن تكون العُلبة تحتوي على سكّر رقيق.

احتمال أن تكون العُلبة تحتوي على سكّر رقيق هو $P(F)$ حيث:

$$P(F) = P(F \cap U) + P(F \cap V) = P(U) \times P_U(F) + P(V) \times P_V(F)$$

بالإعتماد على الشجرة السابقة نجد: $P(F) = 0,009 + 0,035 = 0,044$

2)حساب احتمال أن يكون السكّر آتياً من المصنع U علما انه رقيق

احتمال أن يكون سكّرآتياً من المصنع U علما انه رقيق احتمال شرطي $P_U(F)$

نعلم أن $P_F(U) = \dfrac{P(F \cap U)}{P(F)} = \dfrac{0,009}{0,044} = 0,205$

3) حساب النسبة المئويّة من السّكّر الآتي من كلٍّ من المصنعيْن U و V

ترغب المؤسّسة أن يكون 30% من السّكّر الرّقيق، آتياً من المصنع U (أي $P_F(U) = 0,3$)

نعلم أن $P_F(U) = \dfrac{P(F \cap U)}{P(F)} = \dfrac{P(U) \times P_U(F)}{P(U) \times P_U(F) + P(V) \times P_V(F)} = 0,3$

ومنه: $\dfrac{P(U) \times 0,03}{P(U) \times 0,03 + P(V) \times 0,05} = 0,3$ أي $P(U) \times 0,03 = P(U) \times 0,009 + P(V) \times 0,015$

بعد التبسيط نجد: $7P(U) = 5P(V)$ ونعلم أن $P(U) + P(V) = 1$ أي $P(V) = 1 - P(U)$

ومنه: $7P(U) = 5P(V) = 5 - 5P(U)$ وعليه: $P(U) = \dfrac{5}{12} = 0,42$ و $P(V) = \dfrac{7}{12} = 0,58$

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2015 66

$P(B)=\frac{1}{7}$ $P(A)=\frac{12}{35}$ **I**

C_7^3 35

A

3 4

P(A) $\frac{12}{35}$ A C_4^1 C_3^2 12

3 B

P(B) $\frac{5}{35}$ $\frac{1}{7}$ B C_4^3 C_3^3 5

$P(C)=\frac{6}{35}$ **II**

U_2 U_1

C_7^2 C_5^1 21 5 105

P(C) $\frac{18}{105}$ $\frac{6}{35}$ C C_4^2 C_3^1 6 3 18

2003 67

B A **1**

8

C_8^2 28

A

C_6^2 C_2^2 15 1 16

P(A) $\frac{16}{28}$ $\frac{4}{7}$ A

B

0 2 1 0

4 0 4 0

P(B) $\frac{22}{28}$ $\frac{11}{14}$ B C_4^1 C_4^1 C_4^2 4 4 6 22

X **2**

X

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3 2 1 0 X

x_i X X

P_i

x_i	0	1	2	3
P(X x_i)	$\frac{6}{28}$	$\frac{12}{28}$	$\frac{7}{28}$	$\frac{3}{28}$

0 0

P(X 0) $\frac{C_4^2}{C_8^2}$ $\frac{6}{28}$

0 1

P(X 1) $\frac{C_4^1 \quad C_3^1}{C_8^2}$ $\frac{12}{28}$ 1 3 1

2 3 2

0 4 0 2

P(X 2) $\frac{C_3^2 \quad C_4^1 \quad C_1^1}{C_8^2}$ $\frac{7}{28}$

P(X 3) $\frac{C_3^1 \quad C_1^1}{C_8^2}$ $\frac{3}{28}$ 5

2003 68

2 1 1 0 1 2 6

A

$C_6^3 = 20$

1 A

1 1

1 1 1

$C_2^1 \times C_4^2 + C_2^2 \times C_4^1 = 2.6 + 1.4 = 16$

P(A) $\frac{16}{20}$ $\frac{4}{5}$ A

A $\overline{A}$ P(A) 1 P($\overline{A}$) $\frac{4}{5}$ 2

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1 $\overline{A}$

$P(\overline{A})$ $\frac{4}{20}$ $\frac{1}{5}$ $C_4^3 = 4$

$\frac{1}{5}$ **S**

S

1 1 2 2 0 2 1 0 1

$C_1^1 \times C_2^1 \times C_1^1 + C_1^1 \times C_1^1 \times C_1^1 + C_2^2 = 4$

$P(S) = \frac{4}{20} = \frac{1}{5}$ S

2004 69

1

9

2 1 1 1

2 2 1 1

9 $C_9^3 = 84$

A

$P(A)$ $\frac{24}{84}$ $\frac{2}{7}$ A C_2^1 C_3^1 C_4^1 2 3 4 24

B

3 2 5 1

$P(B)$ $\frac{21}{84}$ $\frac{1}{4}$ B C_6^3 C_3^3 20 1 21

C

C $\overline{A}$ $P(C)$ 1 $P(\overline{C})$ $\frac{16}{21}$

$\overline{C}$

$P(\overline{C})$ $\frac{20}{84}$ $\frac{5}{21}$ $C_6^3 = 20$

$A \cap B$ **2**

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$A \cap B$

1

$P(A \cap B) = \frac{8}{84} = \frac{2}{21}$ $A \cap B$ $C_2^1 \quad C_2^1 \quad C_2^1 \quad 2 \quad 2 \quad 2 \quad 8$

2006 70

X **1**

$P(P2) = \frac{3}{5}$ 2 U_1 $P2$

$P(P3) = \frac{2}{5}$ 3 U_1 $P3$

$P(0R) = \frac{C_2^0 \times C_3^2}{C_5^2} = \frac{3}{10}$ 0 $0R$

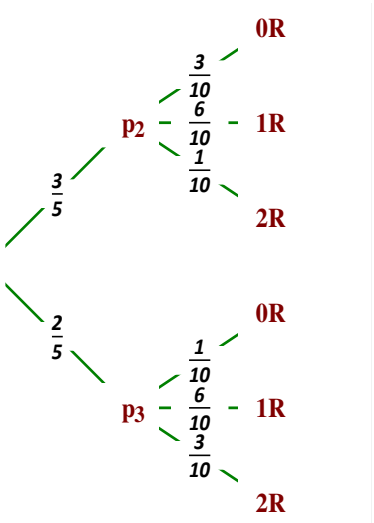
$P(0R) = \frac{C_2^0 \times C_3^3}{C_5^2} = \frac{1}{10}$ $n = 3$ 3

1 $1R$

$P(1R) = \frac{C_2^1 \times C_3^1}{C_5^2} = \frac{2 \times 3}{10} = \frac{6}{10}$ $n = 2$

$P(1R) = \frac{C_2^1 \times C_3^2}{C_5^2} = \frac{2 \times 3}{10} = \frac{6}{10}$ $n = 3$

2 $2R$



$P(2R) = \frac{C_2^2 \times C_3^0}{C_5^2} = \frac{1}{10}$ $n = 2$

$n = 3$

$P(2R) = \frac{C_2^2 \times C_3^1}{C_5^2} = \frac{1 \times 3}{10} = \frac{3}{10}$

$P(0R) = \frac{3}{5} \times \frac{3}{10} + \frac{2}{5} \times \frac{1}{10} = \frac{11}{50}$ 0

$P(1R) = \frac{3}{5} \times \frac{6}{10} + \frac{2}{5} \times \frac{6}{10} = \frac{30}{50}$ 1

$P(1R) = \frac{3}{5} \times \frac{1}{10} + \frac{2}{5} \times \frac{3}{10} = \frac{9}{50}$ 2

x_i	0	1	2
P_i	$\frac{11}{50}$	$\frac{30}{50}$	$\frac{9}{50}$

X **2**

$E(X) = 0 \times \frac{11}{50} + 1 \times \frac{30}{50} + 2 \times \frac{9}{50} = \frac{48}{50}$

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2007 71

P(B) P(A) **1**

0 $\overline{A}$ 0 A

$$P(A)=1-P(\overline{A})=1-\frac{C_3^3}{C_7^3}=1-\frac{1}{35}=\frac{34}{35}$$ P(A)

3 B

$$P(B)=\frac{C_3^1\times C_3^1\times C_1^1}{C_7^3}=\frac{3\times 3}{35}=\frac{9}{35}$$ P(B)

$P(C)=\frac{2}{7}$ **2**

C

1 1 0 0 3

C_3^3 C_1^1 C_3^1 C_3^1 1 1 3 3 10 C

$$P(C)=\frac{C_3^3+C_3^1\times C_3^1\times C_1^1}{C_7^3}=\frac{10}{35}=\frac{2}{7}$$ P(C)

2007 72

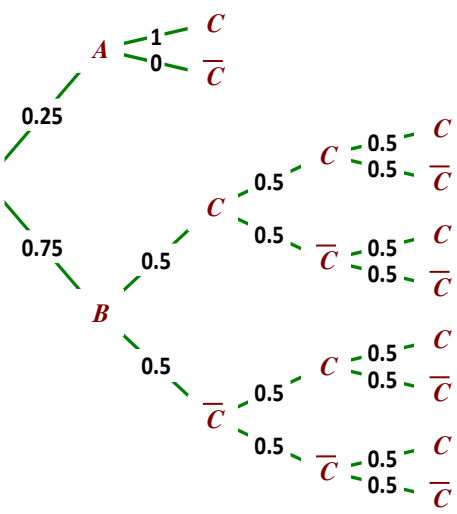
B A **1**

$P(B)=\frac{3}{4}$ ، $P(A)=\frac{1}{4}$

$P(C/B)=\frac{1}{8}$ $P(C/A)=1$ **2**

$\overline{C}$ C

P(C)



$$P(C)=P(C\cap A)+P(C\cap B)=P(C/A)\times P(A)+P(C/B)\times P(B)=1\times 0.25+0.125\times 0.75=0.34375$$

X **3**

x_i	0	1	2	3
P_i	0.125	3×0.125	3×0.125	0.125

X

$$E(x)=0\times 0.125+1\times 3\times 0.125+2\times 3\times 0.125+3\times 0.125=1.5$$

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