

第3回 答え

Ⅱ。 $U = \{k \mid 1 \leq k \leq 100 \text{ となるすべての整数 } k\}$,

U の部分集合のうち、6で割り切れる整数全体の集合を A ,

4で割り切れる整数全体の集合を B

とする。

$$(1) \quad n(A) = 16$$

$$\therefore n(\bar{A}) = 100 - 16 = 84 //$$

$$100 = 60 + 36 + 4$$

$$= 6 \times 16 + 4$$

$$(2) \quad n(A \cap B) = 8$$

$$n(A \cup B) = 16 + 25 - 8$$

$$= 33 //$$

$$100 = 120 - 20$$

$$= 12 \times (10 - 1) - 8$$

$$= 12 \times 8 + 4$$

Ⅲ。 $U = \{k \mid 1 \leq k \leq 1000 \text{ となるすべての整数 } k\}$,

U の部分集合のうち、整数 l で割り切れる整数全体の集合を S_l とする。

$$(1) \quad n(S_3) = 333 //$$

$$1000 = 999 + 1$$

$$= 3 \times 333 + 1$$

$$(2) \quad n(S_5) = 200 //$$

$$20 \quad (3) \quad n(S_3 \cap S_5) = 66 //$$

$$1000 = 900 + 90 + 10$$

$$(4) \quad n(S_3 \cup S_5) = 333 + 200 - 66$$

$$= 15 \times (60 + 6) + 10$$

$$= 467 //$$

$$533$$

$$(5) \quad n(\bar{S}_3) = 1000 - 333$$

$$= 667 //$$

$$(6) \quad n(\bar{S}_3 \cap \bar{S}_5)$$

$$= n(\overline{S_3 \cup S_5})$$

$$= 1000 - 467$$

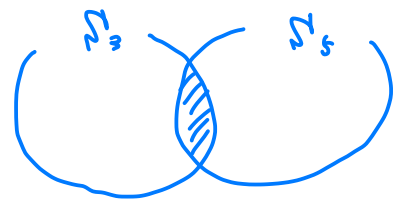
$$= 533 //$$

$$(7) \quad n(S_3 \cap \bar{S}_5)$$

$$= n(S_3) - n(S_3 \cap S_5)$$

$$= 333 - 66$$

$$= 267 //$$



$$267 + 66$$

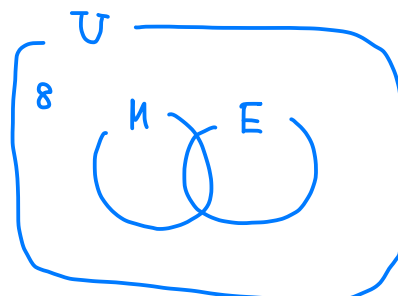
$$= 333$$

30. 試験を受けた60人のうち、

数学を合格した人

と英語も "

の和は80, よって (1) 28人 //



$$60 - 8 = 52$$

$$80 - 52 = 28$$

3. (2) $30 - 28 = 2$ (人) //

4. (i) 0 が 1 つ 含まれる (d, o, t)

$$3! = 6$$

(ii) 0 が 2 つ 含まれる (d, o, o, t, o, o)

$$3 \times 2 = 6$$

$\therefore 12$ 通り //

5.

	1	2	3	4	5	6
1					x	
2				x		o
3			x		o	
4		x		o		o
5	x		o		o	o
6		o	o	o	o	x

(1) 8 通り

(2) 6 通り

(3) 10 通り

6. $8 \times 4 = 32$ (通り) //

7. $2 \times 3 \times 4 = 24$ (項) //

8. (1) $7 \times 6 \times 5 = 210$ //

(2) 5040 //

(3) 1 //

$$\begin{array}{r} 720 \\ \times 7 \\ \hline 140 \\ 49 \\ \hline 5040 \end{array}$$

$$8a \quad (4) \quad 5040 //$$

$$(5) \quad n(n-1) //$$

$$9a \quad (1) \quad 5P_3 = 5 \times 4 \times 3 = 60 //$$

$$(2) \quad 7P_5 = 7 \times 6 \times 5 \times 4 \times 3 = 2520 //$$

$$(3) \quad 5! = 120 //$$

$$10a \quad (1) \quad 8P_3 = 8 \times 7 \times 6 = 336 //$$

$$(2) \quad 336 //$$

$$11a \quad (1) \quad 7! = 5040 \text{ (通)} //$$

$$(2) \quad 5! = 120 \text{ (通)} //$$

$$12a \quad 3^5 = 243 \text{ (通)} //$$

$$13a \quad 2^6 = 64 \text{ (コ)} //$$

$$14a \quad (1) \quad \frac{4 \cdot 3}{2 \cdot 1} = 6 //$$

$$(2) \quad 1 //$$

$$(3) \quad 1 //$$

$$(4) \quad {}_9C_7 = {}_9C_2 = \frac{{}_9C_2^4}{2 \cdot 1} = 36 //$$

$$115. \quad {}_7C_3 = \frac{7 \cdot 6 \cdot 5}{3 \cdot 2 \cdot 1} = 35 \text{ (通り)} //$$

$$116. \quad {}_{10}C_4 = \frac{10 \cdot \overset{3}{\cancel{9}} \cdot \overset{1}{\cancel{8}} \cdot 7}{\cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot 1} = 210 \text{ (通り)} //$$

$$117. \quad {}_{10}C_3 = \frac{10 \cdot \overset{3}{\cancel{9}} \cdot \cancel{8} \cdot 4}{\cancel{3} \cdot \cancel{2} \cdot 1} = 120 \text{ (通り)} //$$

$$118. \quad (1) \quad {}_{10}C_3 = 120 \text{ (コ)} //$$

$$(2) \quad {}_{10}C_4 = 210 \text{ (コ)} //$$

$$(3) \quad {}_{10}C_2 = 45 \text{ (本)} //$$

$$(4) \quad 45 - 10 = 35 \text{ (本)} //$$

$$119. \quad {}_4C_2 \cdot {}_6C_2 = \frac{\cancel{4} \cdot 3 \cdot 6 \cdot 5}{\cancel{2} \cdot \cancel{2}} = 90 \text{ (通り)} //$$

$$120. \quad \frac{8!}{2!2!} = 2 \cdot 7! = 10080 \text{ (通り)} //$$

121. 黒玉を取り出す事象をそれぞれ

$\{b_1\}, \{b_2\}$, 白 //

$\{w_1\}, \{w_2\}, \{w_3\}, \{w_4\}$

とす。

$$(1) \quad \{b_1, b_2\}, \{b_1, w_1\}, \{b_1, w_2\}, \{b_1, w_3\}, \{b_1, w_4\} \\ \{b_2, w_1\}, \{b_2, w_2\}, \{b_2, w_3\}, \{b_2, w_4\} \\ \{w_1, w_2\}, \{w_1, w_3\}, \{w_1, w_4\}, \{w_2, w_3\}, \{w_2, w_4\}, \\ \{w_3, w_4\} //$$

$$21. (2) \{h_1, h_2\}, \{h_1, w_1\}, \{h_1, w_2\}, \{h_1, w_3\}, \{h_1, w_4\} \\ \{h_2, w_1\}, \{h_2, w_2\}, \{h_2, w_3\}, \{h_2, w_4\} //$$

$$22. (1) \frac{4}{15} //$$

$$(2) \frac{3}{15} = \frac{1}{5} //$$

$$23. (1) \frac{{}^4C_2 \times {}^5C_1}{\frac{9 \cdot 8 \cdot 7}{3!}} = \frac{\cancel{8} \times \cancel{4} \times \cancel{3} \times 5}{\cancel{9} \cdot \cancel{8} \cdot \underset{2}{7}} = \frac{5}{14} //$$

$$(2) \frac{{}^5C_3}{\frac{9 \cdot 8 \cdot 7}{3!}} = \frac{5 \cdot \cancel{4} \cdot \cancel{3}}{\cancel{9} \cdot \cancel{8} \cdot \underset{2}{7}} = \frac{5}{42} //$$

$$24. (1) P(A \cap B) = \frac{1}{6} //$$

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

$$(3) A \subset C, A \subset D, B \subset D //$$

$$25. \frac{{}^5C_3}{{}^9C_3} + \frac{{}^4C_1 \times {}^5C_2}{{}^9C_3} = \frac{5 \cdot 4 \cdot 3 + 3 \cdot 4 \cdot 5 \cdot 4}{9 \cdot 8 \cdot 7}$$

$$= \frac{5 \cdot \cancel{4} \cdot \cancel{3} (1+4)}{\underset{2}{3} \cdot \cancel{9} \cdot \cancel{8} \cdot 7}$$

$$= \frac{25}{42} //$$

$$26. (1) \frac{1}{5} //$$

$$(2) \frac{12}{100} = \frac{3}{25} //$$

$$100 = 80 + 16 + 4$$

$$= 8 \times 12 + 4$$

$$(3) \frac{20 + 12 - 2}{100} = \frac{30}{100} = \frac{3}{10} //$$

$$27. \frac{{}^6C_3}{{}^{14}C_3} = \frac{\cancel{6}^3 \cdot \cancel{5}^1 \cdot \cancel{4}^1}{\cancel{14}^7 \cdot \cancel{13}^1 \cdot \cancel{12}^1} = \frac{5}{91}$$

$$1 - \frac{5}{91} = \frac{86}{91} //$$

$$28. (1) \frac{2}{6} \times \frac{2}{6} = \frac{1}{9} //$$

$$(2) \frac{1}{6} \times \frac{2}{6} = \frac{1}{18} //$$

$$29. \frac{7}{11} \times \frac{{}^8C_2}{{}^{11}C_2} = \frac{7}{11} \times \frac{\cancel{8}^3 \cdot \cancel{7}^1}{\cancel{11}^1 \cdot \cancel{10}^1} = \frac{21}{121} //$$

$$30. \frac{3}{5} \times \frac{3}{5} \times \frac{2}{5} = \frac{18}{125} //$$

$$31. \frac{6}{10} \times \frac{6}{10} + \frac{4}{10} + \frac{4}{10}$$

$$= \left(\frac{2}{10}\right)^2 \{ 9 + 4 \}$$

$$= \frac{13}{25} //$$

$$B2. (1) \left(\frac{1}{6}\right)^2 \cdot \left(\frac{5}{6}\right) \cdot {}^3C_2 = \frac{5}{72} //$$

$$36 \times 2$$

$$= 72$$

$$(2) \left(\frac{2}{6}\right) \left(\frac{4}{6}\right)^2 \cdot {}^3C_1 = \frac{4}{9} //$$

$$B3. (1) \left(\frac{1}{2}\right)^6 = \frac{1}{64} //$$

$$(2) \left(\frac{1}{2}\right)^6 \cdot {}^5C_2 = \frac{1}{2^6} \times \frac{5 \cdot 4}{2 \cdot 1} = \frac{5}{32} //$$

$$B4. \left(\frac{2}{3}\right)^4 \cdot \left(\frac{1}{3}\right) \cdot {}^5C_4$$

$$= \frac{2^4}{3^5} \cdot 5$$

$$= \frac{80}{3^5}$$

$$\left(\frac{2}{3}\right)^4 = \frac{32}{3^5}$$

$$\therefore \frac{112}{243} //$$

$$B5. \left(\frac{1}{2}\right)^7 \cdot {}^7C_1 = \frac{7}{128}$$

$$\left(\frac{1}{2}\right)^7$$

$$\therefore \frac{120}{128} = \frac{15}{16} //$$

$$36. (1) \frac{25}{50} = \frac{1}{2} //$$

$$(2) \frac{20}{45} = \frac{4}{9} //$$

$$37. (1) \frac{\cancel{4}^1}{\cancel{20}_5} \times \frac{3}{19} = \frac{3}{95} //$$

$$(2) \frac{\cancel{4}^1}{\cancel{20}_5} \times \frac{16}{19} = \frac{16}{95} //$$

$$38. P_B(A) = \frac{P(A \cap B)}{P(B)} = \frac{0.2}{0.5} = \frac{2}{5} //$$

39.

X	0	1	2	3	4	5	$\frac{1}{6}$
P	$\frac{6}{36}$	$\frac{10}{36}$	$\frac{8}{36}$	$\frac{6}{36}$	$\frac{4}{36}$	$\frac{2}{36}$	1

	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

$$\frac{1}{\cancel{36}_{18}} \left\{ \cancel{16}^5 + \cancel{16}^8 + \cancel{16}^9 + \cancel{16}^8 + \cancel{16}^5 \right\}$$

$$= \frac{1}{18} \{ 10 + 16 + 9 \}$$

$$= \frac{35}{18} //$$

$$9 + 24 + 16$$

$$= 49$$

$$40. \left(\frac{3}{7}\right)^3 \cdot 3 + \left(\frac{3}{7}\right)^2 \cdot \frac{4}{7} \cdot 3 \cdot 2 + \frac{3}{7} \left(\frac{4}{7}\right)^2 \cdot 3 \cdot 1$$

$$= \frac{3^3}{7^3} \{ 9 + 24 + 16 \} = \frac{9}{7} //$$