

## 問題 1

- (1)  $2^3 = 8$  通り それらは、  
 (1) = (男, 男, 男), (2) = (女, 男, 男), (3) = (男, 女, 男), (4) = (男, 男, 女),  
 (5) = (男, 女, 女), (6) = (女, 男, 女), (7) = (女, 女, 男), (8) = (女, 女, 女),
- (2) 8 通りの組み合わせのうち問題の組み合わせは (8) の 1 通りであるから、 $\frac{1}{8}$
- (3) 8 通りの組み合わせのうち問題の組み合わせは、(5), (6), (7) の 3 通りであるから、 $\frac{3}{8}$
- (4) 8 通りの組み合わせのうち問題の組み合わせは、(2), (3), (4) の 3 通りであるから、 $\frac{3}{8}$
- (5) 8 通りのうち、3 人とも男である可能性は無いので、 $\frac{3}{8-1} = \frac{3}{7}$
- (6)  $\left(\frac{1}{2}\right)^2 = \frac{1}{4}$

## 問題 2

- (1)  $P(1_{\text{当}}) = \frac{5}{200} = \frac{1}{40}$
- (2)  $P(1_{\text{外}}) = \frac{195}{200} = \frac{39}{40}$
- (3)  $P(2_{\text{当}}|1_{\text{当}}) = \frac{4}{199}$
- (4)  $P(2_{\text{当}}|1_{\text{外}}) = \frac{5}{199}$
- (5)  $P(2_{\text{当}}) = P(2_{\text{当}}|1_{\text{当}})P(1_{\text{当}}) + P(2_{\text{当}}|1_{\text{外}})P(1_{\text{外}})$
- (6)  $P(2_{\text{当}}) = \frac{4}{199} \cdot \frac{1}{40} + \frac{5}{199} \cdot \frac{39}{40} = \frac{4 + 5 \times 39}{199 \times 40} = \frac{1}{40}$

## 問題 3

- (1) (答)  $P(\text{青}_{\text{目}}) = P(\text{青}_{\text{目}}|\text{青}_{\text{走}})P(\text{青}_{\text{走}}) + P(\text{青}_{\text{目}}|\text{緑}_{\text{走}})P(\text{緑}_{\text{走}})$   
 $= 0.85 \times 0.2 + 0.15 \times 0.8 = 0.29$
- (2) (答)  $P(\text{緑}_{\text{目}}) = P(\text{緑}_{\text{目}}|\text{緑}_{\text{走}})P(\text{緑}_{\text{走}}) + P(\text{緑}_{\text{目}}|\text{青}_{\text{走}})P(\text{青}_{\text{走}})$   
 $= 0.85 \times 0.8 + 0.15 \times 0.2 = 0.71$
- (3) (答)  $P(\text{青}_{\text{事故}}) = \frac{P(\text{青}_{\text{目}}|\text{青}_{\text{走}})P(\text{青}_{\text{走}})}{P(\text{青}_{\text{目}})} = \frac{0.85 \times 0.2}{0.29} = \frac{0.17}{0.29} = \frac{17}{29} \approx 0.586$

## 問題 4

[ 1 ]

- (1)  $P(1_{\text{当}}) = \frac{1}{30}$
- (2)  $P(1_{\text{外}}) = \frac{29}{30}$
- (3)  $P(2_{\text{当}}|1_{\text{外}}) = \frac{1}{29}$
- (4)  $P(2_{\text{当}}) = P(2_{\text{当}}|1_{\text{外}})P(1_{\text{外}}) = \frac{1}{29} \times \frac{29}{30} = \frac{1}{30}$
- (5)  $P(1_{\text{当}}) + P(2_{\text{当}}) = \frac{1}{15} \left( = \frac{1 \times 29}{30C_2} = \frac{2 \times 29}{30 \times 29} \right)$

$$(6) P(2_{\text{外}} \cap 1_{\text{外}}) = P(2_{\text{外}}|1_{\text{外}})P(1_{\text{外}}) = \frac{28}{29} \frac{29}{30} = \frac{28}{30} = \frac{14}{15} \left( = \frac{{}_{29}C_2}{{}_{30}C_2} \right)$$

$$(7) \mu = 100 \times \frac{1}{15} = \frac{20}{3} \text{円}$$

$$(8) \sigma^2 = 100^2 \times \frac{1}{15} - \left( \frac{20}{3} \right)^2 = 100 \times \left( \frac{100}{15} - \frac{4}{9} \right) \\ = 100 \times \left( \frac{20}{3} - \frac{4}{9} \right) = 100 \times \frac{(60-4)}{9} = \frac{5600}{9} \approx 622.2$$

[ 2 ]

$$(1) P(2_{\text{当}} \cap 1_{\text{当}}) = P(2_{\text{当}}|1_{\text{当}})P(1_{\text{当}}) = \frac{1}{59} \frac{2}{60} = \frac{1}{1770} \left( = \frac{1}{{}_{60}C_2} \right)$$

$$(2) P(2_{\text{外}} \cap 1_{\text{当}}) = P(2_{\text{外}}|1_{\text{当}})P(1_{\text{当}}) = \frac{58}{59} \frac{2}{60} = \frac{58}{1770} = \frac{29}{885}$$

$$(3) P(2_{\text{当}} \cap 1_{\text{外}}) = P(2_{\text{当}}|1_{\text{外}})P(1_{\text{外}}) = \frac{2}{59} \frac{58}{60} = \frac{58}{1770} = \frac{29}{885}$$

$$(4) P(2_{\text{当}} \cap 1_{\text{外}}) + P(2_{\text{外}} \cap 1_{\text{外}}) = \frac{116}{1770} = \frac{58}{885} \left( = \frac{2 \times 58}{{}_{60}C_2} \right)$$

$$(5) P(2_{\text{外}} \cap 1_{\text{外}}) = P(2_{\text{外}}|1_{\text{外}})P(1_{\text{外}}) = \frac{57}{59} \frac{58}{60} = \frac{1653}{1770} = \frac{551}{590} \left( = \frac{{}_{58}C_2}{{}_{60}C_2} \right)$$

$$(6) \mu = 100 \times \frac{58}{885} + 200 \times \frac{1}{1770} = \frac{20}{3}$$

$$(7) \sigma^2 = 100^2 \times \frac{116}{1770} + 200^2 \times \frac{1}{1770} - \left( \frac{20}{3} \right)^2 \\ = 100^2 \times \frac{(116+4)}{1770} - \frac{400}{9} = 100^2 \times \frac{120}{1770} - \frac{400}{9} \\ = 400 \times \left( \frac{100}{59} - \frac{1}{9} \right) = 400 \times \frac{(900-59)}{531} = \frac{336400}{531} \approx 633.5$$

### 問題 5

$$(1) \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

$$(2) P(x) = \left( \frac{1}{4} \right) \cdot \left( \frac{3}{4} \right)^{x-1}$$

$$(3) \mu = \frac{1}{\frac{1}{4}} = 4$$

$$(4) \sigma^2 = \frac{\frac{3}{4}}{\left( \frac{1}{4} \right)^2} = 12$$

$$(5) Q(x) = \left( \frac{3}{4} \right)^x$$

$$(6) P(x) + Q(x) = \left( \frac{3}{4} \right)^{x-1} = Q(x-1)$$

$$(7) P(1) + P(2) + \cdots + P(x) + Q(x) = P(1) + P(2) + \cdots + Q(x-1) = \cdots = 1$$

$$(8) 1 - Q(n) > \frac{1}{2} \text{ より、} Q(n) < \frac{1}{2}. \quad \left( \frac{3}{4} \right)^3 = \frac{27}{64} < \frac{1}{2}. \quad \text{ゆえに、} n = 3.$$

### 問題 6

$$(1) P(x) = {}_5C_x \left( \frac{1}{3} \right)^x \left( \frac{2}{3} \right)^{5-x}$$

$$(2) \mu = \frac{5}{3}$$

$$(3) \sigma^2 = 5 \times \frac{1}{3} \times \frac{2}{3} = \frac{10}{9}$$

$$(4) P(3) + P(4) + P(5) = \frac{{}_5C_3 \cdot 2^2 + {}_5C_4 \cdot 2 + {}_5C_5}{3^5} = \frac{51}{243} = \frac{17}{81} \approx 20.98\%$$