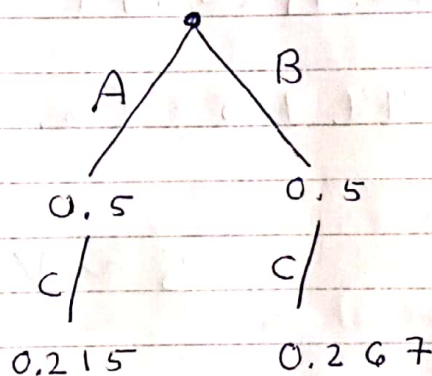


(1)

① $A =$ 10 8 2 0 1 1 1 1 1 1
 $B =$ 2 8 2 0 1 1 1 1 1 1
 $C =$ 8 8 1 1 1 1 1 1 1 1

$$P(C/A) = \binom{10}{7} (0.6)^7 (0.4)^3 = 0.215$$

$$P(C/B) = \binom{10}{7} (0.7)^7 (0.3)^3 = 0.267$$



$$c) P(C) = (0.215)(0.5) + (0.267)(0.5) = \boxed{0.241}$$

$$a) P(A/C) = \frac{P(C/A) \cdot P(A)}{P(C)} = \frac{(0.215)(0.5)}{0.241}$$

$$= \boxed{0.446}$$

$$e) E(X) = E(X/A) \cdot P(A) + E(X/B) \cdot P(B)$$

$$= 10(0.6)(0.5) + 10(0.7)(0.5) = \boxed{6.5}$$

$$\text{Var}(X) = E(X^2) - (6.5)^2$$

$$E(X^2) = E(X^2/A)(0.5) + E(X^2/B)(0.5)$$

2

$$\text{Var}(X/A) = 10(0.6)(0.4) = E(X^2/A) - [E(X/A)]^2$$

$$2.4 = E(X^2/A) - 6^2 \rightarrow E(X^2/A) = 38.4$$

$$\text{Var}(X/B) = 10(0.7)(0.3) = E(X^2/B) - [E(X/B)]^2$$

$$2.1 = E(X^2/B) - 7^2 \rightarrow E(X^2/B) = 51.1$$

$$E(X^2) = (38.4)(0.5) + (51.1)(0.5) = 44.75$$

$$\text{Var}(X) = 44.75 - (6.5)^2 = \boxed{2.5}$$

2

$$n = 100$$

$$\mu = 0.5$$

$$\sigma = 0.25$$

$$S \sim N(50, 2.5)$$

$$k) P(S \leq 52) = P\left(Z \leq \frac{52 - 50}{2.5}\right) = \Phi(0.8)$$

$$= \boxed{0.7881}$$

$$a) P(S \leq K) = 0.95 \rightarrow P\left(Z \leq \frac{K - 50}{2.5}\right) = 0.95$$

$$\Phi\left(\frac{K - 50}{2.5}\right) = 0.95 \rightarrow \frac{K - 50}{2.5} = 1.645$$

$$\boxed{K = 54.11}$$

$$3) \quad k) \quad A \int_0^2 (4x - 2x^2) dx = 1$$

③

$$A \left(2x^2 - \frac{2x^3}{3} \right) \Big|_0^2 = 1$$

$$\left(8 - \frac{16}{3} \right) A = 1 \rightarrow \boxed{A = \frac{3}{8}}$$

$$c) F(x) = \frac{3}{8} \int_0^x (4t - 2t^2) dt$$

$$= \frac{3}{8} \left(2t^2 - \frac{2t^3}{3} \right) \Big|_0^x = \boxed{\frac{3}{8} \left(2x^2 - \frac{2x^3}{3} \right)}$$

$$2) P(X > 1) = 1 - F(1) = 1 - \frac{3}{8} \left(2 - \frac{2}{3} \right) = \boxed{\frac{1}{2}}$$

סוג א נ"ח = B, סוג ב נ"ח = A

$$④ P(A \cup B) = 0.6$$

$$P(B|A) = \frac{P(A \cap B)}{P(A)} = 0.5$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = 0.2$$

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

$$0.6 = \frac{P(A \cap B)}{0.5} + \frac{P(A \cap B)}{0.2} - P(A \cap B)$$

$$0.06 = 0.2 \cdot P(A \cap B) + 0.5 P(A \cap B) - P(A \cap B)$$

$$0.06 = 0.6 \cdot P(A \cap B) \rightarrow P(A \cap B) = \boxed{0.1}$$

(3)

$$42) \frac{4 \cdot 3 \cdot 2 \cdot 1}{4^3} = \boxed{\frac{3}{8} = 0.375}$$

5) $\cdot 170N \text{ e } p'7p'7 720N = X$

$$X \sim B(20, 0.3)$$

$$E(X) = (20)(0.3) = 6$$

$$\text{Var}(X) = 20(0.3)(0.7) = 4.2$$

$\cdot 101000 = Y$

$$Y = 60X + 40(20 - X) = 20X + 800$$

$$E(Y) = 20(6) + 800 = \boxed{920}$$

$$\text{Var}(Y) = (20^2)(4.2) = \boxed{1680}$$

$\cdot 10 \text{ e } p'7$

$\cdot 101000 = X$

X	P(X)
60	0.3
40	0.7

$$E(X) = 60(0.3) + 40(0.7)$$

$$= 46$$

$$E(Y) = (20)(46) = \boxed{920}$$

$$E(X^2) = 60^2(0.3) + 40^2(0.7) = 2200$$

$$\text{Var}(X) = 2200 - (46)^2 = 84$$

$$\text{Var}(Y) = (20)(84) = \boxed{1680}$$

(4)

6)

$X = \text{number of successes in } n \text{ trials}$
 $Y = \text{number of failures in } n \text{ trials}$

$$\begin{aligned}
 P(X > Y) &= P(Y=1, X>1) + P(Y=2, X>2) \\
 &\quad + P(Y=3, X>3) + \dots \\
 &= \left(\frac{1}{6}\right)\left(\frac{1}{2}\right) + \left(\frac{1}{6}\right)\left(\frac{5}{6}\right)\left(\frac{1}{2}\right)^2 + \left(\frac{5}{6}\right)^2\left(\frac{1}{6}\right)\left(\frac{1}{2}\right)^3 + \dots \\
 &= \frac{1}{12} \left(1 + \frac{5}{12} + \left(\frac{5}{12}\right)^2 + \dots \right) \\
 &= \frac{1}{12} \left(\frac{1}{1 - \frac{5}{12}} \right) = \frac{1}{7}
 \end{aligned}$$

$$\begin{aligned}
 P(Y > X) &= P(X=1, Y>1) + P(X=2, Y>2) + \dots \\
 &= \left(\frac{1}{2}\right)\left(\frac{5}{6}\right) + \left(\frac{1}{2}\right)^2\left(\frac{5}{6}\right)^2 + \left(\frac{1}{2}\right)^3\left(\frac{5}{6}\right)^3 + \dots \\
 &= \frac{5}{12} \left(1 + \frac{5}{12} + \left(\frac{5}{12}\right)^2 + \dots \right) \\
 &= \frac{5}{12} \left(\frac{1}{1 - \frac{5}{12}} \right) = \frac{5}{7}
 \end{aligned}$$

$$\begin{aligned}
 P(X=Y) &= P(X=1, Y=1) + P(X=2, Y=2) + \dots \\
 &= \left(\frac{1}{2}\right)\left(\frac{1}{6}\right) + \left(\frac{1}{2}\right)^2\left(\frac{5}{6}\right)\left(\frac{1}{6}\right) + \left(\frac{1}{2}\right)^3\left(\frac{5}{6}\right)^2\left(\frac{1}{6}\right) + \dots \\
 &= \frac{1}{12} \left(1 + \frac{5}{12} + \left(\frac{5}{12}\right)^2 + \dots \right) = \frac{1}{12} \left(\frac{1}{1 - \frac{5}{12}} \right) \\
 &= \frac{1}{7}
 \end{aligned}$$

5

R =

lionel de n(17)

R	P(R)
10	$\frac{1}{7}$
-2	$\frac{5}{7}$
1	$\frac{1}{7}$

$$E(R) = 10\left(\frac{1}{7}\right) - 2\left(\frac{5}{7}\right) + \frac{1}{7}$$
$$= \boxed{\frac{1}{7} = 0.14}$$

$$2) E(R^2) = 100\left(\frac{1}{7}\right) + 4\left(\frac{5}{7}\right) + 1\left(\frac{1}{7}\right) = \frac{122}{7}$$

$$= 17.43$$

$$Var(R) = 17.43 - (0.14)^2 = 17.41$$

$$\sigma(R) = \sqrt{17.41} =$$

$$\left. \begin{aligned} n &= 30 \\ \mu &= 0.14 \\ \sigma &= 4.17 \end{aligned} \right\}$$

$$P(S > 0) = P(Z > -0.18)$$

$$= \Phi(0.18) = \boxed{0.5714}$$

$$S \sim N(4.2, 22.84)$$