1. X and Y are discrete variables whose joint distribution $P[X = x, Y = y] = p(x, y)$ is given by

$$
\begin{array}{lll}
p(1,1) = 0.12 & p(2,1) = 0.06 & p(3,1) = 0.12 \\
p(1,2) = 0.00 & p(2,2) = 0.12 & p(3,2) = 0.08 \\
p(1,3) = 0.20 & p(2,3) = 0.05 & p(3,3) = 0.15 \\
p(1,4) = 0.05 & p(2,4) = 0.02 & p(3,4) = 0.03
\end{array}
$$

Find $P[X > Y]$

A. 0.26   B. 0.30   C. 0.32   D. 0.35   E. 0.39

- -

There are 3 cases in which $X > Y$, namely $(2,1), (3,1)$ and $(3,2)$. Summing their probabilities gives $0.06 + 0.12 + 0.08 = \boxed{0.26}$

---

2. X and Y are discrete variables whose joint distribution $P[X = x, Y = y] = p(x, y)$ is given by

$$
\begin{array}{ll}
p(0,1) = 0.2 & p(1,1) = 0.1 \\
p(1,2) = 0.3 & p(2,2) = 0.1 \\
p(2,3) = 0.1 & p(3,3) = 0.2
\end{array}
$$

Find the coefficient of variation of Y.

A. 0.30   B. 0.39   C. 0.60   D. 2.58   E. 3.33

- -

$$
P[Y = 1] = 0.3 \quad P[Y = 2] = 0.4 \quad P[Y = 3] = 0.3
$$
$$
E[Y] = 0.3 \cdot 1 + 0.4 \cdot 2 + 0.3 \cdot 3 = 2
$$
$$
\text{Var}[Y] = 0.3 \cdot (1 - 2)^2 + 0.4 \cdot (2 - 2)^2 + 0.3 \cdot (3 - 2)^2 = 0.6
$$
$$
\text{CV}[Y] = \frac{\sqrt{0.6}}{2} = \boxed{0.387}
$$