ERHVERVSØKONOMI/MATEMATIK-STUDIET

Besvarelse reeksamen - Statistik 2. år - 4. august 2000

Opgave 1

1)

$$
\begin{aligned}
p(-2) + p(-1) + p(0) + p(1) + p(2) &= c(4 + 2 + 1 + \frac{1}{2} + \frac{1}{4}) \\
&= c(7\frac{3}{4}) = c \cdot \frac{31}{4} = 1
\end{aligned}
$$

så $c = \frac{4}{31}$

2)

$$
E(X) = \frac{4}{31}(-2 \cdot 4 + (-1) \cdot 2 + 0 + \frac{1}{2} + 2 \cdot \frac{1}{4}) = \frac{4}{31}(-1) = -\frac{36}{31}
$$

3) $Y = |X|$. Lad q være ss.fkt for Y. Så er

$$
\begin{aligned}
q(0) &= p(0) = \frac{4}{31} \\
q(1) &= p(-1) + p(1) = \frac{4}{31}(2 + \frac{1}{2}) = \frac{4}{31} \cdot \frac{5}{2} = \frac{10}{31} \\
q(2) &= p(-2) + p(2) = \frac{4}{31}(4 + \frac{1}{4}) = \frac{4}{31} \cdot \frac{17}{4} = \frac{17}{31} \\
q(y) &= 0 \text{ for } y \neq 0, 1, 2.
\end{aligned}
$$

Eller mere kompakt

$$
q(y) = \begin{cases}
\frac{4}{31} & y = 0 \\
\frac{4}{31}\left((\frac{1}{2})^{-y} + (\frac{1}{2})^{y}\right) & y = 1, 2 \\
0 & \text{ellers}
\end{cases}
$$

4)

$$P(X \geq -1) \;=\; 1 - P(X = -2) = 1 - \frac{4}{31} \cdot 4 = \frac{15}{31}$$

$$P(Y = 1 \quad \text{og} \quad X \geq -1) \;=\; P(X = -1 \lor X = 1) = \frac{4}{31}(2 + \frac{1}{2}) = \frac{10}{31}$$

$$P(Y = 2 \quad \text{og} \quad X \geq -1) \;=\; P(X = 2) = \frac{4}{31} \cdot \frac{1}{4} = \frac{1}{31}$$

så

$$P(Y \geq 1 \quad \text{og} \quad X \geq -1) = \frac{11}{31}$$

dvs.

$$P(Y \geq 1 | X \geq -1) = \frac{11}{31}\bigg/\frac{15}{31} = \frac{11}{15}.$$