# Solution for exercise 3.1.1 in Pitman

**Question a)** The probabilities $P(X = i), i = 0, 1, 2, 3$ are given by the binomial distribution, $P(X = i) = \begin{pmatrix} 3 \\ i \end{pmatrix} \frac{1}{2^3}$.

| $i$ | $P(X = i)$ |
|-----|------------|
| 0 | $\frac{1}{8}$ |
| 1 | $\frac{3}{8}$ |
| 2 | $\frac{3}{8}$ |
| 3 | $\frac{1}{8}$ |

**Question b)** We define a random variable $Y = |X - 1|$, with range 0,1,2.

Then

| $i$ | $P(Y = i)$ |
|-----|------------|
| 0 | $\frac{3}{8}$ |
| 1 | $\frac{1}{2}$ |
| 2 | $\frac{1}{8}$ |

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