

### EX031

1/ Les valeurs que peut prendre  $X$ ,

$$X = \{-1, 0, 1, 2, 3\}.$$

2/ La loi de probabilité de  $X$ ,

$$P(-1) = \frac{3}{6} \times \frac{2}{6} = \frac{6}{36} = \frac{2}{12}$$

$$P(0) = \frac{3}{6} \times \frac{3}{6} = \frac{9}{36} = \frac{3}{12}$$

$$P(1) = \frac{2}{6} = \frac{4}{12}$$

$$P(2) = \frac{1}{6} = \frac{2}{12}$$

$$P(3) = \frac{3}{6} \times \frac{1}{6} = \frac{3}{36} = \frac{1}{12}$$

3/ calcul l'espérance:

$$E(X) = \sum_{i=1}^3 u_i P(X=u_i)$$

$$= (-1) \times \frac{2}{12} + 0 \times \frac{3}{12} + 1 \times \frac{4}{12} + 2 \times \frac{2}{12} + 3 \times \frac{1}{12}$$

$$= \frac{-2}{12} + \frac{4}{12} + \frac{4}{12} + \frac{3}{12}$$

$$= \frac{9}{12}$$

$$E(X^2) = \sum_{i=1}^3 u_i^2 P_{u_i}$$

$$= (-1)^2 \times \frac{2}{12} + 0^2 \times \frac{3}{12} + 1^2 \times \frac{4}{12} + 2^2 \times \frac{2}{12} + 3^2 \times \frac{1}{12}$$

$$= \frac{23}{12}$$

$$\text{Var}(X) = E(X^2) - E(X)^2 = \frac{23}{12} - \left(\frac{9}{12}\right)^2 = 1$$