Zadanie 1.

a) $EX^3 = \sum_x x^3 p(x) = -8a - 0.2 + 0 + 0.4 + 8c = 1$ $\quad \Rightarrow c - a = 1$

$F(0) = a + 0.2 + b = 0.4$

$a + 0.2 + b + 0.4 + c = 1$

Stąd $\begin{cases} a = 0.1 \\ b = 0.1 \\ c = 0.2 \end{cases}$

Tabela określająca funkcje prawdopodobieństwa:

x	-2	-1	0	1	2
p(x)	0,1	0,2	0,1	0,4	0,2

b)

$EX = 0.4$

$EX^2 = 1.8$

$\sigma = \sqrt{1.64}$

c) $P(X > -2 \mid X < 2) = \dfrac{P(-2 < X < 2)}{P(X < 2)} = \dfrac{0.2 + 0.1 + 0.4}{0.1 + 0.2 + 0.1 + 0.4} = \dfrac{7}{8}$

d)

$F(x) = \begin{cases} 0 & \text{dla } x < -2 \\ 0.1 & \text{dla } -2 \le x < -1 \\ 0.3 & \text{dla } -1 \le x < 0 \\ 0.4 & \text{dla } 0 \le x < 1 \\ 0.8 & \text{dla } 1 \le x < 2 \\ 1 & \text{dla } x \ge 2 \end{cases}$

Z definicji mediana $= 1$

Zadanie 2.

$EX^2 = VarX + (EX)^2 = \lambda + \lambda^2 = 6 \quad \Rightarrow \lambda = 2$

$P(X > 1) = 1 - P(X = 0) - P(X = 1) = \dots$

Zadanie 3.

$$X \sim bin\left(n, \frac{1}{3}\right) \qquad\qquad P(X \geq 1) = \frac{65}{81}$$

$$P(X \geq 1) = 1 - P(X = 0) = 1 - \left(1 - \frac{1}{3}\right)^n = \frac{65}{81}$$

$$\left(\frac{2}{3}\right)^n = \frac{16}{81} \implies n = 4$$