2) $p_1 = 0.4 \quad p_0 = 0.3$

$$1-\beta = P(R|H_1) = P\left(Z_{\hat{p}} > 2.33 \,|\, H_1\right) = P\left(\frac{\hat{p} - 0.3}{\sqrt{\frac{0.3 \cdot 0.7}{100}}} > 2.33 \,\Big|\, H_1\right) =$$

$$= P\left(\hat{p} > 0.4067 \,|\, H_1\right) = P\left(\frac{\hat{p} - p_1}{\sqrt{\frac{p_1(1-p_1)}{n}}} > \frac{0.4067 - 0.4}{\sqrt{\frac{0.4 \cdot (1-0.4)}{100}}}\right) = P\left(Z_{\hat{p}} > 0.1367\right) =$$

$$= P(Z < -0.1367) = 0.4443 \longrightarrow 1-\beta = 0.4413 = \boxed{\beta = 0.5587}$$

3) $\hat{p} = \frac{35}{100} = 0.35 \quad , \quad p_0 = 0.3$

$$R = \left\{ Z_{\hat{p}} > 2.33 \right\}$$

$$Z_{\hat{p}} = \frac{0.35 - 0.3}{\sqrt{\frac{0.3 \cdot 0.7}{100}}} = 1.091$$