2. $H_0: p = 0.30$

$H_1: p \neq 0.30$

$n = 500$

$x = 170$

$\alpha = .01$

$p = .34$

③ 


④ $ZA_L = \text{INVNORM}(.01/2) = -2.576$

$ZA_R = \text{INVNORM}(1 - .01/2) = 2.576$

⑤ $\hat{p}_L = p_0 + ZA_L \sqrt{\frac{p_0(1-p_0)}{n}}$

$= .30 - 2.576 \sqrt{\frac{.30(1-.30)}{500}}$

$\hat{p}_L = 0.247$

$\hat{p}_R = p_0 + ZA_R \sqrt{\frac{p_0(1-p_0)}{n}}$

$\hat{p}_R = .30 + 2.576 \sqrt{\frac{.30(1-.30)}{500}}$

$\hat{p}_R = 0.353$

⑥ $Z_L = \frac{\hat{p}_L - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.247 - .34}{\sqrt{\frac{.34(1-.34)}{500}}}$

$Z_L = -4.39$

$Z_R = \frac{\hat{p}_R - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.353 - .34}{\sqrt{\frac{.34(1-.34)}{500}}}$

$= 0.61$

⑦ $\beta = \text{NORMALCDF}(Z_L, Z_R)$

$= \text{NORMALCDF}(-4.39, 0.61)$

$\beta = .7291$

⑧ $\text{POWER} = 1 - \beta = 1 - .7291 = .2709$

2. $H_0: p = 0.30$

$H_1: p \neq 0.30$

$n = 500$

$x = 170$

$\alpha = .01$

$p = .34$

③ TWO TAILS 

④ $ZA_L = -2.575$

$ZA_R = 2.575$

⑤ $\hat{p}_L = p_0 + ZA_L \sqrt{\frac{p_0(1-p_0)}{n}}$

$= 0.30 - 2.575 \sqrt{\frac{.30(1-.30)}{500}}$

$\hat{p}_L = 0.247$

$\hat{p}_R = p_0 + ZA_R \sqrt{\frac{p_0(1-p_0)}{n}}$

$\hat{p}_R = 0.30 + 2.575 \sqrt{\frac{.30(1-.30)}{500}}$

$\hat{p}_R = 0.353$

⑥ $Z_L = \frac{\hat{p}_L - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.247 - .34}{\sqrt{\frac{.34(1-.34)}{500}}}$

$Z_L = -4.39$

$Z_R = \frac{\hat{p}_R - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.353 - .34}{\sqrt{\frac{.34(1-.34)}{500}}}$

$= 0.61$

⑦ $Z_L = -4.39$ $Z_R = 0.61$

$.0002$ $0.7291$

$\beta = 0.7291 - 0.0002$

$\beta = 0.7289$

⑧ $\text{POWER OF TEST} = 1 - \beta = 1 - .7289 = .2711$