השערה חד צדדית שמאלית: $H_1\colon\ \mu_1 < \mu_0$

$$1-\beta = P(R/H_1) = P(Z_{\bar{x}} < -Z_{1-\alpha}/H_1) = P\left(\frac{\bar{x}-\mu_0}{\sigma/\sqrt{n}} < -Z_{1-\alpha}/H_1\right)$$

$$= P\left(\bar{x} < \mu_0 + Z_{1-a} \times \frac{\sigma}{\sqrt{n}}/H_1\right) = P\left(\frac{\bar{x}-\mu_1}{\sigma/\sqrt{n}} < \frac{\left(\mu_0 - Z_{1-a}\times \sigma/\sqrt{n}\right)-\mu_1}{\sigma/\sqrt{n}}\right)$$

$$= P\left(Z_{\bar{x}} < \frac{\mu_0 - Z_{1-a}\times \sigma/\sqrt{n} - \mu_1}{\sigma/\sqrt{n}}\right)$$

$$\beta = P(\overline{R}/H_1) = 1 - P\left(Z_{\bar{x}} < \frac{\mu_0 - Z_{1-a}\times \sigma/\sqrt{n} - \mu_1}{\sigma/\sqrt{n}}\right)$$

השערה דו צדדית: $H_1\colon\ \mu_1 \neq \mu_0$

$$\beta = P(\overline{R}/H_1) = P\left(-Z_{1-\frac{\alpha}{2}} \le Z_{\bar{x}} \le Z_{1-\frac{\alpha}{2}}/H_1\right) = P\left(-Z_{1-\frac{\alpha}{2}} \le \frac{\bar{x}-\mu_0}{\sigma/\sqrt{n}} \le Z_{1-\frac{\alpha}{2}}/H_1\right)$$

$$= P\left(\mu_0 - Z_{1-\frac{\alpha}{2}} \times \frac{\sigma}{\sqrt{n}} \le \bar{x} \le \mu_0 + Z_{1-\frac{\alpha}{2}} \times \frac{\sigma}{\sqrt{n}}/H_1\right) =$$

$$= P\left(\frac{\left(\mu_0 - Z_{1-a}\times \sigma/\sqrt{n}\right)-\mu_1}{\sigma/\sqrt{n}} \le \frac{\bar{x}-\mu_1}{\sigma/\sqrt{n}} \le \frac{\left(\mu_0 + Z_{1-a}\times \sigma/\sqrt{n}\right)-\mu_1}{\sigma/\sqrt{n}}\right)$$

$$= P\left(\frac{\left(\mu_0 - Z_{1-a}\times \sigma/\sqrt{n}\right)-\mu_1}{\sigma/\sqrt{n}} \le Z_{\bar{x}} \le \frac{\left(\mu_0 + Z_{1-a}\times \sigma/\sqrt{n}\right)-\mu_1}{\sigma/\sqrt{n}}\right)$$

$$= P\left(Z_{\bar{x}} \le \frac{\left(\mu_0 + Z_{1-a}\times \sigma/\sqrt{n}\right)-\mu_1}{\sigma/\sqrt{n}}\right) - P\left(Z_{\bar{x}} \le \frac{\left(\mu_0 - Z_{1-a}\times \sigma/\sqrt{n}\right)-\mu_1}{\sigma/\sqrt{n}}\right)$$

<u>מציאת גודל מדגם:</u>

$$n \ge \left[\frac{\sigma\left(Z_{1-\alpha}+Z_{1-\beta}\right)}{\mu_1-\mu_0}\right]^2$$

*כאשר ההשערה היא דו צדדית במקום α יש להציב $\frac{\alpha}{2}$