

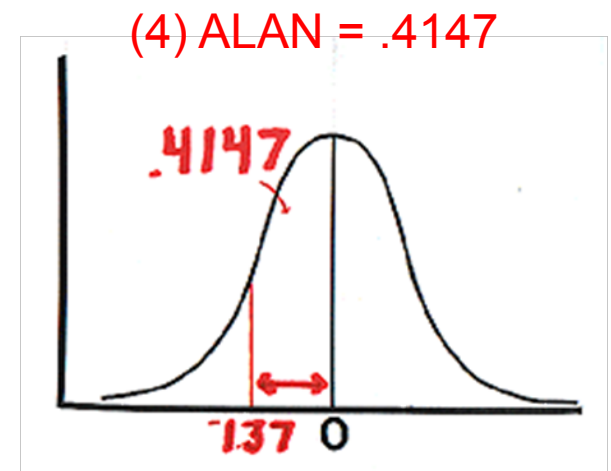
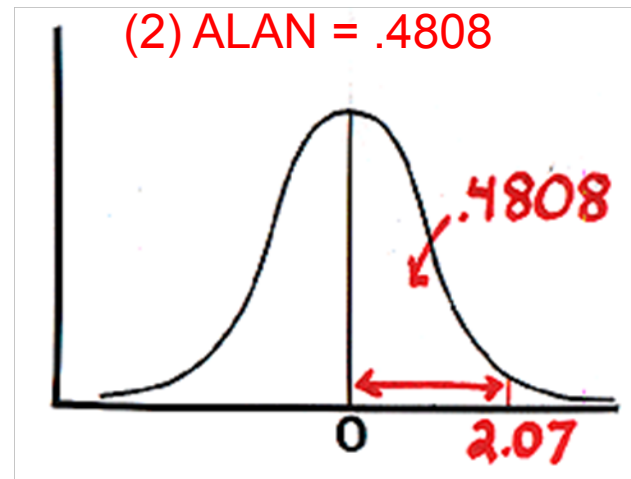
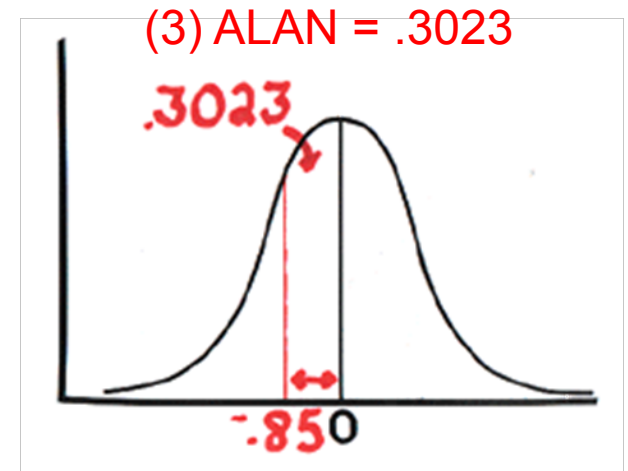
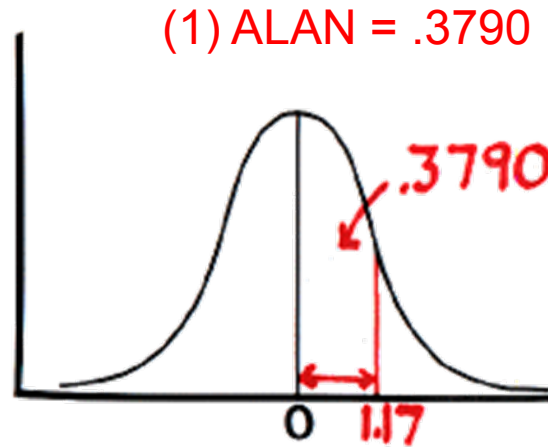
GÜVEN ARALIĞI KESTİRİM Z-TABLOSU KULLANIMI

PROBLEMLER

ÇÖZÜMLER

ÇÖZÜM: Aşağıdaki değerlerin her birisi için z ile aritmetik ortalama arasında kalan alanı bulunuz:

- 1) $z = 1.17$
- 2) $z = 2.07$
- 3) $z = -.85$
- 4) $z = -1.37$



$$P(-1.32 \leq z \leq 0) = ?$$

$$P(z < -1.32) = ?$$

$$P(z \geq -1.32) = ?$$

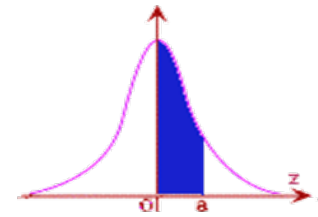
$$P(-1.41 \leq z \leq .87) = ?$$

$$P(z \leq -1.41 \text{ veya } z \geq .87) = ?$$

$$P(.51 \leq z \leq 1.79) = ?$$

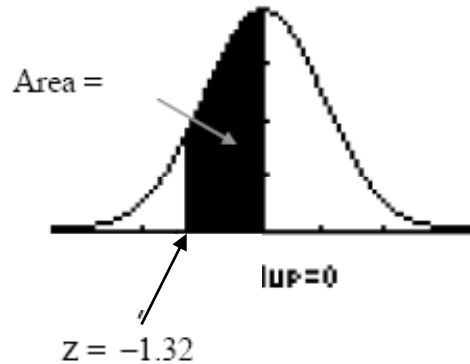
$$P(-1.32 \leq z \leq 0) = ?$$

Tablo ne gösteriyor?



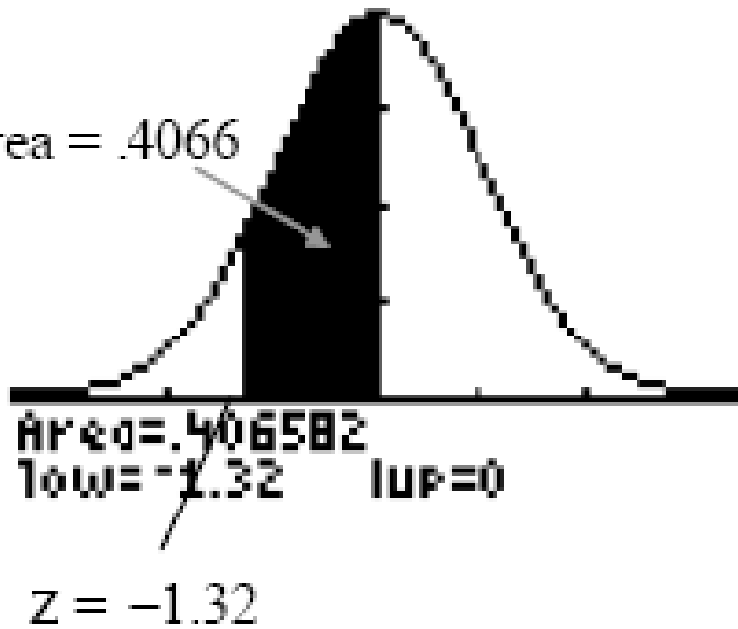
Ne soruluyor?

Kritik z değeri ile $z=0$ arasında kalan alan.



a	0.00	0.01	0.02	0.03
1.0	0.3413	0.3438	0.3461	0.3485
1.1	0.3643	0.3665	0.3686	0.3708
1.2	0.3849	0.3869	0.3888	0.3907
1.3	0.4032	0.4049	0.4066	0.4082
1.4	0.4192	0.4207	0.4222	0.4236

Area = .4066



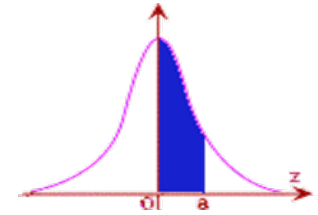
$$P(z \leq -1.32) = 0.4066$$

$$P(z < -1.32) = ?$$

Ne soruluyor?

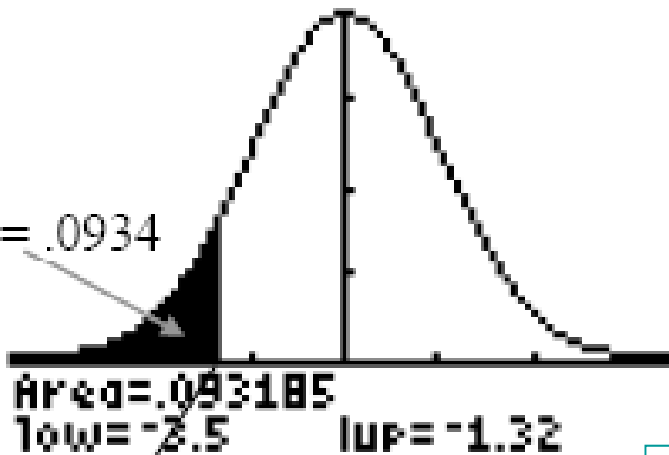
Kritik z değerinin solunda kalan alan.

Tablo ne gösteriyor?



a	0.00	0.01	0.02	0.03
1.0	0.3413	0.3438	0.3461	0.3485
1.1	0.3643	0.3665	0.3686	0.3708
1.2	0.3849	0.3869	0.3888	0.3907
1.3	0.4032	0.4049	0.4066	0.4082
1.4	0.4192	0.4207	0.4222	0.4236

Area = .0934

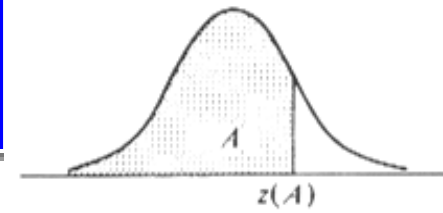


$z = -1.32$

Z'nin -1.32'den küçük olması olasılığı:
 $P(z \leq 1.32) = 0.5000 - 0.4066 = 0,0934$

Tablo B1

$$P(z < -1.32) = ?$$



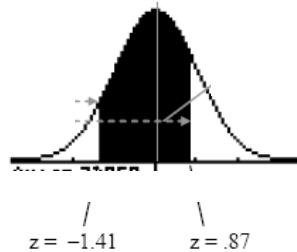
Tablo ne
gösteriyor?

Z'nin -1.32'den
küçük olması
olasılığı:
 $P(z \leq 1.32)$
= 1.0000 - 0.9066
= 0,0934

z	.00	.01	.02	.03
.0	.5000	.5040	.5080	.5120
.1	.5398	.5438	.5478	.5517
.2	.5793	.5832	.5871	.5910
.3	.6179	.6217	.6255	.6293
.4	.6554	.6591	.6628	.6664
.5	.6915	.6950	.6985	.7019
.6	.7257	.7291	.7324	.7357
.7	.7580	.7611	.7642	.7673
.8	.7881	.7910	.7939	.7967
.9	.8159	.8186	.8212	.8238
1.0	.8413	.8438	.8461	.8485
1.1	.8643	.8665	.8686	.8708
1.2	.8849	.8869	.8888	.8907
1.3	.9032	.9049	.9066	.9082
1.4	.9192	.9207	.9222	.9236

$$P(-1.41 \leq z \leq .87) = ?$$

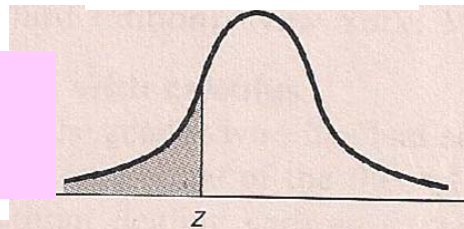
Ne soruluyor?



z	0	1	2

-1.5	.0668	.0655	.0643
-1.4	.0808	.0793	.0778
-1.3	.0968	.0951	.0934

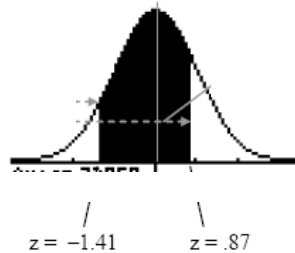
Tablo B2 ne gösteriyor?



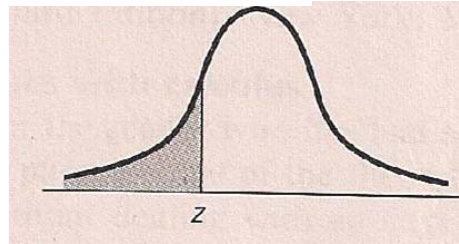
z	0	1	2	3	4	5	6	7	8	9
-1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
-.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
-.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
-.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148

$P(-1.41 \leq z \leq .87) = ?$

Ne soruluyor?



Tablo B2 ne gösteriyor?



$$P(z \leq -1.41) = 0.0793 \quad \blacktriangleright$$

$$P(Z \geq -1.41) = 0.5000 - 0.0793 = 0.4207$$

$$P(z \geq 0.87) = 0.1922 \quad \blacktriangleright$$

$$P(z \leq 0.87) = 0.5000 - 0.1922 = 0.3078$$

Veya

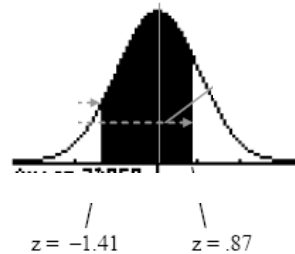
$$P(z \leq -0.87) = 0.1922$$

$$\mathbf{P(-1.41 \leq z \leq 0.87) = 0.4207 + 0.3078 = 0.7285}$$

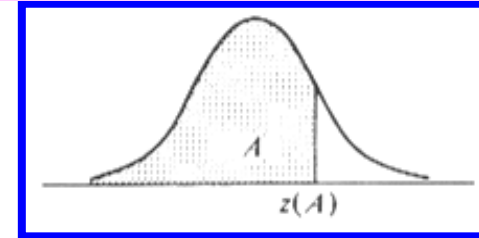
Z değerinin -1.41 ile 0.87 arasında bulunması olasılığı %72.85'dir.

$$P(-1.41 \leq z \leq .87) = ?$$

Ne soruluyor?



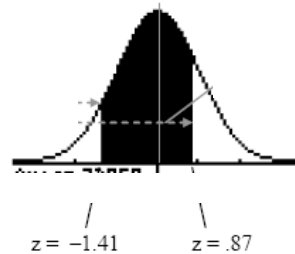
Tablo B2 ne gösteriyor?



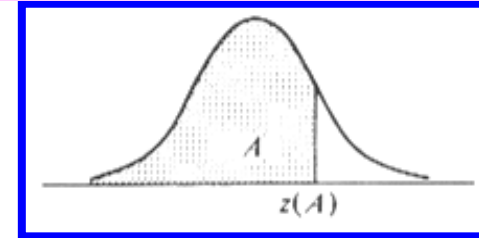
z	.05	.06	.07	.02	.03
.0	.5199	.5239	.5279	.8461	.8485
.1	.5596	.5636	.5675	.8686	.8708
.2	.5987	.6026	.6064	.8888	.8907
.3	.6368	.6406	.6443	.9066	.9082
.4	.6736	.6772	.6808	.9222	.9236
.5	.7088	.7123	.7157		
.6	.7422	.7454	.7486		
.7	.7734	.7764	.7794		
.8	.8023	.8051	.8078		
.9	.8289	.8315	.8340		

$$P(-1.41 \leq z \leq .87) = ?$$

Ne soruluyor?



Tablo B2 ne gösteriyor?

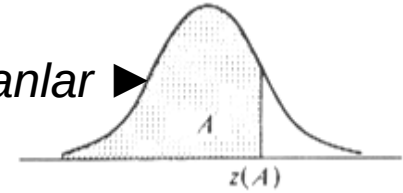


z	.05	.06	.07		
.0	.5199	.5239	.5279		
.1	.5596	.5636	.5675	.02	.03
.2	.5987	.6026	.6064		
.3	.6368	.6406	.6443	.8461	.8485
.4	.6736	.6772	.6808	.8686	.8708
				.8888	.8907
.5	.7088	.7123	.7157	.9066	.9082
.6	.7422	.7454	.7486	.9222	.9236
.7	.7734	.7764	.7794		
.8	.8023	.8051	.8078		
.9	.8289	.8315	.8340		

Tablo Kullanımı

Olasılığı bulun: $P(0 \leq z \leq 2,04)$

Tablo B1'de gösterilen alanlar ►



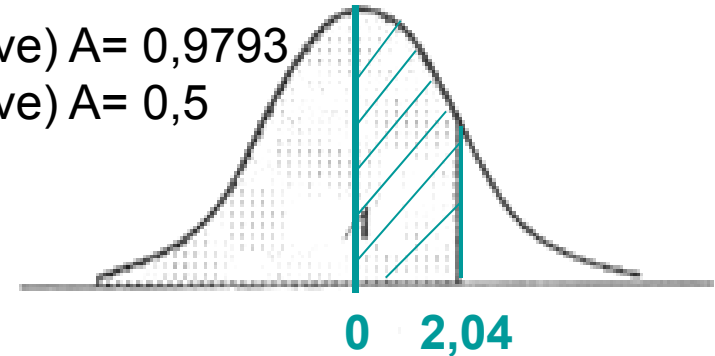
Tablo B1'den $z=2,04$ için alan (yığışımli; cumulative) $A= 0,9793$

Tablo B1'den $z= 0$ için alan (yığışımli; cumulative) $A= 0,5$

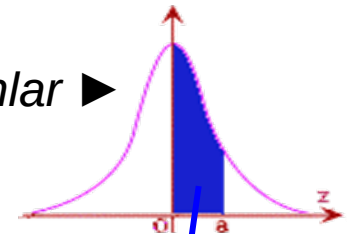
Z'nin 0 ile 2,04 arasında olması olasılığı:

$$0,9793 - 0,5000 = 0,4793$$

$$P(0 \leq z \leq 2,04) = 0,4793$$



Tablo B2'de gösterilen alanlar ►



Tablo B2'den $z=2,04$ için alan $A= 0,4793$

$$P(0 \leq z \leq 2,04) = 0,4793$$

a	0.00	0.01	0.02	0.03	0.04	0.05
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842

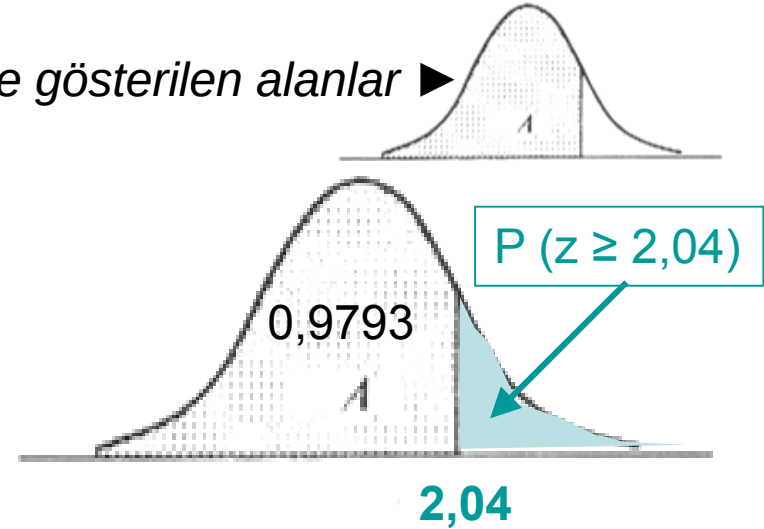
Tablo Kullanımı

Olasılığı bulun: $P(z \geq 2,04)$

Tablo B1'de gösterilen alanlar ►

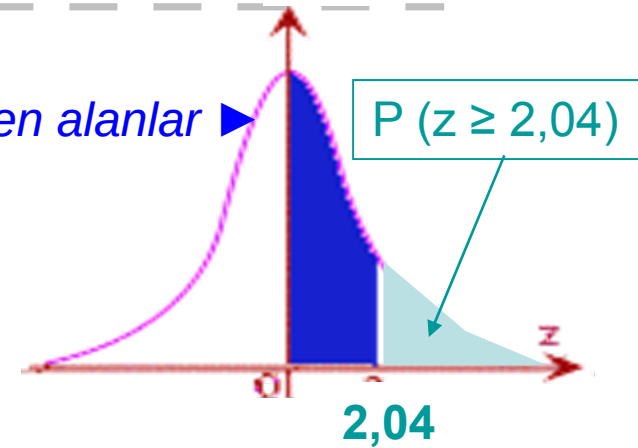
Tablodan $z \leq 2,04$ için alan (yığılımlı) $A = 0,9793$

Z'nin 2,04'den büyük olması olasılığı:
 $P(z \geq 2,04) = 1,000 - 0,9793 = 0,0207$



Tablo B2'de gösterilen alanlar ►

Tablodan $z \leq 2,04$ için alan $A = 0,4793$
 $P(z \geq 2,04) = 0,5000 - 0,4793 = 0,0207$

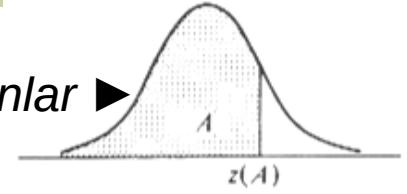


a	0.00	0.01	0.02	0.03	0.04	0.05
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842

Tablo Kullanımı

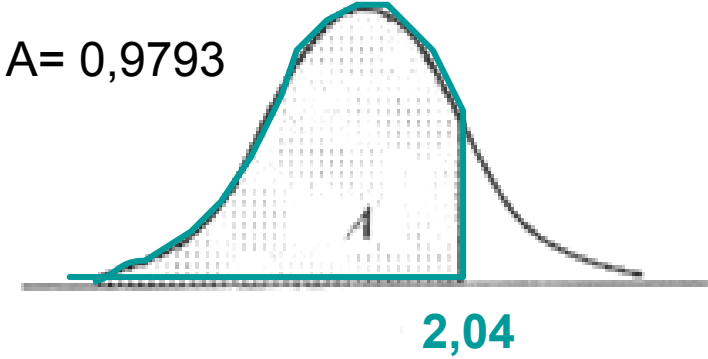
Olasılığı bulun: $P(z \leq 2,04)$

Tablo 1'de gösterilen alanlar ►



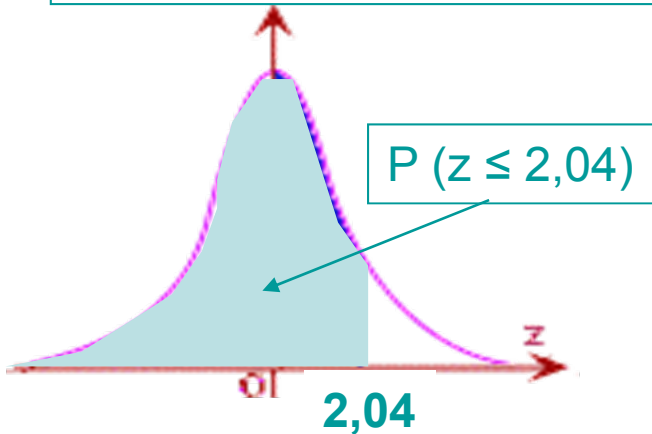
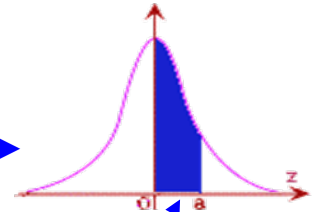
Tablodan $z \leq 2,04$ için alan (yığışımli; cumulative) $A = 0,9793$

Z'nin 2,04'den küçük olması olasılığı:
 $P(z \leq 2,04) = 0,9793$



Z'nin 2,04'den küçük olması olasılığı:
 $P(z \leq 2,04) = 0,5000 + 0,4793 = 0,9793$

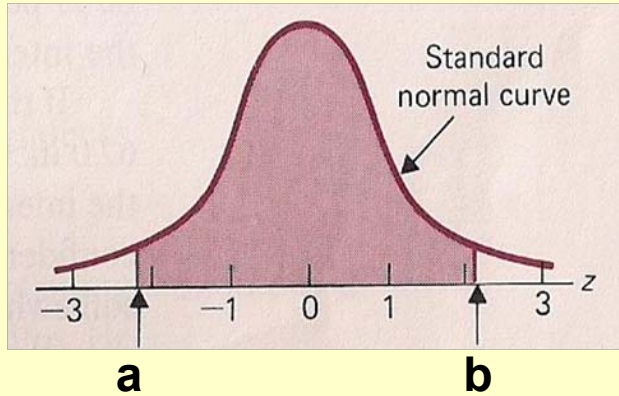
Tablo 2'de gösterilen alanlar ►



a	0.00	0.01	0.02	0.03	0.04	0.05
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842

**BU SLAYTTAN SONRAKİ
BÖLÜM (slayt no.:15-25)
1.VİZE KAPSAMI DIŞINDADIR.**

Rastlantısal bir değişkenin standartlaştırılması



$$z = \frac{x - \mu}{\sigma}$$

m ya da μ = **x**'in aritmetik ortalaması

s ya da σ = **x**'in standart sapması

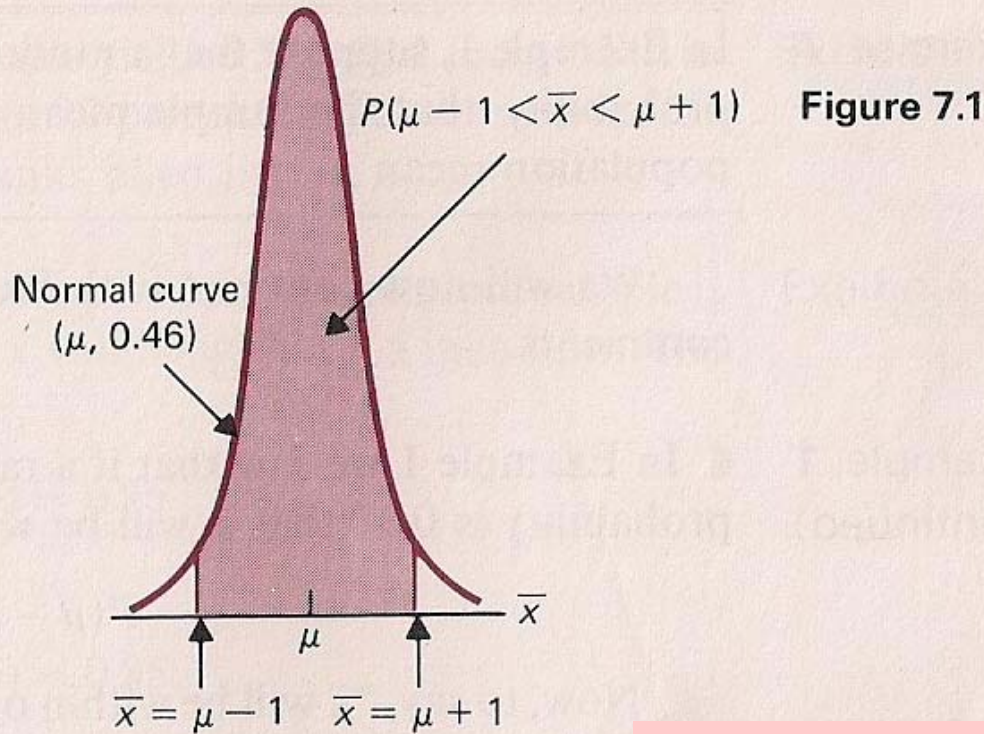
Bir x değerini Z skoruna dönüştürmek için:

$$x = a \blacktriangleright z = (a - \mu) / \sigma / \sqrt{n} \quad \text{veya} \quad z = (a - m) / s / \sqrt{n}$$

$$x = b \blacktriangleright z = (b - \mu) / \sigma / \sqrt{n} \quad \text{veya} \quad z = (b - m) / s / \sqrt{n}$$

$$a = m - z_{\alpha/2} s / \sqrt{n}$$

$$b = m + z_{\alpha/2} s / \sqrt{n}$$

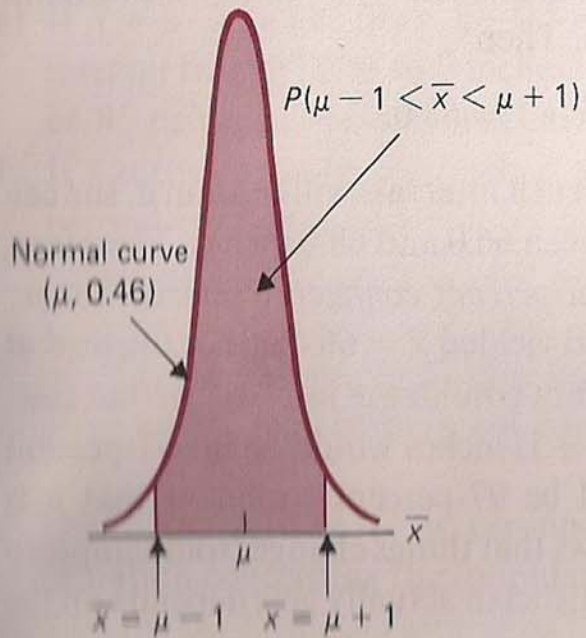


Bir plancı büyük bir kentteki hane büyüklükleri hakkında betimleyici rapor verecektir. Geçmişte yapılmış çalışmalarda bu büyük kentteki hane büyüklüklerinin standart sapması 2.50 olarak bulunmuştur. Kentten olasılıklı yöntemle 30 hanelik bir örnek seçmeye karar vermiştir. Bu örneğin ortalamasının (m), ana kitle ortalaması çevresinde ± 1 kişilik güven aralığında içinde kalmasının olasılığı nedir?

Örnek ortalaması (m) için z değerinin hesaplanması:

$$m = \bar{x} = \mu + 1 \text{ is}$$

$$z = \frac{(\mu + 1) - \mu}{0.46} = \frac{1}{0.46} \doteq 2.17.$$

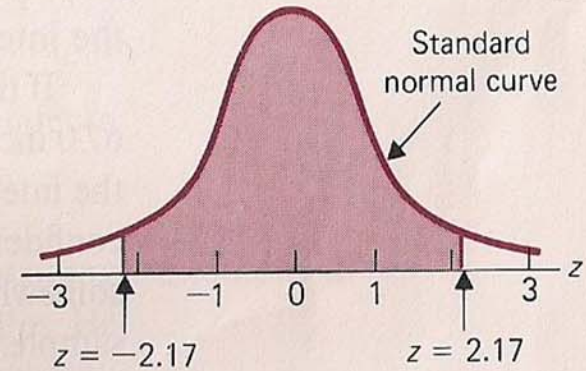


$$z = \frac{\bar{x} - \mu}{0.46}$$

Change to z

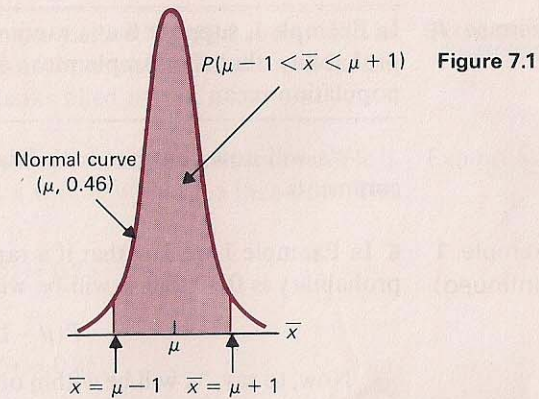
$$\bar{x} = \mu - 1 \rightarrow z \doteq -2.17$$

$$\bar{x} = \mu + 1 \rightarrow z \doteq 2.17$$



$$\text{Area} = 0.9850 - 0.0150 = 0.9700$$

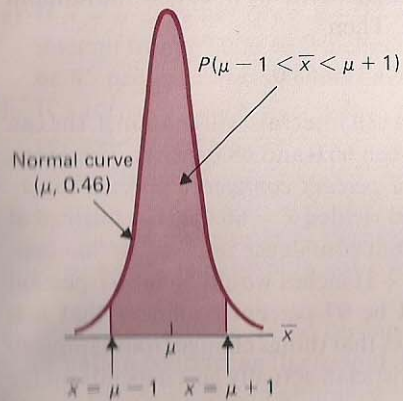
Alan



and the z-score for $\bar{x} = \mu + 1$ is

$$z = \frac{(\mu + 1) - \mu}{0.46} = \frac{1}{0.46} \doteq 2.17.$$

So we get the following:

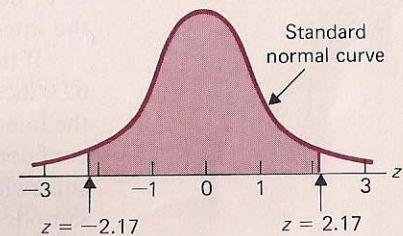


$$z = \frac{\bar{x} - \mu}{0.46}$$

Change to z

$$\bar{x} = \mu - 1 \rightarrow z \doteq -2.17$$

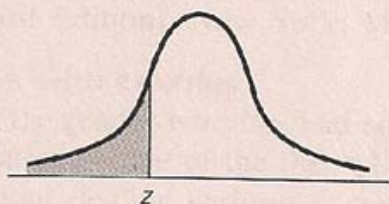
$$\bar{x} = \mu + 1 \rightarrow z \doteq 2.17$$



$$\text{Area} = 0.9850 - 0.0150 = 0.9700$$

Table I

Areas under the standard normal curve (Areas to the left)



z	0	1	2	3	4	5	6	7	8	9
-3.0*	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
-2.9	.0019	.0018	.0017	.0017	.0016	.0016	.0015	.0015	.0014	.0014
-2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0020	.0020	.0019
-2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
-2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
-2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
-2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
-2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
-2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
-2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
-2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
-1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
-1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
-1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
-1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
-1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
-1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
-1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
-1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
-1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
-1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
-.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
-.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
-.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
-.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
-.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
-.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
-.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
-.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
-.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
-.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

* For $z \leq -4$ the areas are 0 to four decimal places.

Applying this formula is straightforward. For example, determining the probability of obtaining at least 100 heads on 300 coin flips would involve finding the area under the normal curve above the following z :

$$z = \frac{100 - (300)(.5)}{\sqrt{(300)(.5)(.5)}} = -5.77.$$

This area is approximately 1, and so we can be almost certain to obtain at least 100 heads if we flip a coin 300 times.

300 adet işyeriyle anket yaptık. Tüm denekler YS12 no.lu soruyu (*Yeni yapılan KSS'ne gitmek ister misiniz?*) yanıtladılar. Bu soruya “Evet” cevabını verenlerin sayısı 100.

İşyerlerinin yeni yapılan KSS'ne gitmek isteyip istemediği konusunda ne söyleyebiliriz?

İşyerlerinin en az %30'unun gitmek istediğini söyleyebilir miyiz?

STANDART HATA

Oranlar İçin

$$E = z_{\alpha/2} \sqrt{\frac{pq}{n}}$$

PROBLEM: Bir mahalleden 40 yapıyı rastlantılı örneklemeyle seçtim. Bu yapıların 12 tanesi depremde hasar görme riski taşıyor.

Hasar riski taşıyan yapıların ana kitledeki oranını örneğe dayanarak hesaplarken, bu büyüklükte bir örnek kullanmış olmaktan ötürü hata yapabilirim. **Bu örneklemeden kaynaklanan standart hata ne kadardır?**

$$p = 12/40 = 0.30 \quad \sigma_p = \sqrt{\frac{(0.3)(0.7)}{40}} = 0.072$$

$$\text{Alt sınır} = .30 - (1.96)(0.072) = .16$$

$$\text{Üst sınır} = .30 + (1.96)(0.072) = .44.$$

$$\text{GÜVEN ARALIĞI: } 0.16 \leq \pi \leq .44.$$

GÜVEN ARALIĞI

Oranlar İçin

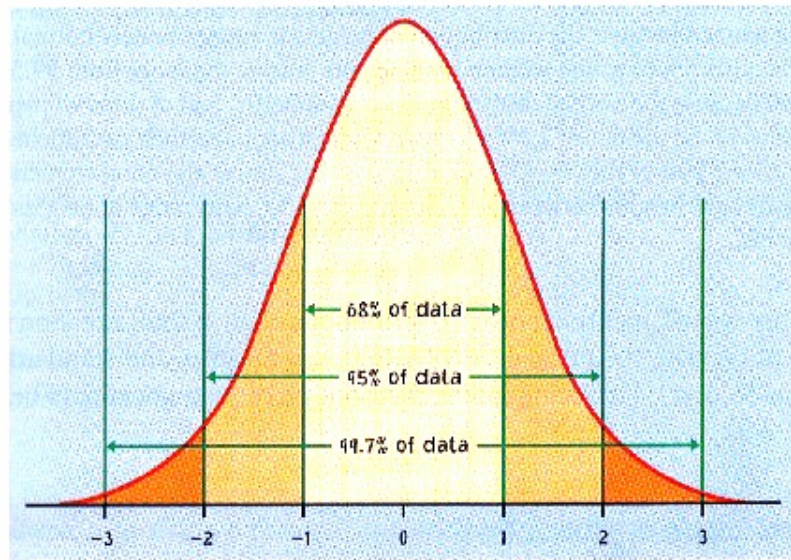


Figure 1.20 The 68–95–99.7 rule for normal distributions.

$$\bar{p} \pm z \sigma_{\bar{p}}$$

%95 güven düzeyinde,
güven aralığının z- değeri

Standart hata

$$\bar{p} \pm 1,96 \sigma_{\bar{p}}$$

Problemdeki örnek için alt sınır = $.30 - (1.96)(0.072) = .16$

Problemdeki örnek için üst sınır = $.30 + (1.96)(0.072) = .44$.

GÜVEN ARALIĞI: $0.16 \leq \pi \leq .44$.

GÜVEN ARALIĞI

Oranlar İçin

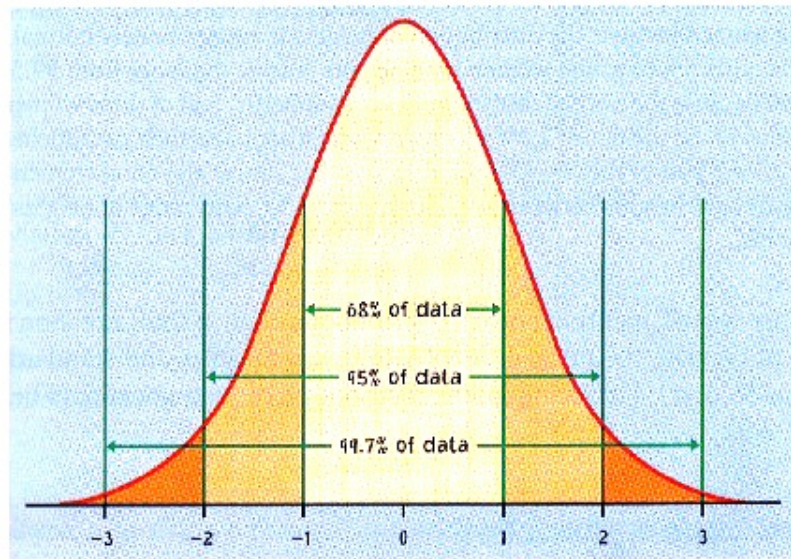


Figure 1.20 The 68–95–99.7 rule for normal distributions.

$$\rho \pm z \sigma_p$$

%95 güven düzeyinde,
güven aralığının z- değerleri

Standart hata

$$\rho \pm 1,96 \sigma_p$$

Problemdeki örnek için alt sınır = $.30 - (1.96)(0.072) = .16$
Problemdeki örnek için üst sınır = $.30 + (1.96)(0.072) = .44$.

GÜVEN ARALIĞI: $0.16 \leq \pi \leq .44$.