# Working Backwards with the Normal Distribution

Average IQ Scores by Country 2021 Average IQ by State 2021 IQ Classifications

IQ Scores are Normally Distributed with a mean of 100 and a standard deviation of 15.

What IQ Score is needed to be considered a Genius?



What IQ Score is needed to be eligible for MENSA membership?





### A term that is no longer in use!

The key to answering all these questions is to work backwards!



.00 0000 0398 0793 1179 1554 1915	.01 .0040 .0438 .0832 .1217 .1591	.02 .0080 .0478 .0871 .1255 .1628	.03 .0120 .0517 .0910 1293	.04 .0160 .0557	.05	.06	.07	.08	.09
0000 0398 0793 1179 1554 1915	.0040 .0438 .0832 .1217 .1591	.0080 .0478 .0871 .1255 1628	.0120 .0517 .0910 1293	.0160 .0557	.0199	0230			
0398 0793 1179 1554 1915	.0438 .0832 .1217 .1591	.0478 .0871 .1255 1628	.0517 .0910 1293	.0557		.0239	.0279	.0319	.0359
0793 1179 1554 1915	.0832 .1217 .1591	.0871 .1255 1628	.0910		.0596	.0636	.0675	.0714	.0753
1179 1554 1915	.1217 .1591	.1255	1293	.0948	.0987	.1026	.1064	.1103	.1141
1554 1915	.1591	1628	.12/5	.1331	.1368	.1406	.1443	.1480	.1517
1915		.1020	.1664	.1700	.1736	.1772	.1808	.1844	.1879
	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
4452	.4463	.4474	.4484	.4495 *	.4505	.4515	.4525	.4535	.4545
4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 *	.4951	.4952
4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
4999									
	2380 2881 1159 1413 1643 1849 1032 192 1332 1452 1554 1641 1713 1772 1821 1821 1861 1918 1938 1953 1965 1974 1981 1965 1974 1981 1987 1999 1085 1999 1085 1095 1	1,2011           12881         .2910           1159         .3186           1413         .3438           1643         .3665           1849         .3869           1032         .4049           1192         .4207           1433         .4345           1452         .4463           1554         .4564           1641         .4649           1713         .4719           1772         .4778           1821         .4826           1861         .4864           1893         .4940           1953         .4955           1965         .4966           1974         .4987           14987         .4987           14999         .4987	2380 $22010$ $2939$ $1881$ $22910$ $2939$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3665$ $3686$ $1849$ $3869$ $3888$ $1032$ $4049$ $4066$ $1192$ $4207$ $4222$ $1332$ $4345$ $4357$ $1452$ $4463$ $4474$ $1554$ $4564$ $4573$ $1641$ $4649$ $4656$ $1713$ $4719$ $4726$ $1772$ $4778$ $4783$ $1821$ $4826$ $4830$ $1861$ $44864$ $4868$ $1893$ $4920$ $4922$ $1938$ $4940$ $4941$ $1953$ $4955$ $4956$ $1965$ $4966$ $4967$ $1974$ $4982$ $4982$	2380 $.2611$ $.2042$ $.2073$ $2881$ $.2910$ $.2939$ $.2967$ $1159$ $.3186$ $.3212$ $.3238$ $1413$ $.3438$ $.3461$ $.3485$ $1643$ $.3665$ $.3686$ $.3708$ $1849$ $.3869$ $.3888$ $.3907$ $1032$ $.4049$ $.4066$ $.4082$ $1192$ $.4207$ $.4222$ $.4236$ $1332$ $.4345$ $.4357$ $.4370$ $1452$ $.4463$ $.4474$ $.4484$ $1554$ $.4564$ $.4573$ $.4582$ $1641$ $.4649$ $.4656$ $.4664$ $1713$ $.4719$ $.4726$ $.4732$ $1772$ $.4778$ $.4783$ $.4788$ $1821$ $.4826$ $.4830$ $.4834$ $1861$ $.4868$ $.4871$ $.4925$ $1938$ $.4920$ $.4922$ $.4925$ $1938$ $.4940$ $.4941$ $.4943$ $1955$ $.4956$	$2360$ $.2611$ $.2642$ $.2673$ $.2704$ $2881$ $.2910$ $.2939$ $.2967$ $.2995$ $1159$ $.3186$ $.3212$ $.3238$ $.3264$ $4413$ $.3438$ $.3461$ $.3485$ $.3508$ $1643$ $.3665$ $.3686$ $.3708$ $.3729$ $1849$ $.3869$ $.3888$ $.3907$ $.3925$ $1032$ $.4049$ $.4066$ $.4082$ $.4099$ $1192$ $.4207$ $.4222$ $.4236$ $.4251$ $1332$ $.4345$ $.4357$ $.4370$ $.4382$ $1452$ $.4463$ $.4474$ $.4484$ $.4495$ $*$ $1554$ $.4564$ $.4573$ $.4582$ $.4591$ $\bullet$ $1641$ $.4649$ $.4656$ $.4664$ $.4671$ $\bullet$ $1772$ $.4778$ $.4783$ $.4788$ $.4793$ $\bullet$ $1821$ $.4826$ $.4830$ $.4834$ $.4838$ $\bullet$ $\bullet$ $\bullet$ $\bullet$ $\bullet$	2580 $.2011$ $.2042$ $.2073$ $.2704$ $.2734$ $2881$ $.2910$ $.2939$ $.2967$ $.2995$ $.3023$ $1159$ $.3186$ $.3212$ $.3238$ $.3264$ $.3289$ $4413$ $.3438$ $.3461$ $.3485$ $.3508$ $.3531$ $1643$ $.3665$ $.3686$ $.3708$ $.3729$ $.3749$ $849$ $.3869$ $.3888$ $.3907$ $.3925$ $.3944$ $1032$ $.4049$ $.4066$ $.4082$ $.4099$ $.4115$ $1192$ $.4207$ $.4222$ $.4236$ $.4251$ $.4265$ $1332$ $.4345$ $.4357$ $.4370$ $.4382$ $.4394$ $1452$ $.4463$ $.4474$ $.4484$ $.4495$ $.4505$ $1554$ $.4564$ $.4573$ $.4582$ $.4591$ $.4599$ $1641$ $.4649$ $.4656$ $.4664$ $.4671$ $.4678$ $1713$ $.4719$ $.4726$ $.4732$ .4738 $.4744$ <tr< td=""><td>2500 <math>.2011</math> <math>.2042</math> <math>.2073</math> <math>.2704</math> <math>.2734</math> <math>.2764</math> <math>2881</math> <math>.2910</math> <math>.2939</math> <math>.2967</math> <math>.2995</math> <math>.3023</math> <math>.3051</math> <math>1159</math> <math>.3186</math> <math>.3212</math> <math>.3238</math> <math>.3264</math> <math>.3289</math> <math>.3315</math> <math>4413</math> <math>.3438</math> <math>.3461</math> <math>.3485</math> <math>.3508</math> <math>.3531</math> <math>.3554</math> <math>643</math> <math>.3665</math> <math>.3666</math> <math>.3708</math> <math>.3729</math> <math>.3749</math> <math>.3770</math> <math>849</math> <math>.3869</math> <math>.3888</math> <math>.3907</math> <math>.3925</math> <math>.3944</math> <math>.3962</math> <math>1032</math> <math>.4049</math> <math>.4066</math> <math>.4082</math> <math>.4099</math> <math>.4115</math> <math>.4131</math> <math>1492</math> <math>.4207</math> <math>.4222</math> <math>.4236</math> <math>.4251</math> <math>.4265</math> <math>.4279</math> <math>4332</math> <math>.4345</math> <math>.4357</math> <math>.4370</math> <math>.4382</math> <math>.4394</math> <math>.4406</math> <math>1452</math> <math>.4463</math> <math>.4474</math> <math>.4484</math> <math>.4495</math> <math>.4505</math> <math>.4515</math> <math>1554</math> <math>.4564</math> <math>.4573</math> <math>.4582</math> <math>.4591</math> <math>.4608</math> <math>.4774</math> <math>.4775</math> <math>.4778</math> <math>.4788</math>       &lt;</td><td><math display="block">\begin{array}{c ccccccccccccccccccccccccccccccccccc</math></td><td>2500       .2611       .2642       .2673       .2794       .2784       .2794       .3749       .3740       .3340       .3365       .3340       .3365       .3997       .3923       .3944       .3962       .3980       .3997       .3922       .3944       .3962       .3980       .3997       .4032       .4306       .4429       .4422       .4422       .4422       .4422       .4425       .4463       .4429       .4455       .4505       .4515       .4525       .4535       <td< td=""></td<></td></tr<>	2500 $.2011$ $.2042$ $.2073$ $.2704$ $.2734$ $.2764$ $2881$ $.2910$ $.2939$ $.2967$ $.2995$ $.3023$ $.3051$ $1159$ $.3186$ $.3212$ $.3238$ $.3264$ $.3289$ $.3315$ $4413$ $.3438$ $.3461$ $.3485$ $.3508$ $.3531$ $.3554$ $643$ $.3665$ $.3666$ $.3708$ $.3729$ $.3749$ $.3770$ $849$ $.3869$ $.3888$ $.3907$ $.3925$ $.3944$ $.3962$ $1032$ $.4049$ $.4066$ $.4082$ $.4099$ $.4115$ $.4131$ $1492$ $.4207$ $.4222$ $.4236$ $.4251$ $.4265$ $.4279$ $4332$ $.4345$ $.4357$ $.4370$ $.4382$ $.4394$ $.4406$ $1452$ $.4463$ $.4474$ $.4484$ $.4495$ $.4505$ $.4515$ $1554$ $.4564$ $.4573$ $.4582$ $.4591$ $.4608$ $.4774$ $.4775$ $.4778$ $.4788$ <	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2500       .2611       .2642       .2673       .2794       .2784       .2794       .3749       .3740       .3340       .3365       .3340       .3365       .3997       .3923       .3944       .3962       .3980       .3997       .3922       .3944       .3962       .3980       .3997       .4032       .4306       .4429       .4422       .4422       .4422       .4422       .4425       .4463       .4429       .4455       .4505       .4515       .4525       .4535 <td< td=""></td<>

z score Area

<u>score</u> <u>Arc</u>

1.6450.45002.5750.4950

What z value is associated with finding the following shaded portions of the bell? To answer these questions we will need to work backwards with our z table.



Top 1%

Use the z table working backwards to determine the z value that represents 49% of the bell being shaded.





TABLE A-	2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

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z score Area

score An

1.6450.45002.5750.4950



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**<sup>nd</sup> then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.99,0,1)

#### Top 1%

# Bottom 1% or the 1<sup>st</sup> Percentile



Use the z table working backwards to determine the z value that represents 49% of the bell being shaded.





	Z Stan	dard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.035
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.075
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.114
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.151
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.187
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.222
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.254
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.285
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.313
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.338
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.362
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.383
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.40
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.41
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.43
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.444
1.6	.4452	.4463	.4474	.4484	.4495	* .4505	.4515	.4525	.4535	.454
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.463
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.470
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.476
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.48
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.48
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.489
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.493
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.493
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	* .4951	.49
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.49
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.49
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.498
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.498
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.499
3.10										
and	.4999									
higher										

<u>z score</u> Area

0.4500 1.645

2.575

0.4950 🔫

-

# Bottom 1% or the 1<sup>st</sup> Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2<sup>nd</sup>** then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.01,0,1)



Use the z table working backwards to determine the z value that represents 45% of the bell being shaded.



Тор 5%



TABLE A-	-2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

-

z score Area

score An

1.6450.45002.5750.4950





Top 5%

# Bottom 5% or the 5<sup>th</sup> Percentile



Use the z table working backwards to determine the z value that represents 45% of the bell being shaded along with **symmetry** to determine a negative z value.





	Z Stan	dard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.035
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.075
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.114
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.151
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.187
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.222
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.254
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.285
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.313
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.338
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.362
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.383
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.40
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.41
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.43
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.444
1.6	.4452	.4463	.4474	.4484	.4495	* .4505	.4515	.4525	.4535	.454
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.463
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.470
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.476
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.48
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.48
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.489
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.493
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.493
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	* .4951	.49
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.49
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.49
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.498
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.498
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.499
3.10										
and	.4999									
higher										

<u>z score</u> Area

0.4500 1.645

2.575

0.4950 🔫

-

# Bottom 5% or the 5<sup>th</sup> Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2<sup>nd</sup>** then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.05,0,1)



Use the z table working backwards to determine the z value that represents 40% of the bell being shaded.



# Top 10%



TABLE A-	-2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

-

z score Area

score An

1.6450.45002.5750.4950



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**<sup>nd</sup> then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.90,0,1)

### Top 10%

# Bottom 10% or 1<sup>st</sup> Decile



Use the z table working backwards to determine the z value that represents 40% of the bell being shaded.





TABLE A-	2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

-

z score Area

score An

1.6450.45002.5750.4950

# Bottom 10% or 1<sup>st</sup> Decile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**<sup>nd</sup> then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.10,0,1)

# 3<sup>rd</sup> Quartile



Use the z table working backwards to determine the z value that represents 25% of the bell being shaded.





TABLE A-	2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

-

z score Area

score An

1.6450.45002.5750.4950

# 3<sup>rd</sup> Quartile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2<sup>nd</sup>** then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.75,0,1)

# 1<sup>st</sup> Quartile



Use the z table working backwards to determine the z value that represents 25% of the bell being shaded.





TABLE A-	2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

-

z score Area

score An

1.6450.45002.5750.4950

# 1<sup>st</sup> Quartile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2<sup>nd</sup>** then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

# InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.25,0,1)

# 85<sup>th</sup> Percentile



Use the z table working backwards to determine the z value that represents 35% of the bell being shaded.





TABLE A-	-2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

-

z score Area

score An

1.6450.45002.5750.4950

# 85<sup>th</sup> Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**<sup>nd</sup> then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.85,0,1)





Use the z table working backwards to determine the z value that represents 10% of the bell being shaded.





TABLE A-	-2 Stan	idard Norn	nal ( <i>z</i> ) Dis	tribution						
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495 >	* .4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 >	* .4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.10										
and	.4999									
higher										
NOTE: For	r values of z	above 3.09, u	se 0.4999 for	the area.						

-

z score Area

score An

1.6450.45002.5750.4950





TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2<sup>nd</sup>** then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

# InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.60,0,1)





Use the z table working backwards to determine the z value that represents 10% of the bell being shaded along with **symmetry** to determine a negative z value.





.00 0000 0398 0793 1179 1554 1915	.01 .0040 .0438 .0832 .1217 .1591	.02 .0080 .0478 .0871 .1255 .1628	.03 .0120 .0517 .0910 1293	.04 .0160 .0557	.05	.06	.07	.08	.09
0000 0398 0793 1179 1554 1915	.0040 .0438 .0832 .1217 .1591	.0080 .0478 .0871 .1255 1628	.0120 .0517 .0910 1293	.0160 .0557	.0199	0230			
0398 0793 1179 1554 1915	.0438 .0832 .1217 .1591	.0478 .0871 .1255 1628	.0517 .0910 1293	.0557		.0239	.0279	.0319	.0359
0793 1179 1554 1915	.0832 .1217 .1591	.0871 .1255 1628	.0910		.0596	.0636	.0675	.0714	.0753
1179 1554 1915	.1217 .1591	.1255	1293	.0948	.0987	.1026	.1064	.1103	.1141
1554 1915	.1591	1628	.12/5	.1331	.1368	.1406	.1443	.1480	.1517
1915		.1020	.1664	.1700	.1736	.1772	.1808	.1844	.1879
	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
4452	.4463	.4474	.4484	.4495 *	.4505	.4515	.4525	.4535	.4545
4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949 *	.4951	.4952
4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
4999									
	2380 2881 1159 1413 1643 1849 1032 192 1332 1452 1554 1641 1713 1772 1821 1821 1861 1918 1938 1953 1965 1974 1981 1965 1974 1981 1987 1999 1085 1999 1085 1095 1	1,2011           12881         .2910           1159         .3186           1413         .3438           1643         .3665           1849         .3869           1032         .4049           1192         .4207           1433         .4345           1452         .4463           1554         .4564           1641         .4649           1713         .4719           1772         .4778           1821         .4826           1861         .4864           1893         .4940           1953         .4955           1965         .4966           1974         .4987           14987         .4987           14999         .4987	2380 $22010$ $2939$ $1881$ $22910$ $2939$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3186$ $3212$ $1159$ $3665$ $3686$ $1849$ $3869$ $3888$ $1032$ $4049$ $4066$ $1192$ $4207$ $4222$ $1332$ $4345$ $4357$ $1452$ $4463$ $4474$ $1554$ $4564$ $4573$ $1641$ $4649$ $4656$ $1713$ $4719$ $4726$ $1772$ $4778$ $4783$ $1821$ $4826$ $4830$ $1861$ $44864$ $4868$ $1893$ $4920$ $4922$ $1938$ $4940$ $4941$ $1953$ $4955$ $4956$ $1965$ $4966$ $4967$ $1974$ $4982$ $4982$	2380 $.2611$ $.2042$ $.2073$ $2881$ $.2910$ $.2939$ $.2967$ $1159$ $.3186$ $.3212$ $.3238$ $1413$ $.3438$ $.3461$ $.3485$ $1643$ $.3665$ $.3686$ $.3708$ $1849$ $.3869$ $.3888$ $.3907$ $1032$ $.4049$ $.4066$ $.4082$ $1192$ $.4207$ $.4222$ $.4236$ $1332$ $.4345$ $.4357$ $.4370$ $1452$ $.4463$ $.4474$ $.4484$ $1554$ $.4564$ $.4573$ $.4582$ $1641$ $.4649$ $.4656$ $.4664$ $1713$ $.4719$ $.4726$ $.4732$ $1772$ $.4778$ $.4783$ $.4788$ $1821$ $.4826$ $.4830$ $.4834$ $1861$ $.4868$ $.4871$ $.4925$ $1938$ $.4920$ $.4922$ $.4925$ $1938$ $.4940$ $.4941$ $.4943$ $1955$ $.4956$	$2360$ $.2611$ $.2642$ $.2673$ $.2704$ $2881$ $.2910$ $.2939$ $.2967$ $.2995$ $1159$ $.3186$ $.3212$ $.3238$ $.3264$ $4413$ $.3438$ $.3461$ $.3485$ $.3508$ $1643$ $.3665$ $.3686$ $.3708$ $.3729$ $1849$ $.3869$ $.3888$ $.3907$ $.3925$ $1032$ $.4049$ $.4066$ $.4082$ $.4099$ $1192$ $.4207$ $.4222$ $.4236$ $.4251$ $1332$ $.4345$ $.4357$ $.4370$ $.4382$ $1452$ $.4463$ $.4474$ $.4484$ $.4495$ $*$ $1554$ $.4564$ $.4573$ $.4582$ $.4591$ $\bullet$ $1641$ $.4649$ $.4656$ $.4664$ $.4671$ $\bullet$ $1772$ $.4778$ $.4783$ $.4788$ $.4793$ $\bullet$ $1821$ $.4826$ $.4830$ $.4834$ $.4838$ $\bullet$ $\bullet$ $\bullet$ $\bullet$ $\bullet$	2580 $.2011$ $.2042$ $.2073$ $.2704$ $.2734$ $2881$ $.2910$ $.2939$ $.2967$ $.2995$ $.3023$ $1159$ $.3186$ $.3212$ $.3238$ $.3264$ $.3289$ $4413$ $.3438$ $.3461$ $.3485$ $.3508$ $.3531$ $1643$ $.3665$ $.3686$ $.3708$ $.3729$ $.3749$ $849$ $.3869$ $.3888$ $.3907$ $.3925$ $.3944$ $1032$ $.4049$ $.4066$ $.4082$ $.4099$ $.4115$ $1192$ $.4207$ $.4222$ $.4236$ $.4251$ $.4265$ $1332$ $.4345$ $.4357$ $.4370$ $.4382$ $.4394$ $1452$ $.4463$ $.4474$ $.4484$ $.4495$ $.4505$ $1554$ $.4564$ $.4573$ $.4582$ $.4591$ $.4599$ $1641$ $.4649$ $.4656$ $.4664$ $.4671$ $.4678$ $1713$ $.4719$ $.4726$ $.4732$ .4738 $.4744$ <tr< td=""><td>2500 <math>.2011</math> <math>.2042</math> <math>.2073</math> <math>.2704</math> <math>.2734</math> <math>.2764</math> <math>2881</math> <math>.2910</math> <math>.2939</math> <math>.2967</math> <math>.2995</math> <math>.3023</math> <math>.3051</math> <math>1159</math> <math>.3186</math> <math>.3212</math> <math>.3238</math> <math>.3264</math> <math>.3289</math> <math>.3315</math> <math>4413</math> <math>.3438</math> <math>.3461</math> <math>.3485</math> <math>.3508</math> <math>.3531</math> <math>.3554</math> <math>643</math> <math>.3665</math> <math>.3666</math> <math>.3708</math> <math>.3729</math> <math>.3749</math> <math>.3770</math> <math>849</math> <math>.3869</math> <math>.3888</math> <math>.3907</math> <math>.3925</math> <math>.3944</math> <math>.3962</math> <math>1032</math> <math>.4049</math> <math>.4066</math> <math>.4082</math> <math>.4099</math> <math>.4115</math> <math>.4131</math> <math>1492</math> <math>.4207</math> <math>.4222</math> <math>.4236</math> <math>.4251</math> <math>.4265</math> <math>.4279</math> <math>4332</math> <math>.4345</math> <math>.4357</math> <math>.4370</math> <math>.4382</math> <math>.4394</math> <math>.4406</math> <math>1452</math> <math>.4463</math> <math>.4474</math> <math>.4484</math> <math>.4495</math> <math>.4505</math> <math>.4515</math> <math>1554</math> <math>.4564</math> <math>.4573</math> <math>.4582</math> <math>.4591</math> <math>.4608</math> <math>.4774</math> <math>.4775</math> <math>.4778</math> <math>.4788</math>       &lt;</td><td><math display="block">\begin{array}{c ccccccccccccccccccccccccccccccccccc</math></td><td>2500       .2611       .2642       .2673       .2794       .2784       .2794       .3749       .3740       .3340       .3365       .3340       .3365       .3997       .3923       .3944       .3962       .3980       .3997       .3922       .3944       .3962       .3980       .3997       .4032       .4306       .4429       .4422       .4422       .4422       .4422       .4425       .4463       .4429       .4455       .4505       .4515       .4525       .4535       <td< td=""></td<></td></tr<>	2500 $.2011$ $.2042$ $.2073$ $.2704$ $.2734$ $.2764$ $2881$ $.2910$ $.2939$ $.2967$ $.2995$ $.3023$ $.3051$ $1159$ $.3186$ $.3212$ $.3238$ $.3264$ $.3289$ $.3315$ $4413$ $.3438$ $.3461$ $.3485$ $.3508$ $.3531$ $.3554$ $643$ $.3665$ $.3666$ $.3708$ $.3729$ $.3749$ $.3770$ $849$ $.3869$ $.3888$ $.3907$ $.3925$ $.3944$ $.3962$ $1032$ $.4049$ $.4066$ $.4082$ $.4099$ $.4115$ $.4131$ $1492$ $.4207$ $.4222$ $.4236$ $.4251$ $.4265$ $.4279$ $4332$ $.4345$ $.4357$ $.4370$ $.4382$ $.4394$ $.4406$ $1452$ $.4463$ $.4474$ $.4484$ $.4495$ $.4505$ $.4515$ $1554$ $.4564$ $.4573$ $.4582$ $.4591$ $.4608$ $.4774$ $.4775$ $.4778$ $.4788$ <	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2500       .2611       .2642       .2673       .2794       .2784       .2794       .3749       .3740       .3340       .3365       .3340       .3365       .3997       .3923       .3944       .3962       .3980       .3997       .3922       .3944       .3962       .3980       .3997       .4032       .4306       .4429       .4422       .4422       .4422       .4422       .4425       .4463       .4429       .4455       .4505       .4515       .4525       .4535 <td< td=""></td<>

z score Area

<u>score</u> <u>Arc</u>

1.6450.45002.5750.4950





TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2<sup>nd</sup>** then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the area to the left of the z value, enter the mean  $\mu$ , enter the standard deviation  $\sigma$

#### InvNorm(area to the left, $\mu$ , $\sigma$ ) and press enter

InvNorm (0.40,0,1)