

Present Thursday: #3, 6, and 7

9:55 Rachel Web., Jena, Rebekah, Luke, Arie, Kelly Bei.
11:00 Calli Vik., Molly, Tyson, Colin, Janessa, Mykki Bor.

Wednesday's Presenters: (#11)

9:55 Hannah Rot., Chelsea, Molly, Amy, Jared, Briana Tor.
11:00 Victoria Sch., Abbey, Kelly, Jeffrey, Kayla, Kelly Tom.

Homework:

- Part A) Redo #3, 6, and 7 from Wednesday's homework using
(i) an 80% confidence interval and
(ii) a 99% confidence interval

Part B) (from your textbook)

Sec. 13.5 #7-14 all, #19-22 all, 37, 39, 45, 47

Present Monday: A(#7) and B(#39, 45)

9:55 - Leigha B, Lexi, Ashley, Mae, Aspyn, Abby B.

11:00 - Brittany E, Lauren, Katie, Courtney, Sarah, Tyler H.

Mth126 Quick Quiz
The. 03/10/2011

Name: _____
Section: 9:55 11:00

Suppose two polls are conducted on a property tax referendum. Assume both use an appropriate, unbiased sampling design. In the first poll, 123 people are surveyed and 58% plan to vote in favor of the referendum. In the second poll, 624 people are surveyed and 55% are in favor of the referendum.

Calculate the margin of error for each poll.

- a) Does the first poll provide sufficient evidence to conclude that the referendum will pass?
b) Does the second poll?

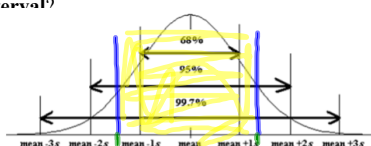
a) Poll 1: $\frac{1}{\sqrt{123}} \approx 9.0\%$, so confidence interval is 49% to 67%.
Suggests it will pass, but evidence is not conclusive.

b) Poll 2: $\frac{1}{\sqrt{624}} \approx 4.0\%$, so confidence interval is 51 to 59%. This evidence is stronger that the referendum will likely pass.

Example: Suppose in a survey of 100 people, 44% intend to vote for a school referendum.

4. What if we are told the standard deviation for the 100 person sample is 0.02, or 2 percentage points. What is the 68% confidence interval?

68% CI.
42% to 46%



5. What is the 80% confidence interval?

To do this, we must find the z-scores that bound the middle 80% of the dataset. Use Table 10!

Table 10:

The column under A gives the proportion of the area under the entire curve that is between $z = 0$ and a positive value of z .



Because the curve is symmetric about the 0-value, the area between $z = 0$ and a negative value of z can be found by using the corresponding positive value of z .

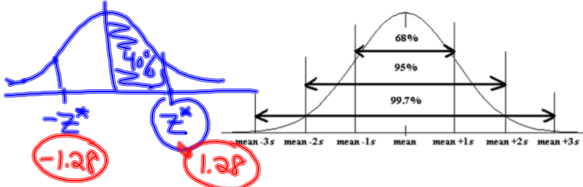
TABLE 10 Areas Under the Standard Normal Curve											
z	A	z	A	z	A	z	A	z	A	z	A
.00	.0000	.36	.1123	.72	.2643	1.08	.4584	1.44	.4247	1.80	.3599
.01	.0040	.37	.1163	.73	.2683	1.09	.4625	1.45	.4287	1.81	.3639
.02	.0080	.38	.1201	.74	.2724	1.10	.4665	1.46	.4329	1.82	.3679
.03	.0120	.39	.1241	.75	.2764	1.11	.4706	1.47	.4371	1.83	.3719
.04	.0160	.40	.1281	.76	.2804	1.12	.4747	1.48	.4413	1.84	.3759
.05	.0200	.41	.1321	.77	.2845	1.13	.4788	1.49	.4455	1.85	.3799
.06	.0240	.42	.1361	.78	.2885	1.14	.4829	1.50	.4497	1.86	.3839
.07	.0280	.43	.1401	.79	.2925	1.15	.4870	1.51	.4539	1.87	.3879
.08	.0320	.44	.1441	.80	.2965	1.16	.4911	1.52	.4581	1.88	.3919
.09	.0360	.45	.1481	.81	.3005	1.17	.4952	1.53	.4623	1.89	.3959
.10	.0400	.46	.1521	.82	.3045	1.18	.4993	1.54	.4665	1.90	.3999
.11	.0440	.47	.1561	.83	.3085	1.19	.5034	1.55	.4707	1.91	.4039
.12	.0480	.48	.1601	.84	.3125	1.20	.5075	1.56	.4749	1.92	.4079
.13	.0520	.49	.1641	.85	.3165	1.21	.5116	1.57	.4791	1.93	.4119
.14	.0560	.50	.1681	.86	.3205	1.22	.5157	1.58	.4833	1.94	.4159
.15	.0600	.51	.1721	.87	.3245	1.23	.5198	1.59	.4875	1.95	.4199
.16	.0640	.52	.1761	.88	.3285	1.24	.5239	1.60	.4917	1.96	.4239
.17	.0680	.53	.1801	.89	.3325	1.25	.5280	1.61	.4959	1.97	.4279
.18	.0720	.54	.1841	.90	.3365	1.26	.5321	1.62	.4999	1.98	.4319
.19	.0760	.55	.1881	.91	.3405	1.27	.5362	1.63	.5041	1.99	.4359
.20	.0800	.56	.1921	.92	.3445	1.28	.5403	1.64	.5083	2.00	.4399
.21	.0840	.57	.1961	.93	.3485	1.29	.5444	1.65	.5125		
.22	.0880	.58	.2001	.94	.3525	1.30	.5485	1.66	.5167		
.23	.0920	.59	.2041	.95	.3565	1.31	.5526	1.67	.5209		
.24	.0960	.60	.2081	.96	.3605	1.32	.5567	1.68	.5251		
.25	.1000	.61	.2121	.97	.3645	1.33	.5608	1.69	.5293		
.26	.1040	.62	.2161	.98	.3685	1.34	.5649	1.70	.5335		
.27	.1080	.63	.2201	.99	.3725	1.35	.5690	1.71	.5377		
.28	.1120	.64	.2241	.00	.3765	1.36	.5731	1.72	.5419		
.29	.1160	.65	.2281	.01	.3805	1.37	.5772	1.73	.5461		
.30	.1200	.66	.2321	.02	.3845	1.38	.5813	1.74	.5503		
.31	.1240	.67	.2361	.03	.3885	1.39	.5854	1.75	.5545		
.32	.1280	.68	.2401	.04	.3925	1.40	.5896	1.76	.5587		
.33	.1320	.69	.2441	.05	.3965	1.41	.5937	1.77	.5629		
.34	.1360	.70	.2481	.06	.4005	1.42	.5979	1.78	.5671		
.35	.1400	.71	.2521	.07	.4045	1.43	.6020	1.79	.5713		
.36	.1440	.72	.2561	.08	.4085	1.44	.6062	1.80	.5755		
.37	.1480	.73	.2601	.09	.4125	1.45	.6104	1.81	.5797		
.38	.1520	.74	.2641	.10	.4165	1.46	.6146	1.82	.5839		
.39	.1560	.75	.2681	.11	.4205	1.47	.6188	1.83	.5881		
.40	.1600	.76	.2721	.12	.4245	1.48	.6230	1.84	.5923		
.41	.1640	.77	.2761	.13	.4285	1.49	.6272	1.85	.5965		
.42	.1680	.78	.2801	.14	.4325	1.50	.6314	1.86	.6007		
.43	.1720	.79	.2841	.15	.4365	1.51	.6356	1.87	.6049		
.44	.1760	.80	.2881	.16	.4405	1.52	.6398	1.88	.6091		
.45	.1800	.81	.2921	.17	.4445	1.53	.6440	1.89	.6133		
.46	.1840	.82	.2961	.18	.4485	1.54	.6482	1.90	.6175		
.47	.1880	.83	.3001	.19	.4525	1.55	.6524	1.91	.6217		
.48	.1920	.84	.3041	.20	.4565	1.56	.6566	1.92	.6259		
.49	.1960	.85	.3081	.21	.4605	1.57	.6608	1.93	.6301		
.50	.2000	.86	.3121	.22	.4645	1.58	.6650	1.94	.6343		
.51	.2040	.87	.3161	.23	.4685	1.59	.6692	1.95	.6385		
.52	.2080	.88	.3201	.24	.4725	1.60	.6734	1.96	.6427		
.53	.2120	.89	.3241	.25	.4765	1.61	.6776	1.97	.6469		
.54	.2160	.90	.3281	.26	.4805	1.62	.6818	1.98	.6511		
.55	.2200	.91	.3321	.27	.4845	1.63	.6860	1.99	.6553		
.56	.2240	.92	.3361	.28	.4885	1.64	.6902	2.00	.6595		
.57	.2280	.93	.3401	.29	.4925	1.65	.6944				
.58	.2320	.94	.3441	.30	.4965	1.66	.6986				
.59	.2360	.95	.3481	.31	.5005	1.67	.7028				
.60	.2400	.96	.3521	.32	.5045	1.68	.7070				
.61	.2440	.97	.3561	.33	.5085	1.69	.7112				
.62	.2480	.98	.3601	.34	.5125	1.70	.7154				
.63	.2520	.99	.3641	.35	.5165	1.71	.7196				
.64	.2560	.00	.3681	.36	.5205	1.72	.7238				
.65	.2600	.01	.3721	.37	.5245	1.73	.7280				
.66	.2640	.02	.3761	.38	.5285	1.74	.7322				
.67	.2680	.03	.3801	.39	.5325	1.75	.7364				
.68	.2720	.04	.3841	.40	.5365	1.76	.7406				
.69	.2760	.05	.3881	.41	.5405	1.77	.7448				
.70	.2800	.06	.3921	.42	.5445	1.78	.7490				
.71	.2840	.07	.3961	.43	.5485	1.79	.7532				
.72	.2880	.08	.4001	.44	.5525	1.80	.7574				
.73	.2920	.09	.4041	.45	.5565	1.81	.7616				
.74	.2960	.10	.4081	.46	.5605	1.82	.7658				
.75	.3000	.11	.4121	.47	.5645	1.83	.7700				
.76	.3040	.12	.4161	.48	.5685	1.84	.7742				
.77	.3080	.13	.4201	.49	.5725	1.85	.7784				
.78	.3120	.14	.4241	.50	.5765	1.86	.7826				
.79	.3160	.15	.4281	.51	.5805	1.87	.7868				
.80	.3200	.16	.4321	.52	.5845	1.88	.7910				
.81	.3240	.17	.4361	.53	.5885	1.89	.7952				
.82	.3280	.18	.4401	.54	.5925	1.90	.7994				
.83	.3320	.19	.4441	.55	.5965	1.91	.8036				
.84	.3360	.20	.4481	.56	.6005	1.92	.8078				
.85	.3400	.21	.4521	.57	.6045	1.93	.8120				
.86	.3440	.22	.4561	.58	.6085	1.94	.8162				
.87	.3480	.23	.4601	.59	.6125	1.95	.8204				
.88	.3520	.24	.4641	.60	.6165	1.96	.8246				
.89	.3560	.25	.4681	.61	.6205	1.97	.8288				
.90	.3600	.26	.4721	.62	.6245	1.98	.8330				
.91	.3640	.27	.4761	.63	.6285	1.99	.8372				
.92	.3680	.28	.4801	.64	.6325	2.00	.8414				
.93	.3720	.29	.4841	.65	.6365						
.94	.3760	.30	.4881	.66	.6405						
.95	.3800	.31	.4921	.67	.6445						
.96	.3840	.32	.4961	.68	.6485						
.97	.3880	.33	.5001	.69	.6525						
.98	.3920	.34	.5041	.70	.6565						
.99	.3960	.35	.5081	.71	.6605						
1.00	.4000	.36	.5121	.72	.6645						

1. What is the area under the curve between $z = 0$ and $z = 1$? 34.1%
(between -1, 1 I'd have $2 \times (34.1\%) = 68.2\%$)
2. What is the area under the curve between $z = -2$ and $z = 2$?
 $2 \times (.477) = .954$

Theorem: If a dataset is normally distributed with standard deviation s , and if the sample mean is m , then the $n\%$ **confidence interval** is found according to:

$$m \pm (z^*)(s),$$

where $n\%$ of the dataset is between $-z^*$ and $+z^*$.



Example: Suppose in a survey of 100 people, 44% intend to vote for a school referendum.

What is the 80% **confidence interval**?

To do this, we must find the z-scores that bound the middle 80% of the dataset. Use Table 10!

$$44\% - 1.28(2\%) = 41.4\%$$

$$44\% + 1.28(2\%) = 46.6\%$$

Given:

$$\bar{x} = 44\%$$

$$s = 2\%$$

Find a 90% C.I for the population.

$$\text{Want: } 44\% - (1.645)(2\%)$$

$$\text{and } 44\% + (1.645)(2\%)$$

More Examples - Empirical Rule:

The final exam scores in biology have a *normal distribution* with a mean of 72 and a standard deviation of 6. (Scores $\sim N(72,6)$)

a) What percent of all biology students scored between 60 and 84?

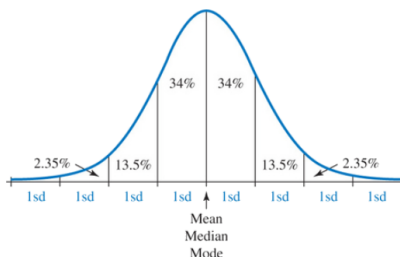


Figure 11 A normal distribution showing the measures of center and the percents in various parts of the distribution

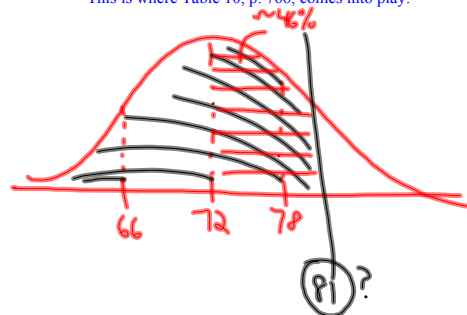
b) What percent of all biology students scored between 60 and 78?

More Examples - Empirical Rule:

The final exam scores are distributed as $\sim N(72, 6)$.

c) What percent of all biology students scored below 81?

* We need more resolution in our normal distribution probabilities! This is where Table 10, p. 766, comes into play.



$$z = \frac{81 - 72}{6} = \frac{11}{6} \approx 1.9$$

Examples, continued: Use Table 10 to help answer these questions:

d) Estimate the percentage of students who scored above 63 ($z = -0.5$) on the Bio 103 exam.

e) Estimate the percentage of students who scored between 63 and 55. ($z = -1.5$ and $z = -2.83$, respectively)

Examples, continued: Use Table 10 to help answer these questions:

f) ... between 63 and 75? ($z = -1.5$ and $z = +0.5$, respectively)