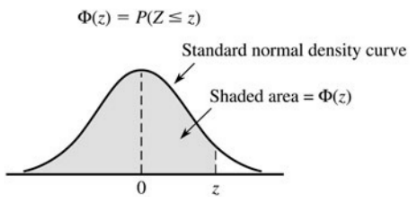
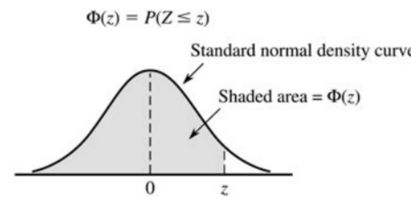


Normal Table

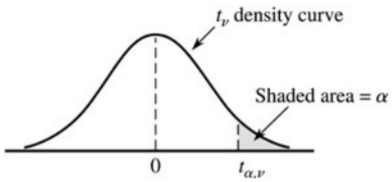
Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
−3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
−3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
−3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
−3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
−3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
−2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
−2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.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
−0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
−0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
−0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
−0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
−0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
−0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
−0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
−0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
−0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
−0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641



Normal Table

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

Critical Values for t Distributions



	α						
	0.1	.05	.025	.01	.005	.001	.0005
ν =df 1	3.078	6.314	12.706	31.821	63.657	318.309	636.619
2	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
32	1.309	1.694	2.037	2.449	2.738	3.365	3.622
34	1.307	1.691	2.032	2.441	2.728	3.348	3.601
36	1.306	1.688	2.028	2.434	2.719	3.333	3.582
38	1.304	1.686	2.024	2.429	2.712	3.319	3.566
40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
50	1.299	1.676	2.009	2.403	2.678	3.261	3.496
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.090	3.291

	Confidence Interval	H_0	Test Statistic
Mean, σ unknown	$\bar{x} \pm t_{\alpha/2,n-1}\dfrac{s}{\sqrt{n}}$	$\mu = \mu_0$	$t = \dfrac{\bar{x}-\mu_0}{s/\sqrt{n}} \sim t_{n-1}$
Proportion	$\hat{p} \pm z_{\alpha/2}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$	$p = p_0$	$z = \dfrac{\hat{p}-p_0}{\sqrt{p_0(1-p_0)/n}} \sim N(0,1)$
Paired	$\bar{d} \pm t_{\alpha/2,n-1}\dfrac{s_d}{\sqrt{n}}$	$\mu_1 = \mu_2$	$t = \dfrac{\bar{d}}{s_d/\sqrt{n}} \sim t_{n-1}$, $n =$# of pairs
Diff. in Means (NOT assuming $\sigma_1 = \sigma_2$)	$\bar{x}_1 - \bar{x}_2 \pm t_{\alpha/2,df}\text{SE}$	$\mu_1 = \mu_2$	$t = \dfrac{\bar{x}_1 - \bar{x}_2}{\text{SE}} \sim t_{df}$
	where $\text{SE} = \sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}$, $\text{df} = \min(n_1-1, n_2-1)$		

Diff. in Proportions: CI for $p_1 - p_2$: $(\hat{p}_1 - \hat{p}_2) \pm z_{\alpha/2}\sqrt{\dfrac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \dfrac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$

H_0: $p_1 = p_2$, $z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$, where $\hat{p} = \dfrac{x_1 + x_2}{n_1 + n_2}$

$$\binom{\text{sample}}{\text{covariance}} = s_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{n-1} = \frac{\left(\sum_{i=1}^n x_i y_i\right) - n\bar{x}\bar{y}}{n-1}, \quad \binom{\text{sample}}{\text{corelation}} = r = \frac{s_{xy}}{s_x s_y}$$

Simple Linear Regression model: $y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$, $\varepsilon_i \sim N(0, \sigma)$

LS estimates: $\widehat{\beta}_1 = \dfrac{s_{xy}}{s_x^2} = r\dfrac{s_y}{s_x}$, $\widehat{\beta}_0 = \bar{y} - \widehat{\beta}_1\bar{x}$, $s_e = \sqrt{\dfrac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{n-2}}$

CI for β_1: $\widehat{\beta}_1 \pm t_{\alpha/2,n-2}\text{SE}(\widehat{\beta}_1)$, H_0: $\beta_1 = c_1$, $t = \dfrac{\widehat{\beta}_1 - c_1}{\text{SE}(\widehat{\beta}_1)} \sim t_{n-2}$

CI for β_0: $\widehat{\beta}_0 \pm t_{\alpha/2,n-2}\text{SE}(\widehat{\beta}_0)$, H_0: $\beta_0 = c_0$, $t = \dfrac{\widehat{\beta}_0 - c_0}{\text{SE}(\widehat{\beta}_0)} \sim t_{n-2}$

Find values of $\text{SE}(\widehat{\beta}_1)$ and $\text{SE}(\widehat{\beta}_0)$ in the R output. No need to momorize their formulas.

Confidence Interval for $E(Y \mid X = x_0)$: $\widehat{\beta}_0 + \widehat{\beta}_1 x_0 \pm t_{\alpha/2,n-2}\, s_e\sqrt{\dfrac{1}{n} + \dfrac{(x_0 - \bar{x})^2}{\sum_{i=1}^n (x_i - \bar{x})^2}}$

Prediction Interval for Y given $X = x_0$: $\widehat{\beta}_0 + \widehat{\beta}_1 x_0 \pm t_{\alpha/2,n-2}\, s_e\sqrt{1 + \dfrac{1}{n} + \dfrac{(x_0 - \bar{x})^2}{\sum_{i=1}^n (x_i - \bar{x})^2}}$

Common Discrete Distributions				
Name and range	PMF at k	Mean	Variance	Gensis
Bernoulli(p) on $\{0,1\}$	$\begin{cases} 1-p & \text{if } k=0 \\ p & \text{if } k=1 \end{cases}$	p	$p(1-p)$	number of successes obtained in n Bernoulli trials Bernoulli trial
Binomial(n,p) on $\{0,1,\dots,n\}$	$\binom{n}{k}p^k(1-p)^{n-k}$	np	$np(1-p)$	number of successes obtained in Bernoulli trials that each trial has a success probability p
Geometric(p) on $\{1,2,3\dots\}$	$(1-p)^{k-1}p$	$\frac{1}{p}$	$\frac{1-p}{p^2}$	number of Bernoulli trials needed to get the first success, that each trial has a success probability p
Negative Binomial(r,p) on $\{r,r+1,r+2,\dots\}$	$\binom{k-1}{r-1}p^r(1-p)^{k-r}$	$\frac{r}{p}$	$\frac{r(1-p)}{p^2}$	number of Bernoulli trials needed to get r successes that each trial has a success probability p
Hypergeometric(R,B,d) on $\{0,1,2,\dots,\min(d,R)\}$	$\binom{R}{k}\binom{B}{d-k}\Big/\binom{R+B}{d}$	$d\frac{R}{R+B}$	$d\frac{RB(R+B-d)}{(R+B)^2(R+B-1)}$	# of Red balls obtained in d draws w/o replacement from a box with R Red balls and B blue balls
Poisson(λ) on $\{0,1,2,\dots\}$	$e^{-\lambda}\frac{\lambda^k}{k!}$	λ	λ	limit of Binomial(n,p) as $n\to\infty,\ p\to 0,$ and $np\to\lambda$

Common Continuous Distributions				
Name	PDF $f(x)$	Range	Mean	Variance
Exponential(λ)	$\lambda e^{-\lambda x}$,	$0\le x<\infty$	$1/\lambda$	$1/\lambda^2$
Gamma(α,λ)	$\frac{\lambda^\alpha}{\Gamma(\alpha)}x^{\alpha-1}e^{-\lambda x}$,	$0\le x<\infty$	α/λ	α/λ^2
Normal(μ,σ)	$\frac{1}{\sigma\sqrt{2\pi}}\,e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$,	$-\infty<x<\infty$	μ	σ^2

Sum of Independent $X_1,\dots,X_k$	
Distribution of X_i for $i=1,\dots,k$	Distribution of $X_1+\cdots+X_k$
$X_i\sim$ Poisson(λ_i)	Poisson$(\lambda_1+\cdots+\lambda_k)$
$X_i\sim$ Bin$(n_i,\ p)$	Bin$(n_1+\cdots+n_k,\ p)$
$X_i\sim$ Geometric(p)	NegBin$(k,\ p)$
$X_i\sim$ NegBin(r_i,p)	NegBin$(r_1+\cdots+r_k,\ p)$
$X_i\sim$ Exponential(λ)	Gamma(k,λ)
$X_i\sim$ Gamma(α_i,λ)	Gamma$(\alpha_1+\cdots+\alpha_k,\lambda)$
$X_i\sim N(\mu_i,\sigma_i)$	$N\left(\mu_1+\cdots+\mu_k,\sqrt{\sigma_1^2+\cdots+\sigma_k^2}\right)$

If $X_1,\dots,X_k$ are independent with $X_i\sim N(\mu_i,\sigma_i)$, $i=1,2,\dots,k$, then for constants $a_1,a_2,\dots,a_k$

$$a_1X_1+\cdots+a_kX_k\sim N\left(a_1\mu_1+\cdots+a_k\mu_k,\ \sqrt{a_1^2\sigma_1^2+\cdots+a_k^2\sigma_k^2}\right).$$