

$$\text{Sample mean: } \bar{x} = \frac{\sum_{i=1}^n x_i}{n}, \quad \text{Sample standard deviation: } s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}.$$

Empirical Rule: 68%: $\bar{x} \pm s$, 95%: $\bar{x} \pm 2s$, 99.7%: $\bar{x} \pm 3s$.

$$\text{Value of specific percentile (P}_k\text{)} \quad L_p = (n+1) \frac{P}{100}$$

If L is an integer (whole number), the value of percentile P_p is at the location L_p , counting from the lowest.

If L is not an integer (decimal number), then interpolate between the integer portion of L_p and the next value.

Box plot: min, Q_1 , median, Q_3 , Max.

$$\text{Probability: } P(\text{event}) = \frac{\text{The number of required outcomes}}{\text{The total number of possible outcomes}}, \quad 0 \leq P(\text{event}) \leq 1$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A \text{ or } B) = P(A) + P(B) \text{ for mutually exclusive events}$$

$$P(A \text{ and } B) = P(A)P(B) \text{ if } A \text{ and } B \text{ are independent}$$

$$P(A \text{ and } B) = P(A)P(B|A) \text{ if } A \text{ and } B \text{ are dependent}$$

$$\text{Conditional probability } P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

$$\text{Total Probability Rule: } P(B) = P(B|A) \cdot P(A) + P(B|\bar{A}) \cdot P(\bar{A}).$$

Normal Distribution:

Use $Z = \frac{x - \mu}{\sigma}$ to convert the *non-standard* normal distribution to *standard* normal distribution.

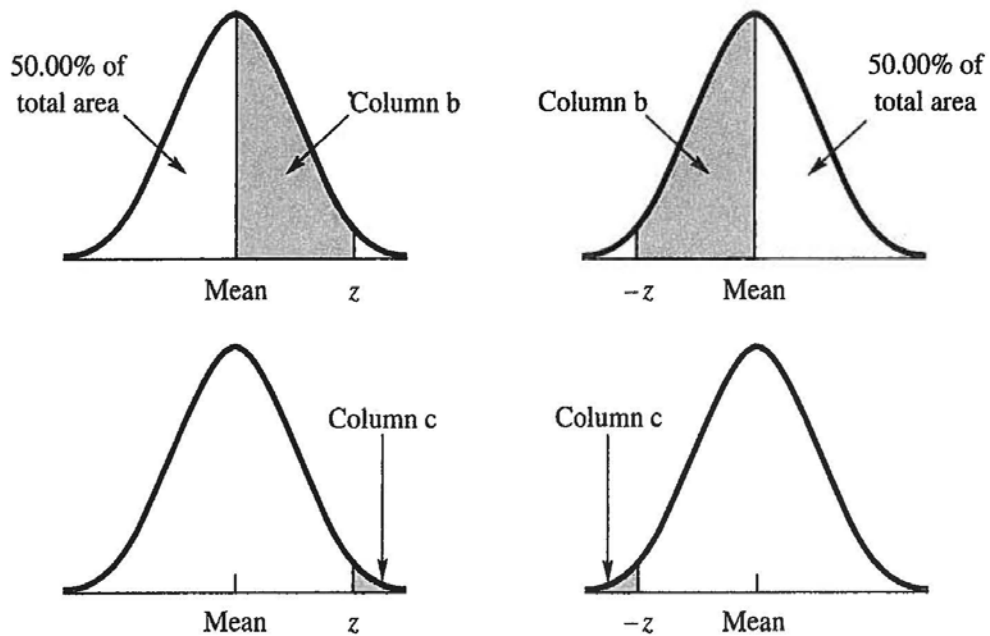
$$\text{Solve for } x: x = (z \times \sigma) + \mu.$$

$$\text{Regression equation: } \hat{y} = b_0 + b_1 x$$

Z-Table:

TABLE A Percentage of Area under the Normal Curve

Column a gives the distance in standard deviation units from the mean (z). Column b represents the percentage of area between the mean and a given z . Column c represents the percentage at or beyond a given z .



(continued)

TABLE A (continued)

(a)	(b)	(c)	(a)	(b)	(c)
z	Area between Mean and z	Area beyond z	z	Area between Mean and z	Area beyond z
.00	.00	50.00	.44	17.00	33.00
.01	.40	49.60	.45	17.36	32.64
.02	.80	49.20	.46	17.72	32.28
.03	1.20	48.80	.47	18.08	31.92
.04	1.60	48.40	.48	18.44	31.56
.05	1.99	48.01	.49	18.79	31.21
.06	2.39	47.61	.50	19.15	30.85
.07	2.79	47.21	.51	19.50	30.50
.08	3.19	46.81	.52	19.85	30.15
.09	3.59	46.41	.53	20.19	29.81
.10	3.98	46.02	.54	20.54	29.46
.11	4.38	45.62	.55	20.88	29.12
.12	4.78	45.22	.56	21.23	28.77
.13	5.17	44.83	.57	21.57	28.43
.14	5.57	44.43	.58	21.90	28.10
.15	5.96	44.04	.59	22.24	27.76
.16	6.36	43.64	.60	22.57	27.43
.17	6.75	43.25	.61	22.91	27.09
.18	7.14	42.86	.62	23.24	26.76
.19	7.53	42.47	.63	23.57	26.43
.20	7.93	42.07	.64	23.89	26.11
.21	8.32	41.68	.65	24.22	25.78
.22	8.71	41.29	.66	24.54	25.46
.23	9.10	40.90	.67	24.86	25.14
.24	9.48	40.52	.68	25.17	24.83
.25	9.87	40.13	.69	25.49	24.51
.26	10.26	39.74	.70	25.80	24.20
.27	10.64	39.36	.71	26.11	23.89
.28	11.03	38.97	.72	26.42	23.58
.29	11.41	38.59	.73	26.73	23.27
.30	11.79	38.21	.74	27.04	22.96
.31	12.17	37.83	.75	27.34	22.66
.32	12.55	37.45	.76	27.64	22.36
.33	12.93	37.07	.77	27.94	22.06
.34	13.31	36.69	.78	28.23	21.77
.35	13.68	36.32	.79	28.52	21.48
.36	14.06	35.94	.80	28.81	21.19
.37	14.43	35.57	.81	29.10	20.90
.38	14.80	35.20	.82	29.39	20.61
.39	15.17	34.83	.83	29.67	20.33
.40	15.54	34.46	.84	29.95	20.05
.41	15.91	34.09	.85	30.23	19.77
.42	16.28	33.72	.86	30.51	19.49
.43	16.64	33.36	.87	30.78	19.22

TABLE A (continued)

(a)	(b)	(c)	(a)	(b)	(c)
z	Area between Mean and z	Area beyond z	z	Area between Mean and z	Area beyond z
.88	31.06	18.94	1.32	40.66	9.34
.89	31.33	18.67	1.33	40.82	9.18
.90	31.59	18.41	1.34	40.99	9.01
.91	31.86	18.14	1.35	41.15	8.85
.92	32.12	17.88	1.36	41.31	8.69
.93	32.38	17.62	1.37	41.47	8.53
.94	32.64	17.36	1.38	41.62	8.38
.95	32.89	17.11	1.39	41.77	8.23
.96	33.15	16.85	1.40	41.92	8.08
.97	33.40	16.60	1.41	42.07	7.93
.98	33.65	16.35	1.42	42.22	7.78
.99	33.89	16.11	1.43	42.36	7.64
1.00	34.13	15.87	1.44	42.51	7.49
1.01	34.38	15.62	1.45	42.65	7.35
1.02	34.61	15.39	1.46	42.79	7.21
1.03	34.85	15.15	1.47	42.92	7.08
1.04	35.08	14.92	1.48	43.06	6.94
1.05	35.31	14.69	1.49	43.19	6.81
1.06	35.54	14.46	1.50	43.32	6.68
1.07	35.77	14.23	1.51	43.45	6.55
1.08	35.99	14.01	1.52	43.57	6.43
1.09	36.21	13.79	1.53	43.70	6.30
1.10	36.43	13.57	1.54	43.82	6.18
1.11	36.65	13.35	1.55	43.94	6.06
1.12	36.86	13.14	1.56	44.06	5.94
1.13	37.08	12.92	1.57	44.18	5.82
1.14	37.29	12.71	1.58	44.29	5.71
1.15	37.49	12.51	1.59	44.41	5.59
1.16	37.70	12.30	1.60	44.52	5.48
1.17	37.90	12.10	1.61	44.63	5.37
1.18	38.10	11.90	1.62	44.74	5.26
1.19	38.30	11.70	1.63	44.84	5.16
1.20	38.49	11.51	1.64	44.95	5.05
1.21	38.69	11.31	1.65	45.05	4.95
1.22	38.88	11.12	1.66	45.15	4.85
1.23	39.07	10.93	1.67	45.25	4.75
1.24	39.25	10.75	1.68	45.35	4.65
1.25	39.44	10.56	1.69	45.45	4.55
1.26	39.62	10.38	1.70	45.54	4.46
1.27	39.80	10.20	1.71	45.64	4.36
1.28	39.97	10.03	1.72	45.73	4.27
1.29	40.15	9.85	1.73	45.82	4.18
1.30	40.32	9.68	1.74	45.91	4.09
1.31	40.49	9.51	1.75	45.99	4.01

(continued)

TABLE A (continued)

(a)	(b)	(c)	(a)	(b)	(c)
<i>z</i>	Area between Mean and <i>z</i>	Area beyond <i>z</i>	<i>z</i>	Area between Mean and <i>z</i>	Area beyond <i>z</i>
1.76	46.08	3.92	2.20	48.61	1.39
1.77	46.16	3.84	2.21	48.64	1.36
1.78	46.25	3.75	2.22	48.68	1.32
1.79	46.33	3.67	2.23	48.71	1.29
1.80	46.41	3.59	2.24	48.75	1.25
1.81	46.49	3.51	2.25	48.78	1.22
1.82	46.56	3.44	2.26	48.81	1.19
1.83	46.64	3.36	2.27	48.84	1.16
1.84	46.71	3.29	2.28	48.87	1.13
1.85	46.78	3.22	2.29	48.90	1.10
1.86	46.86	3.14	2.30	48.93	1.07
1.87	46.93	3.07	2.31	48.96	1.04
1.88	46.99	3.01	2.32	48.98	1.02
1.89	47.06	2.94	2.33	49.01	.99
1.90	47.13	2.87	2.34	49.04	.96
1.91	47.19	2.81	2.35	49.06	.94
1.92	47.26	2.74	2.36	49.09	.91
1.93	47.32	2.68	2.37	49.11	.89
1.94	47.38	2.62	2.38	49.13	.87
1.95	47.44	2.56	2.39	49.16	.84
1.96	47.50	2.50	2.40	49.18	.82
1.97	47.56	2.44	2.41	49.20	.80
1.98	47.61	2.39	2.42	49.22	.78
1.99	47.67	2.33	2.43	49.25	.75
2.00	47.72	2.28	2.44	49.27	.73
2.01	47.78	2.22	2.45	49.29	.71
2.02	47.83	2.17	2.46	49.31	.69
2.03	47.88	2.12	2.47	49.32	.68
2.04	47.93	2.07	2.48	49.34	.66
2.05	47.98	2.02	2.49	49.36	.64
2.06	48.03	1.97	2.50	49.38	.62
2.07	48.08	1.92	2.51	49.40	.60
2.08	48.12	1.88	2.52	49.41	.59
2.09	48.17	1.83	2.53	49.43	.57
2.10	48.21	1.79	2.54	49.45	.55
2.11	48.26	1.74	2.55	49.46	.54
2.12	48.30	1.70	2.56	49.48	.52
2.13	48.34	1.66	2.57	49.49	.51
2.14	48.38	1.62	2.58	49.51	.49
2.15	48.42	1.58	2.59	49.52	.48
2.16	48.46	1.54	2.60	49.53	.47
2.17	48.50	1.50	2.61	49.55	.45
2.18	48.54	1.46	2.62	49.56	.44
2.19	48.57	1.43	2.63	49.57	.43

TABLE A (continued)

(a)	(b)	(c)	(a)	(b)	(c)
<i>z</i>	Area between Mean and <i>z</i>	Area beyond <i>z</i>	<i>z</i>	Area between Mean and <i>z</i>	Area beyond <i>z</i>
2.64	49.59	.41	3.00	49.87	.13
2.65	49.60	.40	3.01	49.87	.13
2.66	49.61	.39	3.02	49.87	.13
2.67	49.62	.38	3.03	49.88	.12
2.68	49.63	.37	3.04	49.88	.12
2.69	49.64	.36	3.05	49.89	.11
2.70	49.65	.35	3.06	49.89	.11
2.71	49.66	.34	3.07	49.89	.11
2.72	49.67	.33	3.08	49.90	.10
2.73	49.68	.32	3.09	49.90	.10
2.74	49.69	.31	3.10	49.90	.10
2.75	49.70	.30	3.11	49.91	.09
2.76	49.71	.29	3.12	49.91	.09
2.77	49.72	.28	3.13	49.91	.09
2.78	49.73	.27	3.14	49.92	.08
2.79	49.74	.26	3.15	49.92	.08
2.80	49.74	.26	3.16	49.92	.08
2.81	49.75	.25	3.17	49.92	.08
2.82	49.76	.24	3.18	49.93	.07
2.83	49.77	.23	3.19	49.93	.07
2.84	49.77	.23	3.20	49.93	.07
2.85	49.78	.22	3.21	49.93	.07
2.86	49.79	.21	3.22	49.94	.06
2.87	49.79	.21	3.23	49.94	.06
2.88	49.80	.20	3.24	49.94	.06
2.89	49.81	.19	3.25	49.94	.06
2.90	49.81	.19	3.30	49.95	.05
2.91	49.82	.18	3.35	49.96	.04
2.92	49.82	.18	3.40	49.97	.03
2.93	49.83	.17	3.45	49.97	.03
2.94	49.84	.16	3.50	49.98	.02
2.95	49.84	.16	3.60	49.98	.02
2.96	49.85	.15	3.70	49.99	.01
2.97	49.85	.15	3.80	49.99	.01
2.98	49.86	.14	3.90	49.995	.005
2.99	49.86	.14	4.00	49.997	.003