FORMULAE

Probability

$A \cup B = A$ or B $\qquad$ $A \cap B = A$ and B (overlap)

$P(B \mid A) =$ probability of B, given A.

Rules of Addition

If A and B are mutually exclusive: $P(A \cup B) = P(A) + P(B)$

If A and B are not mutually exclusive: $P(A \cap B) = P(A) + P(B) - P(A \cap B)$

Rules of Multiplication

If A and B are independent: $P(A \cap B) = P(A)P(B)$

If A and B are not independent: $P(A \cap B) = P(A)P(B \mid A)$

E(X) = $\sum$ (probability $\times$ payoff)

Quadratic Equations

If $ax^2 + bx + c = 0$ is the general quadratic equation, the two solutions (roots) are given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Descriptive Statistics

Arithmetic Mean

$$\bar{x} = \frac{\sum x}{n}, \quad \bar{x} = \frac{\sum fx}{\sum f} \text{ (frequency distribution)}$$

Standard Deviation

$$\text{SD} = \frac{\sqrt{\sum (x - \bar{x})^2}}{N}, \quad \text{SD} = \frac{\sqrt{\sum fx^2 - \bar{x}^2}}{\sum f} \text{ (frequency distribution)}$$

Median

$$\text{m} = L_m + \left(\frac{\frac{n}{2} - F_m}{F_m} \right) c$$

Mode

$$m = L_o + \frac{\Delta_1}{\Delta_1 + \Delta_2}$$

Time Series

Additive Model

Series = Trend + Seasonal + Random

Multiplicative Model

Series = Trend × Seasonal × Random

Linear Regression and Correlation

$$Y = a + bX \text{ or } \overline{Y} = b(X - \overline{X})$$

where

$$b = \frac{Covariance(XY)}{Variance(X)} = \frac{n\sum XY - (\sum X)(\sum Y)}{n\sum X^2 - (\sum X)^2}$$

and

$$a = \overline{Y} - b\overline{X}$$

or solve

$$\sum Y = na + \sum X$$
$$\sum XY = a\sum X + b\sum X^2$$

Coefficient of Correlation

$$r = \frac{Covariance(XY)}{\sqrt{Var(X) \times Var(Y)}} = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{\{n\sum X^2 - (\sum X)^2\}\{n\sum Y^2 - (\sum (Y)^2\}}}$$

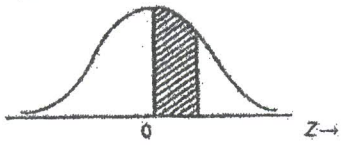
R(rank) = 1 - $\frac{6\sum d^2}{n(n^2-1)}$

Stocks

$$EOQ = \sqrt{\frac{2C_0 D}{C_n}}$$

AREA UNDER THE NORMAL CURVE

This table gives the area under the normal curve between the mean and a point Z standard deviations above the mean. The corresponding area for deviations below the mean can be found by symmetry.



$Z = \frac{(x-\mu)}{\sigma}$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	.0000	.0040	.0080	.0120	.0159	.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	.2518	.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	.4430	.4441
1.6	.4452	.4463	.4474	.4485	.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	.4762	.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	.4865	.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	.4980	.4980	.4981
2.9	.4981	.4982	.4983	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.49865	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.49903	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.49931	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.49952	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.49966	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.49977									