Math 103 Formula Sheet

Financial Management

Simple Interest: $I = P\,r\,t$

Future Value for Simple Interest: $A = P(1 + r\,t)$

Future Value for Compound Interest: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

Present Value for Compound Interest: $P = \frac{A}{\left(1 + \frac{r}{n}\right)^{nt}}$

Annual Yield (effective simple interest rate): $Y = \left(1 + \frac{r}{n}\right)^{n} - 1$

Future Value of an Annuity (P is the amount of each deposit): $A = \frac{P\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}{\left(\frac{r}{n}\right)}$

Monthly Deposit for an Annuity (A is the amount of the annuity): $P = \frac{A\left(\frac{r}{n}\right)}{\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}$

Monthly Mortgage Payments (P is the amount of mortgage): $PMT = \frac{P\left(\frac{r}{n}\right)}{1 - \left(1 + \frac{r}{n}\right)^{-nt}}$

Probability and Counting Rules

Permutation rule: ${}_nP_r = \frac{n!}{(n-r)!}$

Combination rule: ${}_nC_r = \frac{n!}{(n-r)!\,r!}$

$P(\text{not } E) = 1 - P(E)$

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

$P(A \text{ and } B) = P(A) \cdot P(B)$

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

Statistics

Mean for the individual data: $\overline{X} = \frac{\sum X}{n}$

Mean for grouped data: $\overline{X} = \frac{\sum (f \cdot X)}{n}$

Standard Deviation: $s = \sqrt{\frac{\sum (\text{data item} - \text{mean})^2}{n-1}}$

Z-score: $z = \frac{\text{data item} - \text{mean}}{\text{standard deviation}}$

Correlation and Regression

Correlation coefficient: $$r = \frac{n\left[\sum (xy)\right] - \left(\sum x\right)\left(\sum y\right)}{\sqrt{n\left(\sum x^2\right) - \left(\sum x\right)^2} \cdot \sqrt{n\left(\sum y^2\right) - \left(\sum y\right)^2}}$$

The regression line equation: $y = mx + b$ where

$$m = \frac{n\left[\sum (xy)\right] - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum x^2\right) - \left(\sum x\right)^2} \qquad b = \frac{\left(\sum y\right) - m\left(\sum x\right)}{n}$$

z-SCORES AND PERCENTILES							
z-score	**Percentile**	**z-score**	**Percentile**	**z-score**	**Percentile**	**z-score**	**Percentile**
-4.0	0.003	-1.0	15.87	0.0	50.00	1.1	86.43
-3.5	0.02	-0.95	17.11	0.05	51.99	1.2	88.49
-3.0	0.13	-0.90	18.41	0.10	53.98	1.3	90.32
-2.9	0.19	-0.85	19.77	0.15	55.96	1.4	91.92
-2.8	0.26	-0.80	21.19	0.20	57.93	1.5	93.32
-2.7	0.35	-0.75	22.66	0.25	59.87	1.6	94.52
-2.6	0.47	-0.70	24.20	0.30	61.79	1.7	95.54
-2.5	0.62	-0.65	25.78	0.35	63.68	1.8	96.41
-2.4	0.82	-0.60	27.43	0.40	65.54	1.9	97.13
-2.3	1.07	-0.55	29.12	0.45	67.36	2.0	97.72
-2.2	1.39	-0.50	30.85	0.50	69.15	2.1	98.21
-2.1	1.79	-0.45	32.64	0.55	70.88	2.2	98.61
-2.0	2.28	-0.40	34.46	0.60	72.57	2.3	98.93
-1.9	2.87	-0.35	36.32	0.65	74.22	2.4	99.18
-1.8	3.59	-0.30	38.21	0.70	75.80	2.5	99.38
-1.7	4.46	-0.25	40.13	0.75	77.34	2.6	99.53
-1.6	5.48	-0.20	42.07	0.80	78.81	2.7	99.65
-1.5	6.68	-0.15	44.04	0.85	80.23	2.8	99.74
-1.4	8.08	-0.10	46.02	0.90	81.59	2.9	99.81
-1.3	9.68	-0.05	48.01	0.95	82.89	3.0	99.87
-1.2	11.51	0.0	50.00	1.0	84.13	3.5	99.98
-1.1	13.57					4.0	99.997