Common Formulas MAT 135P Math for Liberal Arts Plus

Math Skills Formulas for Linear Programming and Statistics

Slope of a line containing the points (x_1, y_1) and (x_2, y_2) is given by: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope-Intercept form of a line: $y = mx + b$

Point-Slope form of a line: $y - y_1 = m(x - x_1)$

Applications Formulas for Finance

Simple Interest Formulas: $I = Prt$

$$A = P + I = P + Prt = P(1 + rt)$$

Compound Interest Formula: $A = P\left(1 + \frac{r}{m}\right)^{mt} = P(1+i)^n$

Effective Annual Rate (EAR) Formula: $R = \left(1 + \frac{r}{m}\right)^{m} - 1$

Continuous Interest Formula: $A = Pe^{rt}$

Savings Formula: $A = d\left[\frac{\left(1 + \frac{r}{m}\right)^{mt} - 1}{\frac{r}{m}}\right] = d\left[\frac{(1+i)^n - 1}{i}\right]$

Payment Formula: $d = A\left[\frac{\frac{r}{m}}{\left(1 + \frac{r}{m}\right)^{mt} - 1}\right] = A\left[\frac{i}{(1+i)^n - 1}\right]$

Present Value Formula: $P = \frac{A}{\left(1 + \frac{r}{m}\right)^{mt}} = \frac{A}{(1+i)^n}$

Amortization Payment Formula: $d = P\left[\frac{\frac{r}{m}}{1 - \left(1 + \frac{r}{m}\right)^{-mt}}\right] = P\left[\frac{i}{1 - (1+i)^{-n}}\right]$

Applications Formulas for Statistics

Formula for the Mean:

$$\bar{x} = \frac{x_1 + x_2 + ... + x_n}{n} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Standard Deviation Formula:

$$s = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + (x_3 - \bar{x})^2 + \cdots + (x_n - \bar{x})^2}{n-1}} \quad = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

Formula for Correlation Coefficient:

$$r = \frac{1}{n-1}\left[\left(\frac{x_1 - \bar{x}}{s_x}\right)\left(\frac{y_1 - \bar{y}}{s_y}\right) + \left(\frac{x_2 - \bar{x}}{s_x}\right)\left(\frac{y_2 - \bar{y}}{s_y}\right) + \cdots + \left(\frac{x_n - \bar{x}}{s_x}\right)\left(\frac{y_n - \bar{y}}{s_y}\right)\right] = \frac{1}{n-1}\sum_{i=1}^{n}\left(\frac{x_i - \bar{x}}{s_x}\right)\left(\frac{y_i - \bar{y}}{s_y}\right)$$

The regression line's slope *m* is given by: $m = r \bullet \frac{S_y}{S_x}$

The regression line's *y*-intercept *b* is given by: $b = \bar{y} - m\bar{x}$

Equation of the least squares regression line: $\hat{y} = mx + b$