

FINAL EXAM, Math 102, FORMULAS

Simple Interest Formula

$$I = Prt$$

I is the interest, P is the principal, t is the time period.

Future or Maturity Value for Simple Interest

$$A = P + I$$

A is the amount after the interest, I , has been added to the principal, P .

Compound Amount Formula

$$A = P(1 + i)^N$$

A is the compound amount when P dollars are deposited at an interest rate of i per compounding period for N compounding periods.

$$i = \frac{\text{annual interest rate}}{\text{number of compounding periods per year}} = \frac{r}{n}$$

$$N = (\text{number of compounding periods per year}) \cdot (\text{number of years}) = nt$$

Present Value Formula

$$P = \frac{A}{(1 + i)^N}$$

Annual Percentage Rate (APR) Formula

$$APR \approx \frac{2nr}{n + 1}$$

n is the number of payments, r is the simple interest rate.

Payment Formula for an APR Loan

$$PMT = A\left(\frac{i}{1 - (1 + i)^{-n}}\right)$$

PMT is the payment, A is the loan amount, i is the interest rate per payment period, n is the total number of payments.

APR Loan Payoff Formula

$$A = PMT\left(\frac{1 - (1 + i)^{-n}}{i}\right)$$

PMT is the payment, A is the loan payoff, i is the interest rate per payment period, n is the number of *remaining* payments.

Mortgage Payment Formula

$$PMT = A \left(\frac{i}{1 - (1 + i)^{-n}} \right)$$

PMT is the mortgage payment, A is the amount of mortgage, i is the interest rate per payment period, n is the total number of payments.

Future Value of An Annuity Formula

$$A = PMT \left[\frac{(1 + i)^n - 1}{i} \right]$$

A is the future value of an annuity, PMT is the payment per period, i is the interest rate per payment period, n is the total number of payments.

Permutation Formula for Distinct Objects

$$P(n, k) = \frac{n!}{(n - k)!}$$

Combination Formula

$$C(n, k) = \frac{n!}{k! \cdot (n - k)!}$$

Conditional Probability Formula

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

Standard Deviation for Samples If $x_1, x_2, x_3, \dots, x_n$ is a sample of n numbers with a mean of \bar{x} , then the standard deviation is

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

z-Score for Population or Sample

$$z_x = \frac{x - \mu}{\sigma} \quad z_x = \frac{x - \bar{x}}{s}$$