TABLE OF FORMULAS

1. CIRCLE

\[(x - h)^2 + (y - k)^2 = r^2\]

2. PARABOLA

\[y - k = a(x - h)^2\]

The graph of the function

\[y = f(x) = ax^2 + bx + c\quad (a \neq 0)\]

is a parabola with vertex at \(\left( \frac{-b}{2a}, c - \frac{b^2}{4a} \right)\).

3. COMPOUND INTEREST FORMULA. A principal \(P\), earning interest compounded \(k\) times a year for \(n\) years at an annual rate \(r\), will grow to the future value \(FV\) according to the formula

\[FV = P(1 + i)^{kn}\]

where \(i = \frac{r}{k}\) is the periodic interest rate.

4. EFFECTIVE RATE OF INTEREST. The effective rate of interest \(R\) for an account paying a nominal rate \(r\), compounded \(k\) times per year, is

\[R = (1 + i)^k - 1\]

where \(i\) is the periodic rate, \(i = \frac{r}{k}\).

5. PRESENT VALUE. The present value \(PV\) that must be deposited now to provide a future value, \(FV\), \(n\) years from now is given by the formula

\[PV = FV(1 + i)^{-kn}\]

where interest is compounded \(k\) times per year at an annual rate \(r\) (\(i\) is the periodic rate, \(\frac{r}{k}\)).
6. **FUTURE VALUE OF AN ANNUITY.** The future value \( FV \) of an ordinary annuity with deposits of \( P \) dollars made regularly \( k \) times each year for \( n \) years, with interest compounded \( k \) times per year at an annual rate \( r \), is

\[
FV = \frac{P[(1 + i)^{kn} - 1]}{i}
\]

where \( i \) is the periodic rate, \( i = \frac{r}{k} \).

7. **SINKING FUND PAYMENT.** For an annuity to provide a future value \( FV \), regular deposits \( P \) are made \( k \) times per year for \( n \) years, with interest compounded \( k \) times per year at an annual rate \( r \). The payment \( P \) is given by

\[
P = \frac{FVi}{(1 + i)^{kn} - 1}
\]

where \( i \) is the periodic rate, \( i = \frac{r}{k} \).

8. **PRESENT VALUE OF AN ANNUITY.** The present value \( PV \) of an annuity with payments of \( P \) dollars made \( k \) times per year for \( n \) years, with interest compounded \( k \) times per year at an annual rate \( r \), is

\[
PV = \frac{P[1 - (1 + i)^{-kn}]}{i}
\]

where \( i \) is the periodic rate, \( i = \frac{r}{k} \).

9. **INSTALLMENT PAYMENTS.** The periodic payment \( P \) required to repay an amount \( A \) is given by

\[
P = \frac{Ai}{1 - (1 + i)^{-kn}}
\]

where

- \( r \) is the annual rate,
- \( k \) is the frequency of compounding (usually monthly),
- \( i \) is the periodic rate, \( i = \frac{r}{k} \), and
- \( n \) is the term of the loan in years.