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 \((-\frac{b}{2a}, c - \frac{b^2}{4a})\).

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

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

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.