# 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.