```
> ifactor(98765443322);
>
```

$$(2)\ (7)\ (13)\ (37)\ (71)\ (251)\ (823)$$

```
> ifactor(23234235364^2);
```

$$(2)^4\ (5808558841)^2$$

```
> ithprime(335);
```

$$2251$$

```
> nextprime(1000);
```

$$1009$$

```
> floor(3.4);
```

$$3$$

```
> ceil(3.4);
```

$$4$$

```
> round(3.5);
```

$$4$$

```
> frac(3.345);
```

$$.345$$

```
> frac(7/3);
```

$$\frac{1}{3}$$

```
> gcd(60,80);
```

$$20$$

```
> lcm(123,456);
```

$$18696$$

```
> gcd(x^2-y^2,x^3-y^3);
```

$$-y + x$$

```
> phi(6);
```

$$\phi(6)$$

```
> with(numtheory);
Warning, new definition for order
```

[*B*, *F*, *GIgcd*, *J*, *L*, *M*, bernoulli, *bigomega*, *cfrac*, *cfracpol*, *cyclotomic*, *divisors*, euler, *factorEQ*, *factorset*, *fermat*, *ifactor*, *ifactors*, *imagunit*, *index*, *integral_basis*, *invcfrac*, *invphi*, *isolve*, *isprime*, *issqrfree*, *ithprime*, *jacobi*, *kronecker*, λ, *legendre*, *mcombine*, *mersenne*, *minkowski*, *mipolys*, *mlog*, *mobius*, *mroot*, *msqrt*, *nearestp*, *nextprime*, *nthconver*, *nthdenom*, *nthnumer*, *nthpow*, *order*, *pdexpand*, ϕ, *pprimroot*, *prevprime*, *primroot*, *quadres*, *rootsunity*, *safeprime*, σ, *sq2factor*, *sum2sqr*, τ, *thue*]

```
> phi(6);
```

$$2$$

```
> cfrac(sqrt(2));
```

$$1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\ldots}}}}}}}}}}}$$

```
> cfrac(Pi);
```

$$3+\cfrac{1}{7+\cfrac{1}{15+\cfrac{1}{1+\cfrac{1}{292+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\ldots}}}}}}}}}}$$

```
> cfrac(exp(1),20);
```

2

$$+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{14+\ldots}}}}}}}}}}}}}}}}}}}}$$

```
> cfrac(Pi);
```

$$3+\cfrac{1}{7+\cfrac{1}{15+\cfrac{1}{1+\cfrac{1}{292+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\ldots}}}}}}}}}}$$

```
> nthconver(cfrac(Pi),3);
```

$$\frac{355}{113}$$

```
> add(k,k=1..100);
```

$$5050$$

```
> sum(k,k=1..n);
```

$$\frac{1}{2}(n+1)^2-\frac{1}{2}n-\frac{1}{2}$$

```
> Sum(k,k=1..n);
```

$$\sum_{k=1}^{n} k$$

```
> k:=4;
```

$$k := 4$$

```
> sum('k','k'=1..3);
```

$$6$$

```
> sum(1/'k'^2,'k'=1..infinity);
```

$$\frac{1}{6}\pi^2$$

```
> sum(x^n,n=0..infinity);
```

$$-\frac{1}{x-1}$$

```
> mul(n,n=1..3);
```

$$6$$

```
> Product(1+1/n^2,n=1..infinity);
```

$$\prod_{n=1}^{\infty}\left(1+\frac{1}{n^2}\right)$$

```
> limit(sin(x)/x,x=0);
```

$$1$$

```
> limit(sin(x)/x,x=infinity);
```

$$0$$

```
> limit(1/x,x=0);
```

$$\mathit{undefined}$$

```
> limit(1/x,x=0,right);
```

$$\infty$$

```
> limit(x*y*x*y/(x^(2+y^2)),x=0,y=0);
Error, (in limit) invalid directional argument
> e:=exp(1);
```

$$e := \mathbf{e}$$

```
> Digits:=20;
```

$$Digits := 20$$

```
> evalf(e);
```

$$2.7182818284590452354$$

```
> asympt(1/(n+1),n);
```

$$\frac{1}{n} - \frac{1}{n^2} + \frac{1}{n^3} - \frac{1}{n^4} + \frac{1}{n^5} + O\left(\frac{1}{n^6}\right)$$

```
> binomial(2*n,k);
```

$$\text{binomial}(2\,n, 4)$$

```
> asympt(%,n);
Error, (in asympt) unable to compute series
> k:='k';
```

$$k := k$$

```
> asympt(sqrt(n+1)-sqrt(n),n);
```

$$\frac{1}{2}\sqrt{\frac{1}{n}} - \frac{1}{8}\left(\frac{1}{n}\right)^{(3/2)} + \frac{1}{16}\left(\frac{1}{n}\right)^{(5/2)} - \frac{5}{128}\left(\frac{1}{n}\right)^{(7/2)} + \frac{7}{256}\left(\frac{1}{n}\right)^{(9/2)} - \frac{21}{1024}\left(\frac{1}{n}\right)^{(11/2)} + O\left(\left(\frac{1}{n}\right)^{(13/2)}\right)$$

```
> R:=(x+a+x^2)/(x^3+a*x);
```

$$R := \frac{x + a + x^2}{x^3 + a\,x}$$

```
> normal(R);
```

$$\frac{x + a + x^2}{x\,(x^2 + a)}$$

```
> convert(R,parfrac,x);
```

$$\frac{1}{x} + \frac{1}{x^2 + a}$$

```
> numer(R);
```

$$x + a + x^2$$

```
> denom(R);
```

$$x\,(x^2 + a)$$

```
> f:=(tan(x)+exp(I*x)+y)*exp(I*y)/(1+cot(y));
```

$$f := \frac{(\tan(x) + \mathbf{e}^{(I\,x)} + y)\,\mathbf{e}^{(I\,y)}}{1 + \cot(y)}$$

```
> convert(f,exp,x);
```

$$\frac{\left(-\frac{I\left(\left(\mathbf{e}^{(I x)}\right)^{2}-1\right)}{\left(\mathbf{e}^{(I x)}\right)^{2}+1}+\mathbf{e}^{(I x)}+y\right)\mathbf{e}^{(I y)}}{1+\cot(y)}$$

```
> convert(f,trig);
```

$$\frac{(\tan(x)+\cos(x)+I\sin(x)+y)\,(\cos(y)+I\sin(y))}{1+\cot(y)}$$

```
> convert(%,sincos);
```

$$\frac{\left(\frac{\sin(x)}{\cos(x)}+\cos(x)+I\sin(x)+y\right)(\cos(y)+I\sin(y))}{1+\frac{\cos(y)}{\sin(y)}}$$

```
>
```