x
$f(x)$
x
$_{s}eriesPowerSeriesLet\{_{n}\}$
x
c
x
$$\sum_{n=0}^{\infty} a_n x^n = a_0+a_1x+a_2x^2+a_3x^3+\dots$$
x
c
$$\sum_{n=0}^{\infty} a_n (x-c)^n = a_0+a_1(x-c)+a_2(x-c)^2+a_3(x-c)^3+\dots$$
$_{p}s1$**Examples of power series**$Writeoutthefirstfivetermsofthefollowingpowerseries$:
1. $\sum_{n=0}^{\infty} x^n$2. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{(x+1)^n}{n}$3. $\sum_{n=0}^{\infty} (-1)^{n+1} \frac{(x-\pi)^{2n}}{(2n)!}$.
$x^0 =$
1
x
$$\sum_{n=0}^{\infty} x^n = 1+x+x^2+x^3+x^4+\dots$$
$x =$
$c =$
-1
$n =$
1
$n =$
0
$a_0 =$
0
0

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{(x+1)^n}{n} = (x+1)-\frac{(x+1)^2}{2}+\frac{(x+1)^3}{3}-\frac{(x+1)^4}{4}+\frac{(x+1)^5}{5}\dots$$

$c =$
π
$0! =$
1

$$\sum_{n=0}^{\infty} (-1)^{n+1} \frac{(x-\pi)^{2n}}{(2n)!} = -1+\frac{(x-\pi)^2}{2}-\frac{(x-\pi)^4}{24}+\frac{(x-\pi)^6}{6!}-\frac{(x-\pi)^8}{8!}\dots$$

x
$??$
$\sum_{n=0}^{\infty} x^n$
x
$??$
$|x| <$
1
x
$_{c}onvergeConvergenceofPowerSeriesLetapowerseries\sum_{n=0}^{\infty} a_n(x-$
$c)^n$
$x =$
c
$R >$
0
x
$(c-$
$R, c+$
$R)$
$x <$
$c-$
R
$x >$
$c+$
R
x
R
$??$
$(-R, R)$
$_{c}onvergeRadiusandIntervalofConvergence$
R
$??$
$x =$
0
$R =$
0
x
$R =$
∞
x
$_{p}owerTheRadiusofConvergenceofaSeriesandAbsoluteConvergence$
$\sum_{n=0}^{\infty} a_n x^n$
$\sum_{n=0}^{\infty} |a_n x^n|$
R
$\sum_{n=0}^{\infty} a_n(x-$
$c)^n$
$\sum_{n=0}^{\infty} |a_n($