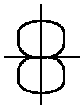
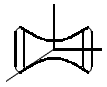
1. (a) $\displaystyle\sum_{n=1}^{\infty}(-1)^{n+1}\frac{x^{2n-1}}{(2n-1)n!}$ (b) $(-\infty,\infty)$ (c) $f(1)\simeq 0.4802\pm .000046$

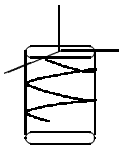
2. (a) $f(x)=\displaystyle\sum_{n=0}^{\infty}x^n \quad f'(x)=\sum_{n=0}^{\infty}nx^{n-1} \quad R=1$ (b) 3

3. (a) $x=2\ln t,\quad y=t+\dfrac{1}{t}$ (b) $y=\mathrm{e}^{x/2}+\mathrm{e}^{-x/2}$ (c) 3/2

4. (a)  (b) 2

5. A hyperboloid of one sheet with central axis along the y axis. 

6. $z=x^2+y^2$:= an elliptic (actually, circular) paraboloid with central axis along the z axis. 

7. (a) This helix curves downwards on the cylinder $x^2+y^2=1$. For $0\le t\le 2\pi$ it makes two complete turns starting at $(1,0,0)$ and ending at $(1,0,-2\pi)$. 

   (b) $\boldsymbol{v}=\langle -2\sin 2t\,,2\cos 2t,\,-2\rangle$, $\boldsymbol{a}=\langle -4\cos 2t\,,-4\sin 2t,\,0\rangle$, $\boldsymbol{T}=\frac{1}{\sqrt{2}}\langle -\sin 2t\,,\cos 2t,\,-1\rangle$, $\boldsymbol{N}=\langle -\cos 2t\,,-\sin 2t,\,0\rangle$, $\kappa=\frac{1}{2}$

   (c) $s=4\sqrt{2}\pi$

8. (a) $x+y+z=1$ (b) 1/3 (c) $\sqrt{3}$

9. $\displaystyle -\frac{x^2/y+\mathrm{e}^x-xz\cos(xy)}{x^2/z-\sin(xy)}$

10. $4\,\frac{\partial^2 z}{\partial x^2}\;=\;4(f''+g'')\;=\;\frac{\partial^2 z}{\partial y^2}$

11. Min at $(6,18)$; saddle point at $(0,0)$.

12. Min distance is 3 (at $(2,4,4)$).

13. (a) $2/3\ (\mathrm{e}-1)$ (b) $1/2\ \sin(1)$

14. The solid is "half an orange segment". The volume is 4.