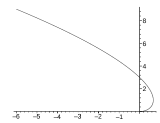
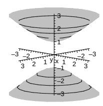
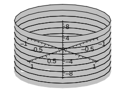
1. (a) $x = t - \frac{1}{3}t^3,\ y = t^2$
   (b) VT: at $(\frac{2}{3}, 1)$ $(t = 1)$ HT: at $(0, 0)$ $(t = 0)$ Graph: 
   (c) $s = 12$
2. $\sqrt{9.1} = 3 + \frac{1}{6}(0.1) \pm \frac{1}{216}(0.1)^2 = 3.016667 \pm 0.000046$
3. $1 + \frac{1}{2!}x^2 + \frac{1}{4!}x^4 + \frac{1}{6!}x^6 + \cdots + \frac{1}{(2n)!}x^{2n} + \cdots$
4. $\frac{1}{3}x^3 + \frac{1}{7}x^7 + \frac{1}{11}x^{11} + \cdots + \frac{1}{4n-1}x^{4n-1} + \cdots$ Interval of convergence: $(-1, 1)$
5. (a) Graph:  (b) Graph: 
6. $\boldsymbol{T} = \frac{1}{1+2t^2}\langle 2t, 1, 2t^2\rangle,\ \boldsymbol{N} = \frac{1}{1+2t^2}\langle 1 - 2t^2, -2t, 2t\rangle,\ \kappa = \frac{2t}{(1+2t^2)^2},\ a_T = \frac{2t^2-1}{t^2},\ a_N = \frac{2}{t}$
7. The limit $\displaystyle\lim_{(x,y)\to(0,0)} \frac{\sin(x^2 + y^2)}{x^2 + y^2} = 1 = f(0, 0)$ so the function is continuous.
8. (a) $-\frac{6}{5\sqrt{2}}$ (b) $\boldsymbol{\nabla} f = \langle \frac{2}{5}, -\frac{4}{5}\rangle;\ |\boldsymbol{\nabla} f| = \frac{2}{\sqrt{5}}$ (c) $\boldsymbol{u} = \left\langle \frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right\rangle$ or $\left\langle \frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right\rangle$
9. (a) $-x + y - 6z = 8$ (b) $f(0.1, 1.9) \simeq -1.03333$
10. $\frac{\partial z}{\partial x} = 2xyf',\ \frac{\partial z}{\partial y} = f - 2y^2 f'$ (so qed)
11. CPs: $(-1, \pm 2)$ are saddle points, $(-\sqrt{5}, 0)$ is a local max, $(\sqrt{5}, 0)$ is a local min.
12. max $(4\sqrt{3})$ at $(2\sqrt{3}, -\sqrt{3}, \sqrt{3})$; min $(-4\sqrt{3})$ at $(-2\sqrt{3}, \sqrt{3}, -\sqrt{3})$
13. (a) $\boldsymbol{b}, \boldsymbol{c}$ (b) π (the region is a circle...)
14. $\frac{2}{3}(e - 1)$ 15. 99π
16. $V = \displaystyle\int_0^{2\pi}\int_{\pi/4}^{\pi/2}\int_0^{\csc\phi} d\rho\, d\phi\, d\theta = \int_0^{2\pi}\int_0^1\int_0^r r\, dz\, dr\, d\theta = \frac{2}{3}\pi$