1. (a) $g'(x) = \dfrac{\cos\left(x^2\right)\cdot 2x\cdot\left(1+e^{x^3}\right) - \sin\left(x^2\right)\cdot 3x^2\cdot e^{x^3}}{\left(1+e^{x^3}\right)^2}$

   (b) $f'(t) = \dfrac{\sqrt{e^{\sin t}+1}}{t} + \dfrac{\ln(2t)\cdot\cos t\cdot e^{\sin t}}{2\sqrt{e^{\sin t}+1}}$

   (c) $\dfrac{dy}{dx} = (2x+1)^{\sqrt[3]{x}}\cdot\left[\dfrac{\ln(2x+1)}{3\sqrt[3]{x^2}} + \dfrac{2\sqrt[3]{x}}{2x+1}\right]$

2. (a) 0 (b) $\frac{1}{2}$ (c) 1

3. $x = \frac{1}{2}$m gives a global maximum for volume

4. $\dfrac{dA}{dt} = 2\left(\dfrac{300}{4\pi}\right)^{-\frac{1}{3}}\cdot 30$ cm^2/sec

5. (a) $y = -\frac{9}{4}(x-1)-2$ (b) $(-2,2)$ and $(-2,-2)$ (c) vertical tangent at $(-3,0)$

6. (a) $(-1.7,4)$ and $(5.5,9)$ (b) $(-9,2)$ and $(2,9)$

   (c) $x=-1.7,5.5$ minima, $x=4$ maximum, $x=2$ neither (d) $(1,5)$ (e) -1 (f) $f(-2.1)\approx -0.9$

7. (a) $t = 0,1,\sqrt{2},\sqrt{3},2$ (b) speed$=\sqrt{4\pi^2+1}$ (c) $y = 2\pi(x+1)$

8. (a) The vertical asymptote is $x=-1$.
   The horizontal asymptote is $y=1$

   (b) $x=0$

   (c) The function is increasing on $(-\infty,-1)\cup(-1,\infty)$.

   (d) The inflection points are $(0,-1)$ and $\left(\sqrt[3]{1/2},-1/3\right)$.