1. (a) $f'(x) = \dfrac{2\tan x \cdot \sec^2 x + \frac{2\sin x \cdot \cos x}{2+\sin^2 x}}{\tan^2 x + \ln\left(2+\sin^2 x\right)}$

   (b) $g'(x) = \cos\left(\dfrac{7x^3+5}{x^2}\right) + x \cdot \sin\left(\dfrac{7x^3+5}{x^2}\right) \cdot \left(7 - \dfrac{10}{x^3}\right)$

   (c) $h'(t) = (t+1)^{\sqrt{t}} \cdot \left(\dfrac{\sqrt{t}}{t+1} + \dfrac{\ln(t+1)}{2\sqrt{t}}\right)$

2. (a) $-\infty$ (b) $-\frac{5}{6}$ (c) DNE

3. $\dfrac{d\theta}{dt} = \dfrac{5}{96}$ radians/minute

4. The dog should run 14.583333 meters and swim the rest.

5. (a) $(\pm\sqrt[4]{56}, \pm\sqrt[4]{56})$ or $(\pm 2.736, \pm 2.736)$

   (b) $y - 3 = -5/6(x-2)$ (c) 2.917

6. (a) $y - 4 = -\frac{1}{2}x$ and $y - 4 = \frac{1}{2}x$

   (b) $g'(1) = -14$

7. (a) $x = -2$ and $x = 2$ (b) $y = 1$

   (c) increasing on $(-\infty, 0)$ and decreasing on $(0, \infty)$

   (d) concave up on $(-\infty, -2)$ and $(2, \infty)$. concave down on $(-2, 2)$.

   (e) $x = 0$ is the only critical value. it is a local ~~minimizer~~ maximizer.