Math 231 Worksheet 4

1. Find the *first* and *second* derivatives of the function.

(*a*) $f(x) = x^2 - 2x + 2^{32}$

(*b*) $g(t) = \sqrt{t} - \dfrac{1}{\sqrt{t}}$

2. Differentiate the function using Product/Quotient Rules.

(*a*) $y = x^2(1 - x)$

(*b*) $y = \dfrac{x^2 + 1}{x}$

(*c*) $h(\theta) = 2(\sin\theta)(\cos\theta)$

1. (a) $f'(x) = 2x - 2, \quad f''(x) = 2$
(b) $g'(t) = \frac{1}{2}t^{-\frac{1}{2}} + \frac{1}{2}t^{-\frac{3}{2}}, \quad g''(t) = -\frac{1}{4}t^{-\frac{3}{2}} - \frac{3}{4}t^{-\frac{5}{2}}$

2. (a) $\frac{dy}{dx} = 2x - 3x^2$
(b) $\frac{dy}{dx} = \frac{x^2-1}{x^2}$
(c) $\frac{dh}{d\theta} = 2\cos^2\theta - 2\sin^2\theta$