23 Sept 2009

p137 30) $h(t) = \left(\frac{t^2}{t^3+2}\right)^2$

$$h'(t) = 2\left(\frac{t^2}{t^3+2}\right)^1 \left(\frac{2t(t^3+2) - (3t^2)(t^2)}{(t^3+2)^2}\right)$$

$$= \frac{2t^2}{(t^3+2)}\left(\frac{t(2t^3+4-3t^3)}{(t^3+2)^2}\right)$$

$$\boxed{\frac{-2t^3(t^3-4)}{(t^3+2)^3}}$$

36) $g(x) = \sqrt{x-1} + \sqrt{x+1}$

$$g'(x) = \frac{1}{2}(x-1)^{-1/2}(1) + \frac{1}{2}(x+1)^{-1/2}(1)$$

$$\boxed{\frac{1}{2\sqrt{x-1}} + \frac{1}{2\sqrt{x+1}}}$$

OR

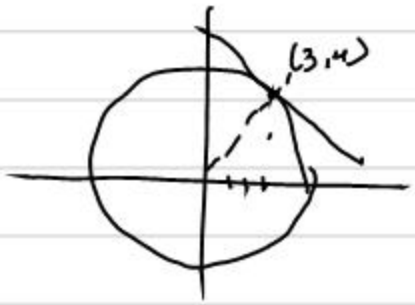
$$\boxed{\frac{\sqrt{x+1} + \sqrt{x-1}}{2\sqrt{x^2-1}}}$$

#6 $y = \frac{1}{x} + \sqrt{\cos x}$ $\left(\frac{\pi}{2}, \frac{2}{\pi}\right)$

$$y' = -1x^{-2} + \frac{-\sin x}{2\sqrt{\cos x}} = \frac{-1}{x^2} - \frac{\sin x}{2\sqrt{\cos x}}$$

$$y'\left(\tfrac{\pi}{2}\right) = \frac{-1}{\frac{\pi^2}{4}} - \frac{1}{0} \quad \text{oh no!} \leftarrow = DNE$$

$$x^2 + y^2 = 25$$



$$y_1 = \sqrt{25 - x^2}$$

$$y_2 = -\sqrt{25 - x^2}$$

$$y_1' = \frac{-2x}{2\sqrt{25 - x^2}} = \frac{-x}{\sqrt{25 - x^2}}$$

$$y_1'(3) = \frac{-3}{\sqrt{25 - 3^2}} = \frac{-3}{4}$$

$$x^2 + y^2 = 25$$

$$\frac{d}{dx}(x^2 + y^2) = \frac{d}{dx}(25)$$

$$2x + 2y\left(\frac{dy}{dx}\right) = 0$$

$$2y\frac{dy}{dx} = -2x$$

$$\frac{dy}{dx} = \frac{-2x}{2y}$$

$$\frac{dy}{dx} = \frac{-x}{y}$$

$$\left.\frac{dy}{dx}\right|_{(3,4)} = \frac{-3}{4}$$

$$x^2y - 2x^3 + 4y^2 - 7x + 2y - 3 = 0$$

$$2xy + \frac{dy}{dx}x^2 - 6x^2 + 8y\frac{dy}{dx} - 7 + 2\frac{dy}{dx} - 0 = 0$$

$$\frac{dy}{dx}x^2 + 8y\frac{dy}{dx} + 2\frac{dy}{dx} = 6x^2 - 2xy + 7$$

$$\frac{dy}{dx}(x^2 + 8y + 2) = 6x^2 - 2xy + 7$$

$$\boxed{\frac{dy}{dx} = \frac{6x^2 - 2xy + 7}{x^2 + 8y + 2}}$$

$$x^2 + y^2 = 25$$

$$2x + 2y\frac{dy}{dx} = 0$$

$$\frac{dy}{dx} = -\frac{x}{y}$$

$$\frac{d^2y}{dx^2} = \frac{-1y - \frac{dy}{dx}(-x)}{y^2}$$

$$\frac{-y + \left(-\frac{x}{y}\right)x}{y^2}$$

$$\frac{-y^2 - x^2}{y^3}$$

a) $\frac{y^2 - x^2}{y^3}$ b) $\frac{-y^2 + x^2}{y^3}$ c) $\frac{y^2 + x^2}{y^3}$ d) $\frac{-y^2 - x^2}{y^2}$ e) $\frac{-25}{y^3}$