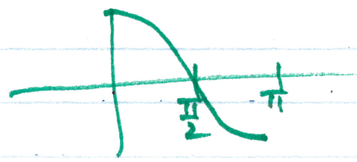
3.7

(39) $y=\sqrt{1-\sqrt{x}}$

$y=\left(1-(x)^{1/2}\right)^{1/2}$

$\frac{dy}{dx}=\frac{1}{2}\left(\underbrace{1-(x)^{1/2}}\right)^{-\frac{1}{2}}\left[-\frac{1}{2}x^{-\frac{1}{2}}\right]$



(25) $y=2\sin(\pi x-y)$

$\frac{dy}{dx}=2\cos(\pi x-y)\left[\pi-\frac{dy}{dx}\right]$

$\frac{dy}{dx}=2\pi\cos(\pi x-y)-\cancel{2\cos(\pi x-y)\frac{dy}{dx}}$

$+2\cos(\pi x-y)\frac{dy}{dx}$ $\quad\quad$ $\cancel{+2\cos(\pi x-y)\frac{dy}{dx}}$

$\frac{\frac{dy}{dx}\cancel{\left(1+2\cos(\pi x-y)\right)}}{\cancel{1+2\cos(\pi x-y)}}=\frac{2\pi\cos(\pi x-y)}{1+2\cos(\pi x-y)}=\frac{dy}{dx}$

(a) TANGENT @ $(1,0)$

$m=\frac{2\pi\cos(\pi(1)-0)}{1+2\cos(\pi(1)-0)}=\frac{-2\pi}{-1}=2\pi$

$y-y_1=m(x-x_1)$

$\boxed{y-0=2\pi(x-1)}$

(b) NORMAL @ $(1,0)$, $m=-\frac{1}{2\pi}$ $\quad$ $\boxed{y=-\frac{1}{2\pi}(x-1)}$

3.7

55) $x^3+y^3-9xy=0$

$3x^2+3y^2\frac{dy}{dx}-9y-9x\frac{dy}{dx}=0$

$-3x^2 \qquad +9y \qquad -3x^2+9y$

$\frac{\frac{dy}{dx}\cancel{(3y^2-9x)}}{\cancel{3y^2-9x}} = \frac{-3x^2+9y}{3y^2-9x}$

(b) $-3x^2+9y=0$ $\qquad x^3+\left(\frac{x^2}{3}\right)^3-9x\left(\frac{x^2}{3}\right)=0$

$\frac{9y}{9}=\frac{3x^2}{9}$

$\boxed{y=\frac{x^2}{3}}$

(c) $3y^2-9x=0$

$\cancel{x^3+(\ \ )^3}$

$3y^2=9x \qquad \left(\frac{y^2}{3}\right)^3+y^3-9\left(\frac{y^2}{3}\right)y=0$

$\frac{3y^2}{9}=x$

$\boxed{\frac{y^2}{3}=x}$

3.7

(2) $x^3+y^3=\overset{f}{18x}\overset{g}{y}$

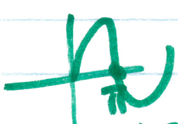
$$\cancel{3x^2}+3y^2\frac{dy}{dx}=18y+\cancel{18x\frac{dy}{dx}}$$

$$\cancel{-3x^2}\quad -18x\frac{dy}{dx}\qquad -3x^2\quad \cancel{-18x\frac{dy}{dx}}$$

$$\frac{\frac{dy}{dx}\cancel{(3y^2-18x)}}{\cancel{3y^2-18x}}=\boxed{\frac{18y-3x^2}{3y^2-18x}=\frac{dy}{dx}}$$

$$\boxed{\frac{\cancel{3}(6y-x^2)}{\cancel{3}(y^2-6x)}=\frac{dy}{dx}}$$

(24) $\overset{f}{x}\,\overset{g}{\sin 2y}=\overset{f}{y}\,\overset{g}{\cos 2x}\qquad\left(\frac{\pi}{4},\frac{\pi}{2}\right)$



$$\sin 2y+\cos 2y\left[2\frac{dy}{dx}\right]x=\frac{dy}{dx}\cos 2x+-\sin 2x[2]y$$

$$\sin\left(2\cdot\frac{\pi}{2}\right)+\cos\left(2\cdot\frac{\pi}{2}\right)\left[2\frac{dy}{dx}\right]\frac{\pi}{4}=\frac{dy}{dx}\cos\left(2\cdot\frac{\pi}{4}\right)-\sin\left(2\cdot\frac{\pi}{4}\right)[2]\left[\frac{\pi}{2}\right]$$

$$0+-1\left[2\frac{dy}{dx}\right]\frac{\pi}{4}=0-1[2]\left[\frac{\pi}{2}\right]$$

$$\cancel{\left(-\frac{2}{\pi}\right)}\cancel{-\frac{\pi}{2}}\frac{dy}{dx}=-\pi\left(\cancel{-\frac{2}{\pi}}\right)$$

$$\frac{dy}{dx}=2$$

TANGENT: $y-\frac{\pi}{2}=2\left(x-\frac{\pi}{4}\right)$

NORMAL: $y-\frac{\pi}{2}=-\frac{1}{2}\left(x-\frac{\pi}{4}\right)$