1. $x^2+y^2-5x-y+4=0$ at point $(1,2)$.

$2x+2y\frac{dy}{dx}-5-\frac{dy}{dx}=0$

$2y\frac{dy}{dx}-\frac{dy}{dx}=5-2x$

$\frac{dy}{dx}=\frac{5-2x}{2y}$

$y\frac{dy}{dx}$

$m=\frac{dy}{dx}=\frac{5-2x}{2y}=\frac{5-2(1)}{2(2)-1}=\frac{3}{3}=1$

$m=-3$

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

$y-0=-3(x-1)$

$y-0=-3x+3$

$y+3x-3=0$ (tangent)

2. $x^2+y^2-12x-12y+47=0$ $(1,0)$

$2x+2y\frac{dy}{dx}-12-12\frac{dy}{dx}=0$

$2y\frac{dy}{dx}-12\frac{dy}{dx}=12-2x$

$\frac{dy}{dx}=\frac{12-2x}{2y-12}=\frac{12-2(1)}{2(0)-12}=\frac{10}{-12}=-\frac{5}{6}$

$y-0=-\frac{5}{6}(x-1)$

multiply all by 6

$6(y-0)=-5(x-1)$

$6y-0=-5x+5$

$6y+5x-5=0$ (tangent)

3. $x^2+y^2-8x+14y+40=0$ $(1,-2)$

$2x+2y\frac{dy}{dx}-8+14\frac{dy}{dx}=0$

$2y\frac{dy}{dx}+14\frac{dy}{dx}=8-2x$

$\frac{dy}{dx}=m=\frac{8-2x}{2y+14}=\frac{8-2(1)}{2(-2)+14}=\frac{6}{14}=\frac{3}{7}$

$y-0=\frac{3}{7}(x-1)$

multiply by 7

$2(y-0) = 3(x-1)$

$2y - 0 = 3x - 3$

$2y - 3x + 3 = 0$

(tangent).