Implicit Differentiation

In problems 1-6, Find dy/dx.

1. $xy + x = 7$	2. $y^3 = 2 + x^4$
3. $x^2 y^3 - 5x = 0$	4. $7y^3 + xy = 6x$
5. $\dfrac{xy + x^2}{x + 3y} = 2$	6. $\sqrt{xy} = 2$

In problems 7-11, Find the slope of the graph of the function at the given point.

7. $x^2 + y^2 = 9 \quad (3,0)$	8. $y^2 + x^2 y = 10 \quad (3,1)$
9. $x^5 - 2xy + y^3 = 5 \quad (1,2)$	10. $8x^3 y^2 = 64 \quad (2,1)$
11. $x^2 + y^2 = 16 \quad (0,-4)$	

In problems 12-13, Find the equation(s) of the tangent line at the two given points

12. $x^2 - y^2 = 3 \quad (2,1),(-2,-1)$	13. $(y+1)^2 = 4(x-3)^2 \quad (3,5),(-5,1)$

14. Given 100,000 units are produced, the Cobb-Douglas production function is given by $100x^{0.55} y^{0.45} = 100000$, find the rate of change of y with respect to x when x = 1000 and y = 800.

15. Given a disease is modeled by $y^2 + 1 = 7t^3 + 5t - 2$, find the rate of change of y with respect to t when t = 1 (y is the number of cases and t is time).