

For problems 1-6, find $\frac{dy}{dx}$ in terms of x and y .

1. $y^2 = x^2 - x$

2. $x^3 + y^3 = 2x$

3. $2xy + y^2 = x - 7$

4. $x^3 - xy + y^2 = 4$

5. $x^2y + y^2x = -2$

6. $3xy + y = x - 4$

For problems 7-9, find $\frac{d^2y}{dx^2}$ in terms of x and y only.

7. $x^2 + y^2 = 36$

8. $1 - xy = x - y$

9. $y^2 = 4x$

10. Evaluate $\frac{dy}{dx}\Big|_{(-4,-1)}$ if $xy = 4$.

11. Evaluate $\frac{dy}{dx}\Big|_{(1,1)}$ if $x^2 - y^3 = 0$.

12. Evaluate $\frac{dy}{dx}\Big|_{(4,-1)}$ if $xy + 2x + 3y = 1$.

13. Evaluate $\frac{dy}{dx}\Big|_{(-1,1)}$ if $(x + y)^3 = x^3 + y^3$.

14. Find the equation of the line tangent to $x^2 + xy - y^2 = 1$ at the point $(2, 3)$.

15. Find the equation of the line tangent to $x^2 + y^2 = 25$ at the point $(3, -4)$.

16. Find the equation of the line normal to $x^2y^2 = 9$ at the point $(-1, 3)$.

17. Find the equation of the line normal to $\frac{x-y}{x-2y} = 2$ at the point $(3, 1)$.