

Implicit Differentiation (CALC.DIF.07)

Find dy/dx by implicit differentiation.

1. $x^2y^2 - 4x^2 - 9y^2 = 0$

3. $-\cos(x - y) = x + y$

5. $\ln\sqrt{xy} - (x - y)^2 = 4$

7. $4x^3 + \ln y^2 + y = 4x$

9. $e^y \sin x = x - xy$

2. $\ln xy - x^2 + y = 4$

4. $\sqrt{x + y} = \frac{1}{x} + y$

6. $(x^2 - y)^2 = 2xy$

8. $\frac{x}{y} + \frac{y}{x} = 4y$

10. $x \cos y + y \cos x = 1$

Use implicit differentiation to write an equation of the tangent line to the graph at the given point.

11. $x^2 + y^2 = 25$ $(-3, 4)$

13. $x^2y - x^2 + 5x = -6$ $(-3, 2)$

15. $\sin^2 x + \cos y = 1$ $(\frac{\pi}{4}, \frac{\pi}{3})$

17. $\sqrt{x} + \sqrt{y} = \frac{3}{4}xy$ $(4, 1)$

19. $x + y - 1 = \ln(x^2 + y^2)$ $(1, 0)$

12. $xy = 10$ $(-5, -2)$

14. $x^2 + xy + y^2 = 9$ $(-3, 0)$

16. $e^{xy} - 2x = 0$ $(1, \ln 2)$

18. $y^2 = \ln xy$ $(e, 1)$

20. $x^2y - xy + xy^2 = 4$ $(2, 1)$

Find d^2y/dx^2 implicitly in terms of x and y .

21. $3x^4 - y^2 = 12$

23. $y^3 = x^2$

25. $xy - x^2 = -6$

27. $x^2y + 4x = 8$

22. $x^2 + y^2 = 81$

24. $x^2 - e^y - 4x = -20$

26. $y^2 - x^2 + 5x = -10$

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