MA4010: Calculus and Linear Algebra

Tutorial : Week 04

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Compute the derivatives of the following functions.

1. $f(x) = x + 1 + (x+1)^2$
2. $f(x) = \frac{x-2}{x^4+1}$
3. $f(x) = \left(\frac{1}{1+x}\right)^{-1}$
4. $f(x) = \sqrt{1-x^2}$
5. $f(x) = \frac{ax+b}{cx+d}$
6. $f(x) = \frac{1}{(1+x^2)^2}$
7. $f(x) = \frac{x}{1+\sqrt{x}}$
8. $f(x) = \sqrt{\frac{1-x}{1+x}}$
9. $f(x) = \sqrt[3]{x+\sqrt{x}}$
10. $\varphi(t) = \frac{t}{1+\sqrt{t}}$
11. $f(x) = \sin x + \cos x$
12. $f(x) = 2\sin x - 3\cos x$
13. $f(x) = 3\sin x + 2\cos x$
14. $f(x) = x\sin x + \cos x$
15. $f(x) = x\cos x - \sin x$
16. $f(x) = \frac{\sin x}{x}$
17. $f(x) = \cos^2 x$
18. $f(x) = \sqrt{1 - \sin^2 x}$
19. $f(x) = \sqrt{\frac{1-\sin x}{1+\sin x}}$
20. $f(x) = \frac{\cos x}{\sin x}$
21. $g(x) = -\cos^2 x$
22. $f(x) = \sin 2x - \cos 3x$
23. $f(x) = \sin\frac{\pi}{x}$
24. $f(x) = \sin(\cos 3x)$
25. $f(x) = \frac{\sin x^2}{x^2}$
26. $f(x) = \tan\sqrt{1+x^2}$
27. $f(x) = \cos^2 x - \cos x^2$

For the implicit functions y defined below, find the derivative y'.

28. $xy = \frac{\pi}{6}$
29. $\sin(xy) = \frac{1}{2}$
30. $\frac{xy}{x+y} = 1$
31. $x + y = xy$
32. $(y-1)^2 + x = 0$
33. $(y+1)^2 + y - x = 0$
34. $(y-x)^2 + x = 0$
35. $(y+x)^2 + 2y - x = 0$
36. $(y^2-1)^2 + x = 0$
37. $(y^2+1)^2 - x = 0$
38. $x^3 + xy + y^3 = 3$
39. $\sin x + \sin y = 1$
40. $\sin x + xy + y^5 = \pi$
41. $\tan x + \tan y = 1$

The End