

1. Cha-cha-cha-chain rule. Compute the derivative:

(a)  $(x^2 + 3x + 1)^2$       (b)  $\sin(5x)$       (c)  $(1 + e^x)^{35}$       (d)  $\sqrt{x^4 - 64}$   
(e)  $(e^{4x} - 12x^2 + x)^3$       (f)  $\sin(\cos(x))$       (g)  $\frac{(1-x)^2}{(1+x)^2}$       (h)  $\sqrt[5]{x^9 - 3x^2 + 1}$   
(i)  $(\tan(x) + \sin(x))^{-5}$       (j)  $\tan(\sin(\sin(-x)))$       (k)  $\frac{(1+e^x)^{35}}{\sqrt{x^4 - 64}}$       (l)  $(\tan(e^x))^3$

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2. Cha-cha-cha-implicit differentiation. Find  $dy/dx$ :

(a)  $y^2 - x = 0$       (b)  $y^2 + x^2 = 1$       (c)  $y = x^2y^3 + x$   
(d)  $x^3 + y^3 = 4$       (e)  $(x - y)^4 = x + y - 1$       (f)  $e^{xy} + e^x = e^{5y}$   
(g)  $\cos^2(y) + \cos^2(x) = \cos(2x + 2y)$       (h)  $\frac{x - y^3}{y + x^2} = x + 2$       (i)  $x = \sqrt{x^2 + y^2}$

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3. Let  $C$  be the curve  $y^{2/3} + x^{2/3} = 8$ . Find all points  $(x, y)$  where the slope of the tangent line to  $C$  has slope 1.

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4. Let  $C$  be the curve  $x = \sin(y)$ . Write the equation of the line tangent to  $C$  at the point  $(0, \pi)$ .