

# Calculus I (Electronics) Assignment 5

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The following functions are either products of two functions  $f_1(x)f_2(x)$  or the composition of two functions  $f_1(f_2(x))$ . Complete the following table by classifying each function as either a product or a composition and finding the derivative of each function:

Function	Product or Composition?	Derivative
$f(x) = \sin x \cos x$	P	$\cos x \cos x - \sin x \sin x$
$g(x) = e^{x^2-2x}$	C	$e^{x^2-2x} \cdot (2x-2)$
$h(x) = \ln(x+4x^2)$	C	$\frac{1}{x+4x^2} \cdot (1+8x)$
$i(x) = \sin(\cos x)$	C	$[\cos(\cos x)] \cdot (-\sin x)$
$j(x) = xe^x$	P	$e^x + xe^x$
$k(x) = x^2 \ln x$	P	$2x \ln x + \frac{1}{x} x^2$
$\alpha(x) = (\sin x)^{13}$	C	$13 (\sin x)^{12} \cdot \cos x$
$\beta(x) = \ln(\cos x)$	C	$\frac{1}{\cos x} (-\sin x)$
$\gamma(x) = e^{\sin x}$	C	$e^{\sin x} (\cos x)$
$\delta(x) = (2x^3 - 3x^2 - 2)^{-8}$	C	$-8(2x^3 - 3x^2 - 2)^{-9} (6x^2 - 6x)$
$\mu(x) = \ln(5x^2 - 3)$	C	$\frac{1}{5x^2-3} \cdot 10x$
$\theta(x) = \cos(x)e^x$	P	$(-\sin x)e^x + e^x \cos x$
$\nu(x) = (x^3 + x^2 - 2x)(\frac{2}{x} - 3\sqrt{x})$	P	$(4x^3 + 2x - 2)(\frac{2}{x} - 3\sqrt{x}) + (-2/x^2 - 3/2 x^{-1/2})(x^4 + x^2 - 2x)$
$F(x) = \sqrt{(2x^3 - 4x)}$	C	$\frac{1}{2} (2x^3 - 4x)^{-1/2} \cdot (6x^2 - 4)$
$G(x) = \sqrt{x} \cos(x)$	P	$\frac{1}{2} x^{-1/2} \cos x - (\sin x) \sqrt{x}$
$H(x) = e^{\sqrt{x}}$	C	$e^{\sqrt{x}} \cdot \frac{1}{2} x^{-1/2}$

NAME: SOLUTIONS