1. Calcule a derivada das seguintes funções:

   (a) $f(x) = e^{-x}$

   (b) $g(x) = \dfrac{e^x - e^{-x}}{2}$

   (c) $h(x) = (1 - x)(1 - x^{50})$

   (d) $p(x) = (x^{17} - 2x^{13})^2$

   (e) $q(x) = (f(x))^3$

   (f) $r(x) = \dfrac{x^3 - 1}{x - 1}$

   (g) $s(x) = x^2 e^{-2x}$

   (h) $t(x) = (x + 1)e^{x+1}$

   (i) $u(x) = (2^x - 1)^3$

2. Use a regra do produto e a regra do quociente para calcular as seguintes derivadas:

   (a) $\dfrac{d}{dx}\left[(x^2 + 3)e^x\right]$

   (b) $\dfrac{d}{dx}\left[\dfrac{x^3}{e^x}\right]$

   (c) $\dfrac{d}{dx}\left[10^x(x^2 + 1)^3\right]$

   (d) $\dfrac{d}{dx}\left[\dfrac{x^3 e^x}{x^2 + 1}\right]$

   (e) $\dfrac{d}{dx}\left[\dfrac{(x + 1)^2}{x^2 e^x}\right]$

   (f) $\dfrac{d}{dx}\left[e^{1-2x} \cdot (x^3 - 1)\right]$

   (g) $\dfrac{d}{dx}\left[\left(1 - \dfrac{1}{x}\right) \cdot 2^{-x}\right]$

   (h) $\dfrac{d}{dx}\left[\dfrac{x^3}{5^x}\right]$

   (i) $\dfrac{d}{dx}\left[3^{\frac{x}{2}+1}\right]$

   (j) $\dfrac{d}{dx}\left[x^2 \cdot 4^x\right]$

   (k) $\dfrac{d}{dx}\left[(x + 1)^3 \cdot 6^x\right]$

   (l) $\dfrac{d}{dx}\left[\dfrac{x^2 \cdot 10^x}{x^3 - 1}\right]$

3. Calcule a derivada de cada uma das funções abaixo:

   (a) $f(x) = x^2 \cos(2x)$

   (b) $g(x) = \dfrac{\operatorname{tg}^2(x)}{x^2}$

   (c) $h(x) = \dfrac{\operatorname{sen}(x)}{x}$

   (d) $p(x) = (x + 1)\operatorname{cotg}(x)$

   (e) $q(x) = \dfrac{x \operatorname{tg}(x)}{x^2 + 1}$

   (f) $r(x) = e^x \operatorname{sen}(2x)$

   (g) $s(x) = \dfrac{\operatorname{sen}^2(x)}{\sqrt[3]{x}}$

   (h) $t(x) = (x^2 - 3x)\operatorname{sc}(x)$

   (i) $u(x) = \dfrac{\cos(x)}{x + 1}$

4. Determine a equação da reta tangente ao gráfico das seguintes funções no ponto x_0 indicado:

   (a) $f(x) = x^2$, $x_0 = -1$

   (b) $g(x) = x\,e^x$, $x_0 = 0$

   (c) $h(x) = e^{-x}$, $x_0 = 0$

   (d) $p(x) = \sqrt[3]{x}$, $x_0 = 1$

   (e) $q(x) = \operatorname{sen}(x)$, $x_0 = \dfrac{\pi}{2}$

   (f) $r(x) = \operatorname{tg}(x)$, $x = 0$

   (g) $s(x) = 2^x$, $x_0 = 1$

   (h) $t(x) = \operatorname{sc}(x)$, $x_0 = 0$

   (i) $u(x) = \dfrac{\operatorname{sen}(x)}{x}$, $x_0 = \dfrac{\pi}{4}$

5. Use a regra da cadeia para calcular as seguintes derivadas:

   (a) $\dfrac{d}{dx}\left[e^{x^2+1}\right]$

   (b) $\dfrac{d}{dx}\left[x^2 e^{-x^3}\right]$

   (c) $\dfrac{d}{dx}\left[\dfrac{7^{x^2}}{x^3 + 2}\right]$

   (d) $\dfrac{d}{dx}\left[\dfrac{e^{x^2}}{x^3 + 1}\right]$

   (e) $\dfrac{d}{dx}\left[e^x \cdot \sqrt{x^2 + 2}\right]$

   (f) $\dfrac{d}{dx}\left[2^{x^3+x} \cdot (x^2 + 3)\right]$

   (g) $\dfrac{d}{dx}\left[\dfrac{(x + 2)^2}{3^{x^2+1}}\right]$

   (h) $\dfrac{d}{dx}\left[4^{x^2+x} \cdot (x^3 - x + 2)\right]$

   (i) $\dfrac{d}{dx}\left[\dfrac{e^{x^3}}{2^{x^2-1}}\right]$