FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA
Departamento de Matemática

Derivadas

1. Calcule a derivada das seguintes funções:

   (a) $x^2 + 3x + 2$;

   (b) $x^4 + \operatorname{sen}(x)$;

   (c) $x^4 \operatorname{sen}(x)$;

   (d) $\dfrac{1}{1+x}$;

   (e) $\dfrac{x}{x-1}$;

   (f) $\dfrac{1}{2+\cos(x)}$;

   (g) $\dfrac{x+\cos(x)}{1-\operatorname{sen}(x)}$;

   (h) $\dfrac{x \operatorname{sen}(x)}{1+x^2}$;

   (i) $\sqrt{x}$;

   (j) $\dfrac{1}{1+\sqrt{x}}$;

   (k) $x^{3/2}$;

   (l) $x^{-3/2}$;

   (m) $x^{1/3} + x^{-1/4}$;

   (n) $\dfrac{\sqrt{x}}{1+x}$;

   (o) $\operatorname{tg}(x) - x$;

   (p) $x \operatorname{tg}(x)$;

   (q) $\operatorname{cotg}(x) + x$;

   (r) $\dfrac{\operatorname{cotg}(x)}{x}$;

   (s) $\dfrac{\operatorname{tg}(x)}{\operatorname{cotg}(x)}$;

   (t) $\operatorname{tg}^2(x)$;

   (u) $\dfrac{x}{\sqrt{4-x^2}}$;

   (v) $\operatorname{tg}\left(\dfrac{x}{2}\right) - \operatorname{cotg}\left(\dfrac{x}{2}\right)$;

   (w) $\operatorname{sen}\left(e^x\right)$.

2. Calcule a derivada das seguintes funções:

   (a) $\operatorname{sen}(\cos^2(x)) \cos(\operatorname{sen}^2(x))$;

   (b) $\dfrac{\operatorname{sen}^2(x)}{\operatorname{sen}(x^2)}$;

   (c) $(2-x^2)\cos(x^2) + 2x \operatorname{sen}(x^3)$;

   (d) $\sqrt{1+x^2}$;

   (e) $\cos(2x) - 2\operatorname{sen}(x)$;

   (f) $\left(\dfrac{1+x^3}{1-x^3}\right)^{1/3}$;

   (g) $\cos^2(\sqrt{x}) + \operatorname{sen}^2(\dfrac{1}{x})$;

   (h) $x\left(\operatorname{sen}(\sqrt{x}) + \cos(\dfrac{1}{x})\right)$;

   (i) $\log(1+x^2)$;

   (j) $x^2(1+\log(x))$;

   (k) $\log(\log(x))$;

   (l) $\log(1+\sqrt{x})$;

   (m) $\log(1+\operatorname{sen}^2(x))$;

   (n) $\log(1+\cos^2(x))$;

   (o) $e^{\log(x)}$;

   (p) $e^{\sqrt{x}}$;

   (q) $x^2\, e^x$;

   (r) $e^{1/x}$;

   (s) $e^{1/\sqrt{x}}$.

3. Calcule a derivada das seguintes funções:

   (a) $e^{\operatorname{sen}^2(x)}$;

   (b) $e^{\cos^2(x)}$;

   (c) $x\, e^{x^2}$;

   (d) $2^{\log(x)}$;

   (e) $2^{\sqrt{x}}$;

   (f) $x\, 2^{x^2}$;

   (g) $(\log(x))^x$;

   (h) $\operatorname{arcsen}(\dfrac{x}{2})$;

   (i) $\arccos(\dfrac{x}{2})$;

   (j) $\operatorname{arcsen}(\operatorname{sen}(x))$;

   (k) $\operatorname{arctg}(\sqrt{x})$;

   (l) $\arccos(\sqrt{1-x^2})$;

   (m) $\operatorname{arcsen}\left(\dfrac{1-x^2}{1+x^2}\right)$;

   (n) $\operatorname{arctg}\left(\dfrac{1+x}{1-x}\right)$;

   (o) $\log(\arccos(1/\sqrt{x}))$;

   (p) $e^{\operatorname{arctg}(x)}$.