GOBIERNO DE ARAGON
Departamento de Educación, Universidad, Cultura y Deporte

Departamento de Matemáticas
2º Bachillerato CCSS
Derivadas

I E S
PEDRO CERRADA

1. p42e06 - Calcula las siguientes derivadas:

(a) $y = 2x$

Sol: $y' = 2$

(b) $y = 3x - 5$

Sol: $y' = 3$

(c) $y = 2x^2 - 7x + 5$

Sol: $y' = 4x - 7$

(d) $y = 7x^5 - 3x^2 + x + 2345$

Sol: $y' = 35x^4 - 6x + 1$

(e) $y = x(x + 2)$

Sol: $y' = 2x + 2$

(f) $y = (x - 1)(x + 1)$

Sol: $y' = 2x$

(g) $y = \frac{5x^4}{7} - \frac{x^3}{55} - \frac{3x^2}{4} + x - 1255$

Sol: $y' = \frac{20x^3}{7} - \frac{3x^2}{55} - \frac{3x}{2} + 1$

(h) $y = (x + 1)^3$

Sol: $y' = 3(x + 1)^2$

(i) $y = (x^3 + x + 1)^4$

Sol: $y' = (12x^2 + 4)(x^3 + x + 1)^3$

(j) $y = -(3x - 1)^2 + (3x + 1)^2$

Sol: $y' = 12$

(k) $y = \frac{1}{x^2}$

Sol: $y' = -\frac{2}{x^3}$

(l) $y = \frac{1}{x+1}$

Sol: $y' = -\frac{1}{(x+1)^2}$

(m) $y = \frac{x^2 - 3}{x^3 + x}$

Sol: $y' = \frac{-x^4 + 10x^2 + 3}{x^2(x^4 + 2x^2 + 1)}$

(n) $y = \frac{x+1}{x}$

Sol: $y' = -\frac{1}{x^2}$

(ñ) $y = \frac{x(x^2 - 1)}{3x^2 - 3}$

Sol: $y' = \frac{1}{3}$

(o) $y = \frac{1}{x^3}$

Sol: $y' = -\frac{3}{x^4}$

(p) $y = x^{\frac{1}{2}}$

Sol: $y' = \frac{1}{2\sqrt{x}}$

(q) $y = x^{\frac{2}{3}}$

Sol: $y' = \frac{2}{3\sqrt[3]{x}}$

(r) $y = x^{\frac{-2}{3}}$

Sol: $y' = -\frac{2}{3x^{\frac{5}{3}}}$

2. p42e06cont - Calcula las siguientes derivadas:

(a) $y = x^{\frac{1}{2}} + x^{\frac{1}{5}} + x^{\frac{1}{6}}$

Sol: $y' = \dfrac{\frac{x^{\frac{49}{30}}}{2} + \frac{x^{\frac{13}{10}}}{6} + \frac{x^{\frac{4}{3}}}{5}}{x^{\frac{32}{15}}}$

(b) $y = \sqrt{3}\sqrt{x}$

Sol: $y' = \dfrac{\sqrt{3}}{2\sqrt{x}}$

(c) $y = \dfrac{x^3}{\sqrt{x}}$

Sol: $y' = \dfrac{5x^{\frac{3}{2}}}{2}$

(d) $y = x^3 x^{\frac{1}{3}}$

Sol: $y' = \dfrac{10x^{\frac{7}{3}}}{3}$

(e) $y = \dfrac{\sqrt{x}}{x}$

Sol: $y' = -\dfrac{1}{2x^{\frac{3}{2}}}$

(f) $y = \left(1 - x^2\right)^3$

Sol: $y' = -6x\left(x^2 - 1\right)^2$

(g) $y = \sqrt{2x - 4}$

Sol: $y' = \dfrac{\sqrt{2}}{2\sqrt{x-2}}$

(h) $y = \sqrt{2 - x}$

Sol: $y' = -\dfrac{1}{2\sqrt{2-x}}$

(i) $y = \sqrt[3]{2}\sqrt[3]{x^2}$

Sol: $y' = \dfrac{2\sqrt[3]{2}\sqrt[3]{x^2}}{3x}$

(j) $y = \sqrt{3x^2 - 1}$

Sol: $y' = \dfrac{3x}{\sqrt{3x^2-1}}$

(k) $y = \dfrac{2x}{\sqrt{x-1}}$

Sol: $y' = \dfrac{x-2}{(x-1)^{\frac{3}{2}}}$

(l) $y = \sqrt{1}$

Sol: $y' = 0$

(m) $y = e^{2x}$

Sol: $y' = 2e^{2x}$

(n) $y = 2^{5x}$

Sol: $y' = 32^x \log{(32)}$

(ñ) $y = 8^{3x^2 - 1}$

Sol: $y' = 9 \cdot 2^{9x^2 - 2} x \log{(2)}$

(o) $y = a^x x^a$

Sol: $y' = a^x x^{a-1}\left(a + x \log{(a)}\right)$

(p) $y = e^{\sqrt{x}}$

Sol: $y' = \dfrac{e^{\sqrt{x}}}{2\sqrt{x}}$

(q) $y = \dfrac{\log{(2x-1)}}{\log{(10)}}$

Sol: $y' = \dfrac{2}{(2x-1)\log{(10)}}$

(r) $y = \log{(x + 3)}$

Sol: $y' = \dfrac{1}{x+3}$

3. p42e07 - Calcula las siguientes derivadas:

(a) $y = \log\left(3x^2 - 7\right)$

Sol: $y' = \frac{6x}{3x^2 - 7}$

(b) $y = \log\left((x-2)^2\right)$

Sol: $y' = \frac{2}{x-2}$

(c) $y = \frac{\log\left(x^2 - 2x\right)}{\log(10)}$

Sol: $y' = \frac{2(x-1)}{x(x-2)\log(10)}$

(d) $y = \frac{\log\left(2x^3 + 3x^2\right)}{\log(2)}$

Sol: $y' = \frac{6(x+1)}{x(2x+3)\log(2)}$

(e) $y = \sqrt{\log(x)}$

Sol: $y' = \frac{1}{2x\sqrt{\log(x)}}$

(f) $y = \frac{\log(x)}{x}$

Sol: $y' = \frac{1 - \log(x)}{x^2}$

(g) $y = \log\left(\frac{1-x}{x+1}\right)$

Sol: $y' = \frac{2}{x^2 - 1}$

(h) $y = \log\left(\sqrt[4]{x^3}\right)$

Sol: $y' = \frac{3}{4x}$

(i) $y = \frac{\log(2x+1)}{\log(4)}$

Sol: $y' = \frac{1}{(2x+1)\log(2)}$

(j) $y = \log\left(\frac{e^x}{e^x - 1}\right)$

Sol: $y' = \frac{1}{1 - e^x}$

(k) $y = \frac{1 - \log(x)}{\log(x) + 1}$

Sol: $y' = -\frac{2}{x(\log(x)+1)^2}$

(l) $y = \frac{e^x}{x-1}$

Sol: $y' = \frac{(x-2)e^x}{x^2 - 2x + 1}$

(m) $y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

Sol: $y' = \frac{4e^{2x}}{e^{4x} + 2e^{2x} + 1}$

(n) $y = e^{\sqrt{x^2+1}}$

Sol: $y' = \frac{xe^{\sqrt{x^2+1}}}{\sqrt{x^2+1}}$

4. p42e08 - Calcula las siguientes derivadas:

(a) $y = \left(x^2 - 3\right)^4$

Sol: $y' = 8x\left(x^2 - 3\right)^3$

(b) $y = (1 - 5x)^6$

Sol: $y' = 30\left(5x - 1\right)^5$

(c) $y = \sqrt[3]{3}\sqrt[3]{x^2}$

Sol: $y' = \frac{2\sqrt[3]{3}\sqrt[3]{x^2}}{3x}$

(d) $y = \left(x^2 + 4\right)\left(3x^3 + 1\right)$

Sol: $y' = x\left(15x^3 + 36x + 2\right)$

(e) $y = \sqrt{2}\sqrt{x} + 2\sqrt{x}$

Sol: $y' = \frac{\sqrt{2}+2}{2\sqrt{x}}$

(f) $y = \log\left(\frac{x^4}{(3x+4)^3}\right)$

Sol: $y' = \frac{3x+16}{x(3x+4)}$

(g) $y = \log\left(\sqrt{\frac{x-1}{x+1}}\right)$

Sol: $y' = \frac{1}{x^2-1}$

(h) $y = \log\left((x+3)^2\right)$

Sol: $y' = \frac{2}{x+3}$

(i) $y = x^2\log(x) - x$

Sol: $y' = 2x\log(x) + x - 1$

(j) $y = \log\left((x^2+1)(2x^2+3x+1)\right)$

Sol: $y' = \frac{8x^3+9x^2+6x+3}{2x^4+3x^3+3x^2+3x+1}$

(k) $y = \log\left(x + \sqrt{x^2+1}\right)$

Sol: $y' = \frac{1}{\sqrt{x^2+1}}$

(l) $y = x^2\sin(x)$

Sol: $y' = x(x\cos(x) + 2\sin(x))$

(m) $y = \operatorname{asin}(x^2 + x)$

Sol: $y' = \frac{2x+1}{\sqrt{-x^2(x+1)^2+1}}$

(n) $y = x^2\operatorname{acos}\left(\frac{2}{x}\right)$

Sol: $y' = 2x\operatorname{acos}\left(\frac{2}{x}\right) + \frac{2}{\sqrt{1-\frac{4}{x^2}}}$

(ñ) $y = \log\left(\frac{e^x-1}{2e^x}\right)$

Sol: $y' = \frac{1}{e^x-1}$

(o) $y = \frac{\log\left(x^2\right)}{x}$

Sol: $y' = \frac{2-\log\left(x^2\right)}{x^2}$

(p) $y = 2^{x^2+3x+1}$

Sol: $y' = 2^{x(x+3)}(2x+3)\log(4)$

(q) $y = 2^{x^2}x$

Sol: $y' = 2^{x^2}\left(x^2\log(4)+1\right)$

(r) $y = 2^{\sin(x)}$

Sol: $y' = 2^{\sin(x)}\log(2)\cos(x)$

(s) $y = e^{\tan(x)}$

Sol: $y' = \frac{e^{\tan(x)}}{\cos^2(x)}$

(t) $y = x^{\log(x)}$

Sol: $y' = 2x^{\log(x)-1}\log(x)$

(u) $y = x^{\frac{1}{x}}$

Sol: $y' = x^{-2+\frac{1}{x}}(1 - \log(x))$