1. p25e16 - 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) $y = \left(x^3 + x + 1\right)^4$

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

(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) $y = \frac{x\left(x^2-1\right)}{3x^2-3}$

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. p25e16cont - Calcula las siguientes derivadas:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. p25e17 - 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: $y' = \frac{xe^{\sqrt{x^2+1}}}{\sqrt{x^2+1}}$

(ñ) $y = \sin(2x)$

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

(o) $y = \sin(7x-3)$

Sol: $y' = 7\cos(7x-3)$

(p) $y = \cos(5x)$

Sol: $y' = -5\sin(5x)$

(q) $y = 3\tan(2x)$

Sol: $y' = \frac{6}{\cos^2(2x)}$

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

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

(s) $y = \sin\left(x^2\right)$

Sol: $y' = 2x\cos\left(x^2\right)$

4. p25e17cont - Calcula las siguientes derivadas:

(a) $y = \cos^2\left(x^2+1\right)$

Sol: $y' = -2x\sin\left(2x^2+2\right)$

(b) $y = \tan^3(5x)$

Sol: $y' = \frac{15\tan^2(5x)}{\cos^2(5x)}$

(c) $y = \sin^3(4x)$

Sol: $y' = 12\sin^2(4x)\cos(4x)$

(d) $y = \sqrt{\sin(2x)}$

Sol: $y' = \frac{\cos(2x)}{\sqrt{\sin(2x)}}$

(e) $y = \log(-\tan(x-1))$

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

(f) $y = \sqrt[3]{\sin(x)}$

Sol: $y' = \frac{\cos(x)}{3\sin^{\frac{2}{3}}(x)}$

(g) $y = \sin^3(x)\cos(x)$

Sol: $y' = \left(3-4\sin^2(x)\right)\sin^2(x)$

(h) $y = \sec(5x+2)$

Sol: $y' = 5\tan(5x+2)\sec(5x+2)$

(i) $y = \operatorname{asin}(2x)$

Sol: $y' = \frac{2}{\sqrt{1-4x^2}}$

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

Sol: $y' = -\frac{2x}{\sqrt{1-x^4}}$

(k) $y = \operatorname{atan}\left(\frac{x-1}{1-x}\right)$

Sol: $y' = 0$

(l) $y = \operatorname{asin}\left(\frac{x+1}{x-1}\right)$

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

(m) $y = \tan^2(\sin(x))$

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

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

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

(ñ) $y = x^{\tan(x)}$

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

(o) $y = 2^{\log(\cos(x))}$

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

(p) $y = \sin^{\operatorname{atan}(x)}(x)$

Sol: $y' = \frac{\left(\left(x^2+1\right)\cos(x)\operatorname{atan}(x) + \log(\sin(x))\sin(x)\right)\sin^{\operatorname{atan}(x)-1}(x)}{x^2+1}$

(q) $y = \operatorname{atan}^x(x)$

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

(r) $y = x^{\sec(x)}$

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

5. p26e18 - 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: $y' = 30\,(5x-1)^5$

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

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

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

6. p26e18cont - Calcula las siguientes derivadas:

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

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

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

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

(c) $y = \cos^{\sin(x)}(x)$

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

(d) $y = \sin^3\left(x^3\right)$

Sol: $y' = 9x^2\sin^2\left(x^3\right)\cos\left(x^3\right)$

(e) $y = \operatorname{asin}(\cos(x))$

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

(f) $y = \operatorname{asin}(\log(x))$

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

(g) $y = 3\sin^2\left((2x+1)^3\right)$

Sol: $y' = 36(2x+1)^2\sin\left((2x+1)^3\right)\cos\left((2x+1)^3\right)$

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

Sol: $y' = -4x\tan\left(x^2\right)$

(i) $y = \log\left(\sqrt{\frac{\sin(2x)+1}{1-\sin(2x)}}\right)$

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

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

Sol: $y' = \frac{2}{\sin(x)}$

(k) $y = \frac{\log\left(\tan\left(\frac{x}{2}\right)\right)}{2}$

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

(l) $y = \frac{\sin(x)+\cos(x)}{\sin(x)-\cos(x)}$

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

(m) $y = a^2 \operatorname{asin}\left(\frac{x}{a}\right) + x\sqrt{a^2 - x^2}$

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

(n) $y = -\frac{\log\left(\tan\left(\frac{x}{2}\right)\right)}{2} + \frac{\cos(x)}{2\sin^2(x)}$

Sol: $y' = -\frac{1}{(\cos(x)+1)\sin^2(x)\tan\left(\frac{x}{2}\right)}$

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

Sol: $y' = \frac{\left(x^2(\sin(\log(x))+2\cos(\log(x)))+(1-x)(2\sin(\log(x))-\cos(\log(x)))\right)e^x}{2x}$

7. p27e27 - Calcula las siguientes derivadas:

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

Sol: $y' = \frac{12x}{(x^2+3)^2}$

(b) $y = \left(\frac{1-x}{x+1}\right)^{\frac{2}{3}}$

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

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

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

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

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

(e) $y = \frac{1}{\sin(x)}$

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

(f) $y = \operatorname{atan}\left(\frac{x}{3}\right)$

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

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

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

(h) $y = \left(2\sqrt{x} - 3\right)^7$

Sol: $y' = \frac{7\left(2\sqrt{x}-3\right)^6}{\sqrt{x}}$

(i) $y = \cos^5\left(7x^2\right)$

Sol: $y' = -70x\sin\left(7x^2\right)\cos^4\left(7x^2\right)$

(j) $y = \sqrt[3]{(5x-3)^2}$

Sol: $y' = \frac{10\sqrt[3]{(5x-3)^2}}{3(5x-3)}$

(k) $y = \log\left(\sqrt{1-x}\right)$

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

(l) $y = \frac{\log\left(\sqrt{\tan(x)}\right)}{\log(2)}$

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

(m) $y = \sqrt[3]{\sin\left(x^2\right)}$

Sol: $y' = \frac{2x\cos\left(x^2\right)}{3\sin^{\frac{2}{3}}\left(x^2\right)}$

(n) $y = \sqrt{\sqrt{x}+x}$

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

(ñ) $y = \sqrt{x\sqrt{x+1}}$

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

(o) $y = \log\left((x\tan(x))^2\right)$

Sol: $y' = \frac{4}{\sin(2x)} + \frac{2}{x}$

(p) $y = \log\left(\frac{\sqrt[3]{x^2-1}}{x^2}\right)$

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

(q) $y = \log\left(\sqrt[4]{\frac{1}{(x+1)^2}}\right)$

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

(r) $y = x^{x+1}$

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

(s) $y = \left(\frac{\sin(x)}{x}\right)^x$

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

(t) $y = e^{2\,\mathrm{asin}\left(x^2\right)}$

Sol: $y' = \frac{4xe^{2\,\mathrm{asin}\left(x^2\right)}}{\sqrt{1-x^4}}$

8. p27e27cont - Calcula las siguientes derivadas:

(a) $y = e^{4x}x^3\cos(x)$

Sol: $y' = x^2\left(-x\sin(x) + 4x\cos(x) + 3\cos(x)\right)e^{4x}$

(b) $y = \mathrm{asin}\left(\frac{2x-1}{\sqrt{5}}\right)$

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

(c) $y = \sin\left(x^2 + \cos(x)\right)$

Sol: $y' = (2x - \sin(x))\cos\left(x^2 + \cos(x)\right)$

(d) $y = \frac{x\sin(x)}{e^x+1}$

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

(e) $y = \operatorname{atan}\left(\frac{-4x^3+4x}{x^4-6x^2+1}\right)$

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

(f) $y = \log\left(\frac{\tan(x-2)-2}{2\tan(x-2)-1}\right)$

Sol: $y' = \frac{3\left(\tan^2(x-2)+1\right)}{(\tan(x-2)-2)(2\tan(x-2)-1)}$

(g) $y = \sqrt{\log(\tan(x^2+1))}$

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

(h) $y = \operatorname{asin}\left(2x\sqrt{1-x^2}\right)$

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

(i) $y = (1-\cos(x))\cot(x)$

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

(j) $y = \operatorname{atan}\left(\frac{\sqrt{x^2+1}-1}{x}\right)$

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

(k) $y = e^{\log\left(\sin^2(x)\right)}$

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

(l) $y = -\operatorname{atan}(x) + \operatorname{atan}\left(\frac{x+1}{1-x}\right)$

Sol: $y' = 0$

(m) $y = \operatorname{atan}\left(\frac{x}{\sqrt{1-x^2}}\right)$

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

(n) $y = \cos^{\log\left(x^2\right)}(x)$

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

(ñ) $y = \frac{4x+1}{\cos^2(2x^2+x+1)}$

Sol: $y' = \frac{2\left((4x+1)^2\sin\left(2x^2+x+1\right)+2\cos\left(2x^2+x+1\right)\right)}{\cos^3(2x^2+x+1)}$

(o) $y = \sin(x)\cos(x)$

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

(p) $y = \sqrt[3]{\frac{\sin(3x)}{1-\sin(x)}}$

Sol: $y' = -\frac{\sqrt[3]{-\frac{\sin(3x)}{\sin(x)-1}}\left(\frac{8\sin^3(x)\cos(x)}{3}+\cos(3x)\right)}{(\sin(x)-1)\sin(3x)}$

(q) $y = \operatorname{asin}\left(\sqrt{\frac{1-e^x}{e^x+1}}\right)$

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

(r) $y = \frac{(x+1)\operatorname{atan}(x)}{\log(x)}$

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

(s) $y = \operatorname{atan}\left(\sqrt{\frac{1-\cos(x)}{\cos(x)+1}}\right)$

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

(t) $y = \frac{x\sqrt{1-x^2}}{4}+\left(\frac{x^3}{2}-\frac{1}{4}\right)\operatorname{asin}(x)$

Sol: $y' = \frac{x^2\left(x+3\sqrt{1-x^2}\operatorname{asin}(x)-1\right)}{2\sqrt{1-x^2}}$