10.19

2023年10月21日 10:10

习题3.2 (A)

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

$= 2x^4+3x^3-4x^2-6x+3x^4+9x^3+x^2-6x-2$

$= 5x^4+12x^3-3x^2-12x-2$

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

$= \frac{-x^2-6x+3}{(3+x^2)^2}$

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

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

$= -\frac{2\sqrt{x}+1}{2x^2\sqrt{x}+2x\sqrt{x}+4x^2}$

3. (1) $y' = -2\sin 2x - 2\cos x$

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

(7) $y' = \cos(x+\sin x)\cdot[1+\cos x]$

(10) $y' = n\sin^{n-1}x\cos x\sin nx + n\sin^n x\cos nx$

$= n\sin^{n-1}x\left(\cos x\sin nx + \sin x\cos nx\right)$

$= n\sin^{n-1}x\sin[(n+1)x]$

4. (2) $y' = (1-\frac{1}{x^2})\ln x + (1+\frac{1}{x^2})$

(5) $y' = \frac{1}{\ln x}\cdot\frac{1}{x} = \frac{1}{x\ln x}$

(8) $\because y = \frac{1}{4}[\ln(x+1)+\ln(x-1)-\ln(x^2+1)]$

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

$= \frac{1}{4}\left(\frac{2x}{x^2-1}-\frac{2x}{x^2+1}\right)$

$= \frac{x}{2}\cdot\frac{2}{x^4-1} = \frac{x}{x^4-1}$

(11) $y' = 1+\frac{1}{2\sqrt{x}}+\frac{1}{3}x^{-\frac{2}{3}}$

5. (2) $y' = e^{-\frac{1}{x^2}} \cdot \frac{2}{x^3}$

(5) $y' = -\frac{1}{\sqrt{1-\sin^2 x}} \cdot \cos x = -1$

(8) $y' = ae^{ax}\sin(bx) + be^{ax}\cos(bx)$

$= e^{ax}\left[a\sin(bx) + b\cos(bx)\right]$

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