

m ***n*** ***o***

$$III) y = (x+1) (2x+3) (3x+4)$$

$$dy / dx = mn \times do / dx + no \times dm / dx + mo \times dn / dx$$

$$\begin{aligned} &= [(x+1) (2x+3)] 3 + [(2x+3) (3x+4)] 1 + [(x+1) (3x+4)] 2 \\ &= (2x^2+3x+2x+3)3 + (6x^2+8x+9x+12)1 + (3x^2+4x+3x+4)2 \\ &= (2x^2+5x+3)3 + (6x^2+17x+12)1 + (3x^2+7x+4)2 \\ &= 6x^2+15x+ 9 + 6x^2+17x+12x+ 6x^2+14x + 8 \\ &= 18x^2 + 46x + 29 \end{aligned}$$

m ***n*** ***o***

$$IV) y = (x^2+1) (2x^3 + 3x^2) (x+1)$$

$$dy / dx = mn \times do / dx + no \times dm / dx + mo \times dn / dx$$

$$\begin{aligned} &= [(x^2+1) (2x^3+3x^2)] 1 + [(2x^3 + 3x^2) (x+1)] 2x + [(x^2+1) (x+1)] \\ &\quad (6x^2+6x) \end{aligned}$$

$$\begin{aligned} &= (2x^5+3x^4+2x^3+3x^2)1 + (2x^4+2x^3+3x^3+3x^2)2x + (x^3+x^2+x+1) \\ &\quad (6x^2+6x) \end{aligned}$$

$$\begin{aligned} &= 2x^5+3x^4+2x^3+3x^2+4x^5+4x^4+6x^4+6x^3+6x^5+6x^4+6x^3+6x^2+6x^4+6x^3 \\ &\quad +6x^2+6x \\ &= 12x^5+25x^4+20x^3+15x^2+ 6x \end{aligned}$$

$$\begin{aligned}
 dy / dx &= m \cdot dn / dx + n \cdot dm / dx \\
 &= 4x \times 1/x + x \times 4 \\
 &= 4x (1/x + 1)
 \end{aligned}$$

g)

$$\begin{aligned}
 &\text{m} \quad \text{n} \\
 y &= (1+x^2) e^{ax} \\
 dy / dx &= (1+x^2) a e^{ax} + e^{ax} \times 2x \\
 &= e^{ax} (1+x^2) a + 2x
 \end{aligned}$$

h)

$$\begin{aligned}
 &\text{m} \quad \text{n} \\
 y &= e^x \ln x \\
 dy / dx &= e^x \times 1/x + x \times e^x \\
 &= e^x (1/x + x)
 \end{aligned}$$

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