

> restart

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$$178. \quad x \ln x \cdot y' - y = x^3 (3 \ln x - 1).$$

> EcuacionOriginal := x\*log(x)\*diff(y(x), x) - y(x) = x^3\*(3\*log(x) - 1)

$$EcuacionOriginal := x \ln(x) \left( \frac{d}{dx} y(x) \right) - y(x) = x^3 (3 \ln(x) - 1) \quad (1)$$

> Ecuacion := expand\left(\frac{lhs(EcuacionOriginal)}{x \cdot \log(x)}\right) = expand\left(\frac{rhs(EcuacionOriginal)}{x \cdot \log(x)}\right)

$$Ecuacion := \frac{d}{dx} y(x) - \frac{y(x)}{x \ln(x)} = 3x^2 - \frac{x^2}{\ln(x)} \quad (2)$$

> p := -\frac{1}{x \cdot \log(x)}; q := rhs(Ecuacion)

$$p := -\frac{1}{x \ln(x)}$$

$$q := 3x^2 - \frac{x^2}{\ln(x)} \quad (3)$$

> IntP := int(p, x)

$$IntP := -\ln(\ln(x)) \quad (4)$$

> IntNegP := -int(p, x)

$$IntNegP := \ln(\ln(x)) \quad (5)$$

> ExpIntP := exp(IntP)

$$ExpIntP := \frac{1}{\ln(x)} \quad (6)$$

> ExpIntNegP := exp(IntNegP)

$$ExpIntNegP := \ln(x) \quad (7)$$

> SolPart := ExpIntNegP\*int(ExpIntP\*q, x)

$$SolPart := x^3 \quad (8)$$

> SolGral := y(x) = C1\*ExpIntNegP + SolPart

$$SolGral := y(x) = C_1 \ln(x) + x^3 \quad (9)$$

> Comprobacion := dsolve(EcuacionOriginal)

$$Comprobacion := y(x) = x^3 + \ln(x) \_C1 \quad (10)$$

> Comprobacion2 := simplify(eval(subs(y(x) = rhs(SolGral), lhs(EcuacionOriginal) - rhs(EcuacionOriginal) = 0)))

$$Comprobacion2 := 0 = 0 \quad (11)$$

> restart

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$$(\cos(y) - \sin(y)) \cdot x = 2 \sin(2y) \quad x(y) \quad EDO(1) \quad L.C.V.N/H$$

$$\begin{aligned} &> \text{Ecuacion} := \text{diff}(x(y), y) - \sin(y) \cdot x(y) = 2 \cdot \sin(2 y) \\ &\quad \text{Ecuacion} := \frac{d}{dy} x(y) - \sin(y) x(y) = 2 \sin(2 y) \end{aligned} \quad (12)$$

$$\begin{aligned} &> p := -\sin(y); q := \text{rhs}(\text{Ecuacion}) \\ &\quad p := -\sin(y) \\ &\quad q := 2 \sin(2 y) \end{aligned} \quad (13)$$

$$\begin{aligned} &> \text{IntP} := \text{int}(p, y) \\ &\quad \text{IntP} := \cos(y) \end{aligned} \quad (14)$$

$$\begin{aligned} &> \text{IntNegP} := -\text{int}(p, y) \\ &\quad \text{IntNegP} := -\cos(y) \end{aligned} \quad (15)$$

$$\begin{aligned} &> \text{ExpIntP} := \exp(\text{IntP}) \\ &\quad \text{ExpIntP} := e^{\cos(y)} \end{aligned} \quad (16)$$

$$\begin{aligned} &> \text{ExpIntNegP} := \exp(\text{IntNegP}) \\ &\quad \text{ExpIntNegP} := e^{-\cos(y)} \end{aligned} \quad (17)$$

$$\begin{aligned} &> \text{SolPart} := x(y) = \text{expand}(\text{ExpIntNegP} \cdot \text{int}(\text{ExpIntP} \cdot q, y)) \\ &\quad \text{SolPart} := x(y) = -4 \cos(y) + 4 \end{aligned} \quad (18)$$

$$\begin{aligned} &> \text{SolucionGeneral} := x(y) = C_1 \cdot \text{ExpIntNegP} + \text{rhs}(\text{SolPart}) \\ &\quad \text{SolucionGeneral} := x(y) = C_1 e^{-\cos(y)} - 4 \cos(y) + 4 \end{aligned} \quad (19)$$

$$\begin{aligned} &> \text{Comprobacion} := \text{dsolve}(\text{Ecuacion}) \\ &\quad \text{Comprobacion} := x(y) = -4 \cos(y) + 4 + e^{-\cos(y)} \_C1 \end{aligned} \quad (20)$$

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