> *restart*

> $EcuaDerParc := diff(z(x, y), x\$2) - 8 \cdot diff(z(x, y), y) = 0$

$$EcuaDerParc := \frac{\partial^2}{\partial x^2} z(x, y) - 8\left(\frac{\partial}{\partial y} z(x, y)\right) = 0 \tag{1}$$

> $with(PDEtools):$

> $pdsolve(EcuaDerParc)$

$$(z(x, y) = \_F1(x)\ \_F2(y))\ \&where\ \left[\left\{\frac{d^2}{dx^2}\ \_F1(x) = \_c_1\ \_F1(x),\ \frac{d}{dy}\ \_F2(y)\right.\right.$$
$$\left.\left. = \frac{1}{8}\ \_c_1\ \_F2(y)\right\}\right] \tag{2}$$

> $SolDerParc := build(\%)$

$$SolDerParc := z(x, y) = e^{\sqrt{\_c_1}\ x}\ \_C3\ e^{\frac{1}{8}\ \_c_1\ y}\ \_C1 + \frac{\_C3\ e^{\frac{1}{8}\ \_c_1\ y}\ \_C2}{e^{\sqrt{\_c_1}\ x}} \tag{3}$$

> *restart*

> $EcuaDerParc := diff(z(x, y), x\$2) - 8 \cdot diff(z(x, y), y) = 0$

$$EcuaDerParc := \frac{\partial^2}{\partial x^2} z(x, y) - 8\left(\frac{\partial}{\partial y} z(x, y)\right) = 0 \tag{4}$$

> $Ecua := subs(z(x, y) = F(x) \cdot G(y), EcuaDerParc)$

$$Ecua := \frac{\partial^2}{\partial x^2}\ (F(x)\ G(y)) - 8\left(\frac{\partial}{\partial y}\ (F(x)\ G(y))\right) = 0 \tag{5}$$

> $EcuaDos := lhs(Ecua) - \left(-8\left(\frac{\partial}{\partial y}\ (F(x)\ G(y))\right)\right) = rhs(Ecua) - \left(\right.$
$$\left. -8\left(\frac{\partial}{\partial y}\ (F(x)\ G(y))\right)\right)$$

$$EcuaDos := \left(\frac{d^2}{dx^2}\ F(x)\right) G(y) = 8\ F(x)\left(\frac{d}{dy}\ G(y)\right) \tag{6}$$

> $EcuaTres := \dfrac{lhs(EcuaDos)}{F(x) \cdot G(y)} = \dfrac{rhs(EcuaDos)}{F(x) \cdot G(y)}$

$$EcuaTres := \frac{\dfrac{d^2}{dx^2}\ F(x)}{F(x)} = \frac{8\left(\dfrac{d}{dy}\ G(y)\right)}{G(y)} \tag{7}$$

> $EcuaX := lhs(EcuaTres) = a;\ EcuaY := rhs(EcuaTres) = a$

$$EcuaX := \frac{\dfrac{d^2}{dx^2}\ F(x)}{F(x)} = a$$

$$EcuaY := \frac{8\left(\dfrac{d}{dy}\ G(y)\right)}{G(y)} = a \tag{8}$$

> $SolXcero := dsolve(subs(a = 0, EcuaX))$

$$SolXcero := F(x) = \_C1\ x + \_C2 \tag{9}$$

> $SolYcero := dsolve(subs(a = 0, EcuaY))$

$$SolYcero := G(y) = \_C1 \tag{10}$$

> $SolGralCero := z(x, y) = rhs(SolXcero) \cdot (subs(\_C1 = 1, rhs(SolYcero)))$

$$SolGralCero := z(x, y) = \_C1\, x + \_C2 \tag{11}$$

> $SolXpos := dsolve(subs(a = b \cdot \cdot 2, EcuaX))$

$$SolXpos := F(x) = \_C1\, e^{-bx} + \_C2\, e^{bx} \tag{12}$$

> $SolYpos := dsolve(subs(a = b \cdot \cdot 2, EcuaY))$

$$SolYpos := G(y) = \_C1\, e^{\frac{1}{8} b^2 y} \tag{13}$$

> $SolGralPos := z(x, y) = rhs(SolXpos) \cdot (subs(\_C1 = 1, rhs(SolYpos)))$

$$SolGralPos := z(x, y) = \left(\_C1\, e^{-bx} + \_C2\, e^{bx} \right) e^{\frac{1}{8} b^2 y} \tag{14}$$

> $SolXneg := dsolve(subs(a = -b \cdot \cdot 2, EcuaX))$

$$SolXneg := F(x) = \_C1\, \sin(b\, x) + \_C2\, \cos(b\, x) \tag{15}$$

> $SolYneg := dsolve(subs(a = -b \cdot \cdot 2, EcuaY))$

$$SolYneg := G(y) = \_C1\, e^{-\frac{1}{8} b^2 y} \tag{16}$$

> $SolGralNeg := z(x, y) = rhs(SolXneg) \cdot (subs(\_C1 = 1, rhs(SolYneg)))$

$$SolGralNeg := z(x, y) = \left(\_C1\, \sin(b\, x) + \_C2\, \cos(b\, x) \right) e^{-\frac{1}{8} b^2 y} \tag{17}$$

> $restart$

> $EcuaDerParc := diff(z(x, y), x\$2) - 4 \cdot diff(z(x, y), y) = z(x, y)$

$$EcuaDerParc := \frac{\partial^2}{\partial x^2} z(x, y) - 4 \left(\frac{\partial}{\partial y} z(x, y) \right) = z(x, y) \tag{18}$$

> $Ecua := eval(subs(z(x, y) = F(x) \cdot G(y), EcuaDerParc))$

$$Ecua := \left(\frac{d^2}{dx^2} F(x) \right) G(y) - 4 F(x) \left(\frac{d}{dy} G(y) \right) = F(x)\, G(y) \tag{19}$$

> $EcuaUno := lhs(Ecua) - \left(-4 F(x) \left(\frac{d}{dy} G(y) \right) \right) = rhs(Ecua) - \left(-4 F(x) \left(\frac{d}{dy} G(y) \right) \right)$

$$EcuaUno := \left(\frac{d^2}{dx^2} F(x) \right) G(y) = F(x)\, G(y) + 4 F(x) \left(\frac{d}{dy} G(y) \right) \tag{20}$$

> $EcuaUnoUno := \frac{lhs(EcuaUno)}{F(x) \cdot G(y)} = simplify\left(\frac{rhs(EcuaUno)}{F(x) \cdot G(y)} \right)$

$$EcuaUnoUno := \frac{\frac{d^2}{dx^2} F(x)}{F(x)} = \frac{G(y) + 4 \left(\frac{d}{dy} G(y) \right)}{G(y)} \tag{21}$$

> $EcuaDos := lhs(Ecua) - \left(-4 F(x) \left(\frac{d}{dy} G(y) \right) + F(x) \cdot G(y) \right) = rhs(Ecua) - ($

$\quad -4 F(x) \left(\frac{d}{dy} G(y) \right) + F(x) \cdot G(y))$

$$EcuaDos := \left(\frac{d^2}{dx^2} F(x) \right) G(y) - F(x)\, G(y) = 4 F(x) \left(\frac{d}{dy} G(y) \right) \tag{22}$$

> $EcuaDosUno := simplify\left(\dfrac{lhs(EcuaDos)}{F(x) \cdot G(y)} \right) = simplify\left(\dfrac{rhs(EcuaDos)}{F(x) \cdot G(y)} \right)$

$$EcuaDosUno := -\frac{F(x) - \left(\dfrac{d^2}{dx^2} F(x)\right)}{F(x)} = \frac{4\left(\dfrac{d}{dy} G(y)\right)}{G(y)} \qquad (23)$$

> $with(PDEtools):$
> $SolGral := pdsolve(EcuaDerParc)$

$$SolGral := (z(x,y) = \_F1(x)\,\_F2(y))\ \&where\ \left[\left\{\frac{d^2}{dx^2}\_F1(x) = \_c_1\_F1(x),\ \frac{d}{dy}\_F2(y)\right.\right. \qquad (24)$$

$$\left.\left. = \frac{1}{4}\_c_1\_F2(y) - \frac{1}{4}\_F2(y)\right\}\right]$$

> $SolGralFinal := build(SolGral)$

$$SolGralFinal := z(x,y) = e^{\sqrt{-c_1}\,x}\_C3\,e^{\frac{1}{4}y\_c_1}\,e^{-\frac{1}{4}y}\_C1 + \frac{\_C3\,e^{\frac{1}{4}y\_c_1}\,e^{-\frac{1}{4}y}\_C2}{e^{\sqrt{-c_1}\,x}} \qquad (25)$$

> $Comprobacion := eval(subs(z(x,y) = rhs(SolGralFinal), lhs(EcuaDerParc)$
> $\quad - rhs(EcuaDerParc) = 0))$

$$Comprobacion := 0 = 0 \qquad (26)$$

>