1) Calculation of $\partial_1(\partial_1 \alpha)$

Use:
$$\partial_1 \alpha = \frac{1}{2r}\left(e^{-2\alpha} - 1\right) \quad - (1)$$

so:
$$\partial_1(\partial_1 \alpha) = -\frac{1}{2r^2}\left(e^{-2\alpha} - 1\right) \boxed{-\frac{1}{r}\left(\partial_1 \alpha\right) e^{-2\alpha}} \quad - (2)$$

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

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

So:

$$R^0{}_{101} = -\frac{1}{2r^2}\left(\frac{x^2}{(1-x)^2} - \frac{x}{1-x} - \frac{x}{(1-x)^2}\right)$$

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

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

$$\boxed{R^0{}_{101} = -\frac{x}{r^2(1-x)^2} = R^0{}_1{}^{10}}$$

2)

So:

$$R^{0}{}_{101} = -\frac{x}{r^2(1-x)^2} = R^{0}{}_{1}{}^{10}$$

$$R^{0}{}_{2}{}^{20} = R^{0}{}_{3}{}^{30} = -\frac{1}{2r^2}\frac{x}{1-x}$$

$$\underline{\nabla}\cdot\underline{E} = \phi\left(R^{0}{}_{1}{}^{10} + R^{0}{}_{2}{}^{20} + R^{0}{}_{3}{}^{30}\right)$$

$$\boxed{\underline{\nabla}\cdot\underline{E} = \frac{x}{r^2(1-x)}\left(\frac{1}{1-x} + 1\right)}$$

$$x = \frac{2MG}{rc^2}$$