No magic, indeed. But, don't loose the faith. In fact, in Formula 1, by supposing ${}^{x}e$ smooth, let's try very simply by putting:

$$\frac{d}{dx}\left({}^{x-1}e\right)=\frac{d}{dx}\left(\ln\left({}^{x}e\right)\right)$$

i.e.:

$$\left[{}^{x-1}e\right]'=\frac{1}{{}^{x}e}\cdot\left[{}^{x}e\right]'$$

therefore:

$$\boxed{{}^{x}e=\left[{}^{x}e\right]'\Big/\left[{}^{x-1}e\right]'}$$

In Formula 2, under the same hypothesis and taking into account Formula 1, we have:

$${}^{x+1}e\cdot{}^{x}e=\left[{}^{x+1}e\right]'\Big/\left[{}^{x-1}e\right]'$$

i.e.:

$$\left({}^{x}e\right)\cdot e^{\left({}^{x}e\right)}=\left[{}^{x+1}e\right]'\Big/\left[{}^{x-1}e\right]'$$

therefore:

$$\boxed{{}^{x}e=\operatorname{plog}\left\{\left[{}^{x+1}e\right]'\Big/\left[{}^{x-1}e\right]'\right\}}$$

where **plog** is the product logarithm, or the ProductLog[] operator, in Mathematica.

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