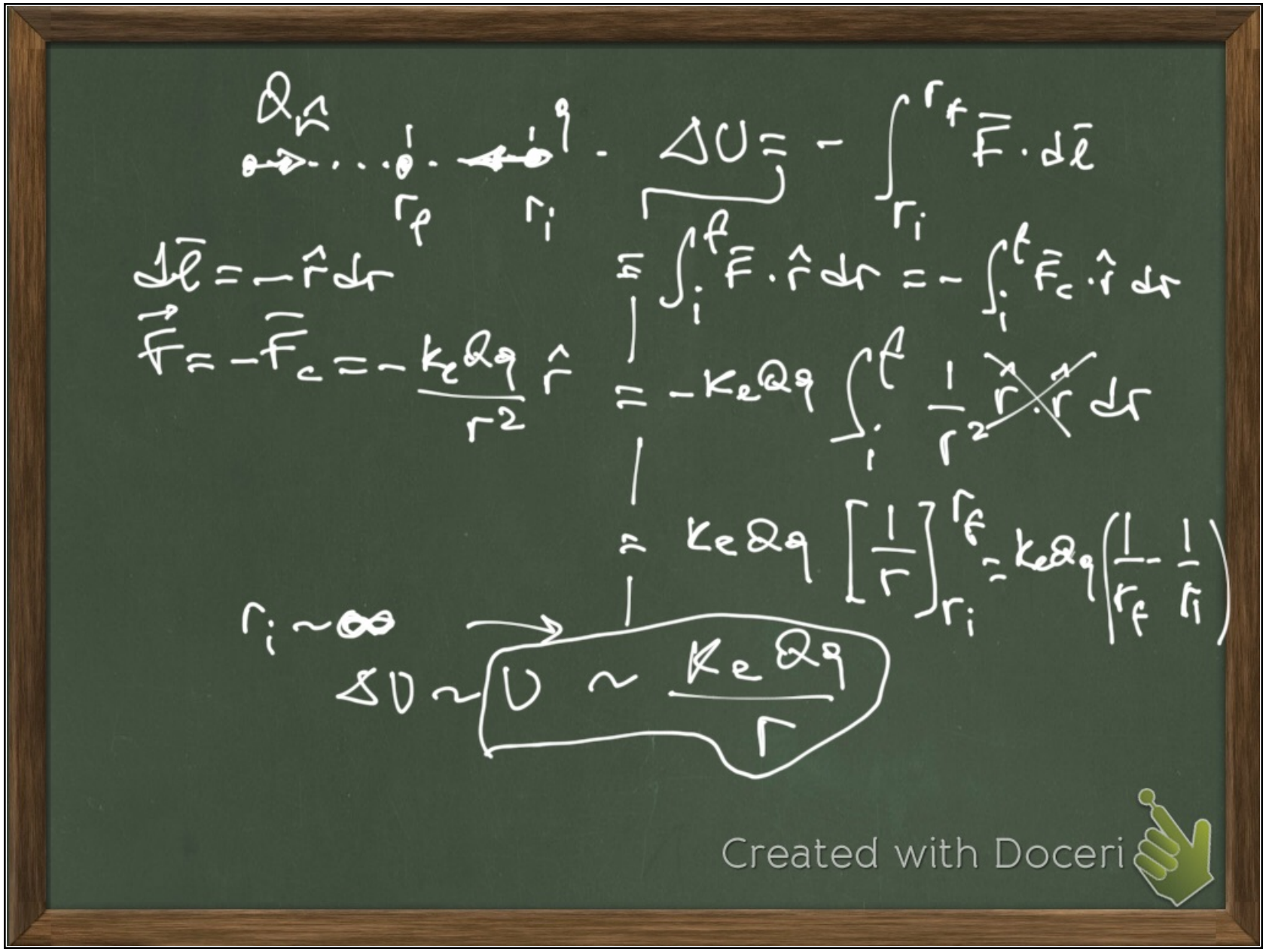
Q
q
r_f
r_i
$\Delta U = -\int_{r_i}^{r_f} \vec{F} \cdot d\vec{\ell}$
$d\vec{\ell} = -\hat{r}\,dr$
$\vec{F} = -\vec{F}_c = -\frac{k_e Q q}{r^2}\hat{r}$
$= \int_i^f \vec{F} \cdot \hat{r}\,dr = -\int_i^f \vec{F}_c \cdot \hat{r}\,dr$
$= -k_e Q q \int_i^f \frac{1}{r^2}\,\hat{r}\cdot\hat{r}\,dr$
$= k_e Q q \left[\frac{1}{r}\right]_{r_i}^{r_f} = k_e Q q \left(\frac{1}{r_f} - \frac{1}{r_i}\right)$
$r_i \sim \infty$
$\Delta U \sim U \sim \frac{k_e Q q}{r}$
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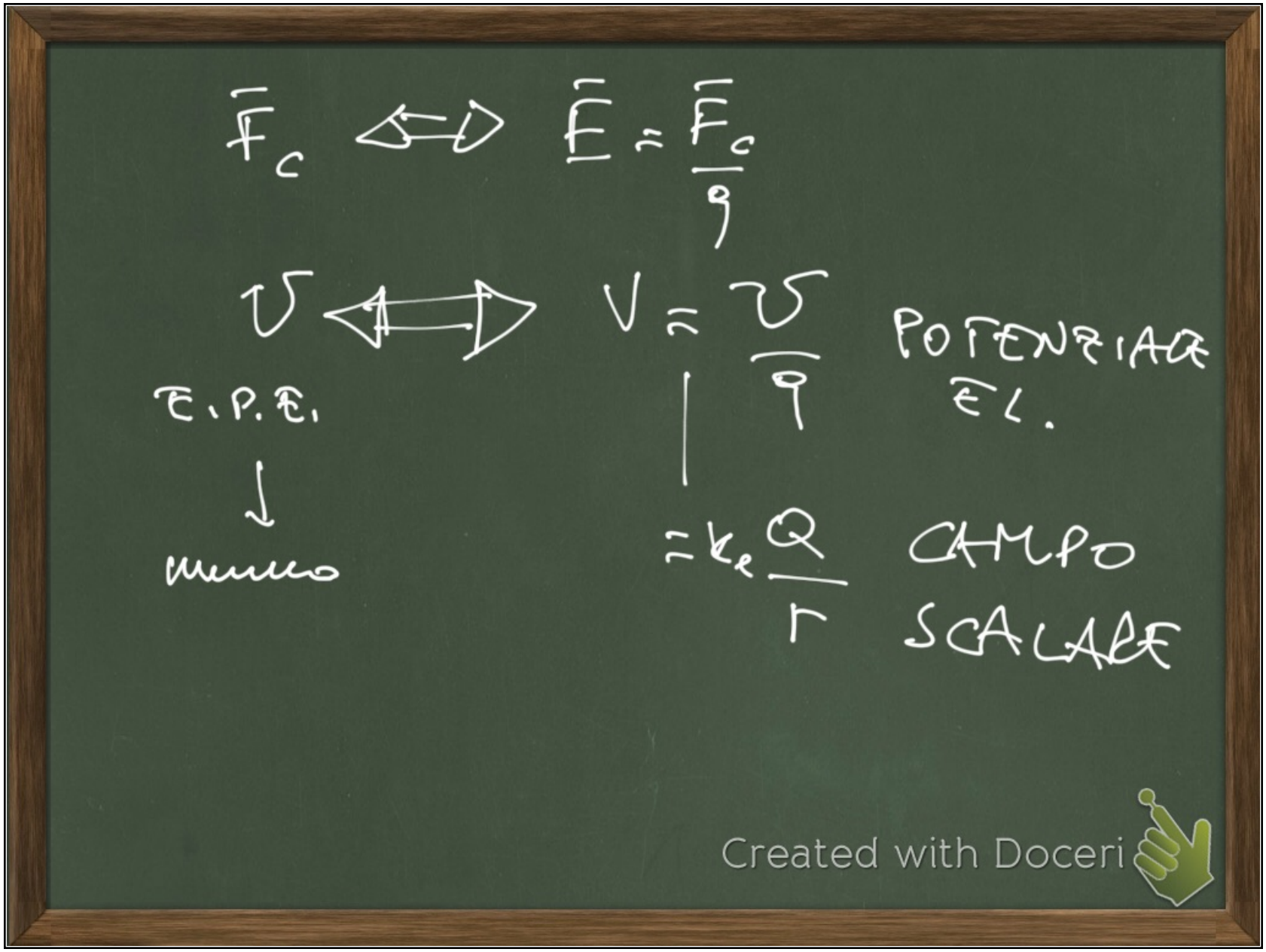
$\vec{F}_c \Leftrightarrow \vec{E} = \frac{\vec{F}_c}{q}$
$U \Leftrightarrow V = \frac{U}{q}$
POTENZIALE EL.
E.P.E.
$= k_e \frac{Q}{r}$
CAMPO SCALARE
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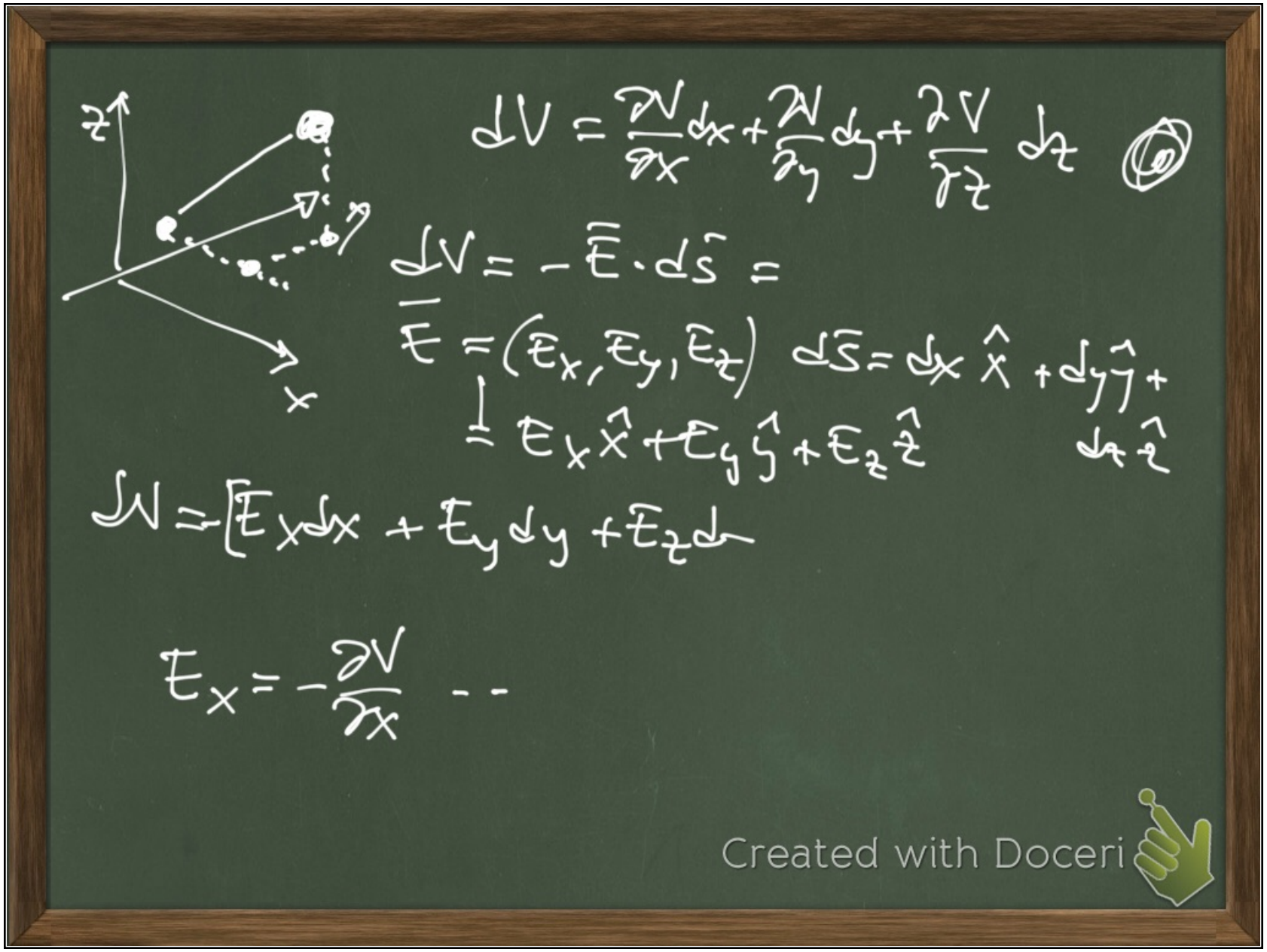
$$U_f - U_i = -\int_i^f \vec{F}_c \cdot d\vec{r} \qquad (\vec{E}: \text{conserv.})$$

$$V_f - V_i = -\int_i^f \vec{E} \cdot d\vec{r}$$

$$V_A - V_B = \int_A^B \vec{E} \cdot d\vec{s}$$

$$\oint \vec{E} \cdot d\vec{s} = 0$$

L. della CIRCUITAZIONE


z
x
$dV = \frac{\partial V}{\partial x}dx + \frac{\partial V}{\partial y}dy + \frac{\partial V}{\partial z}dz$ (a)
$dV = -\vec{E}\cdot d\vec{s} =$
$\vec{E} = (E_x, E_y, E_z)$ $d\vec{s} = dx\,\hat{x} + dy\,\hat{y} + dz\,\hat{z}$
$= E_x\hat{x} + E_y\hat{y} + E_z\hat{z}$
$dV = -[E_x dx + E_y dy + E_z dz$
$E_x = -\frac{\partial V}{\partial x}$ --
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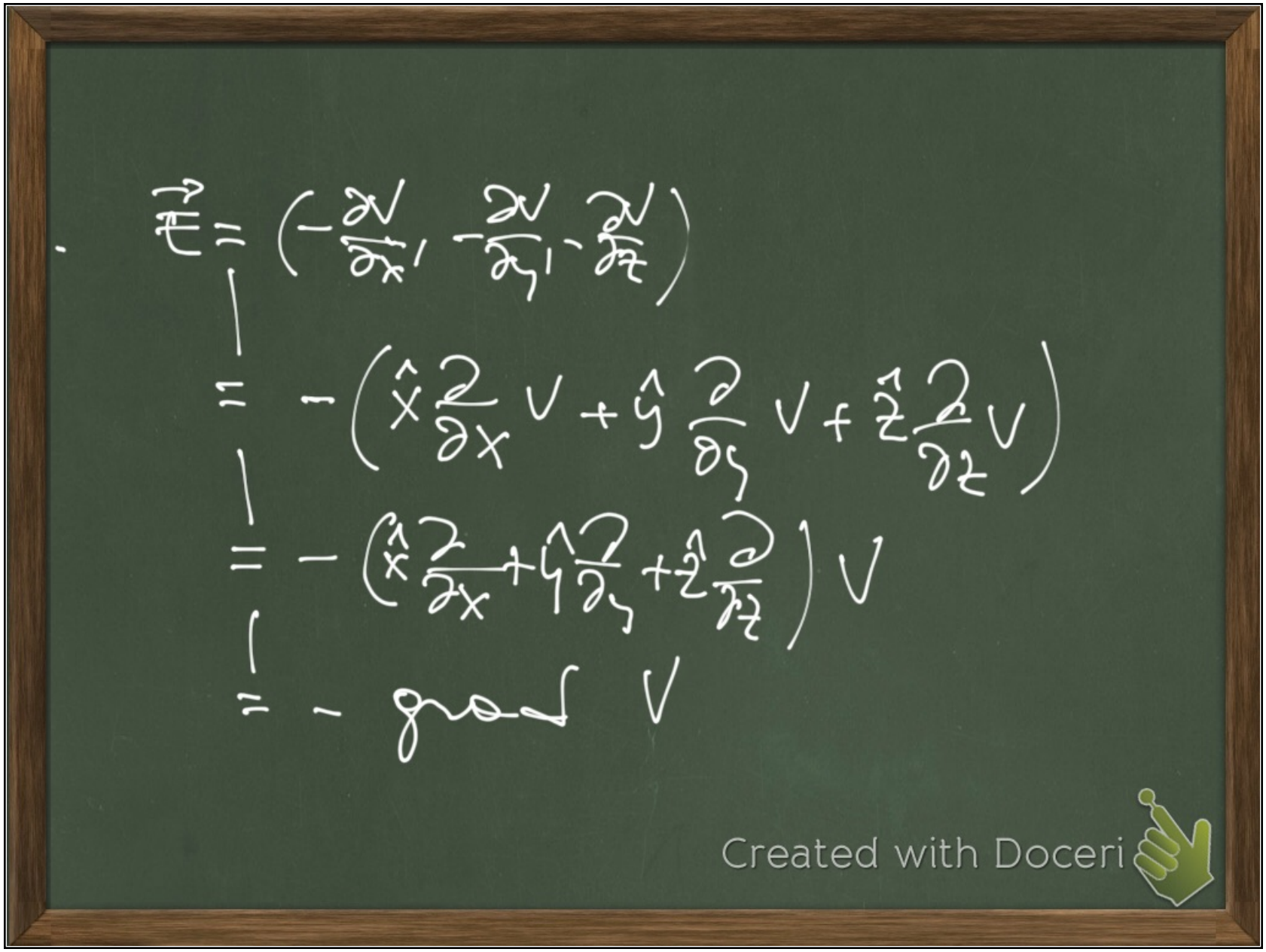
$\vec{F} = \left(-\frac{\partial V}{\partial x}, -\frac{\partial V}{\partial y}, -\frac{\partial V}{\partial z}\right)$
$= -\left(\hat{x}\frac{\partial}{\partial x}V + \hat{y}\frac{\partial}{\partial y}V + \hat{z}\frac{\partial}{\partial z}V\right)$
$= -\left(\hat{x}\frac{\partial}{\partial x} + \hat{y}\frac{\partial}{\partial y} + \hat{z}\frac{\partial}{\partial z}\right)V$
$= -\text{grad } V$
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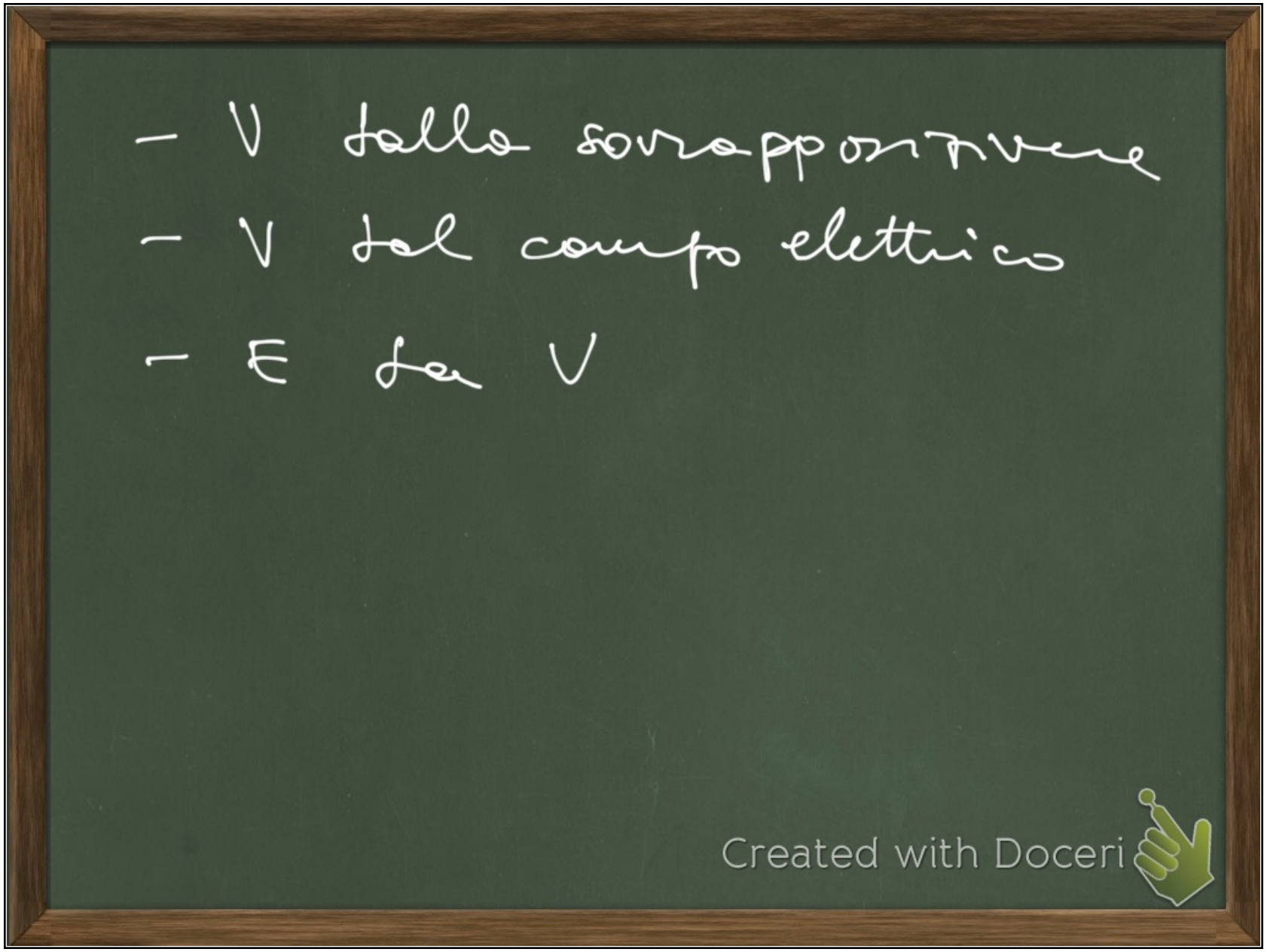
- V dalla sovrapposizione
- V del campo elettrico
- E da V
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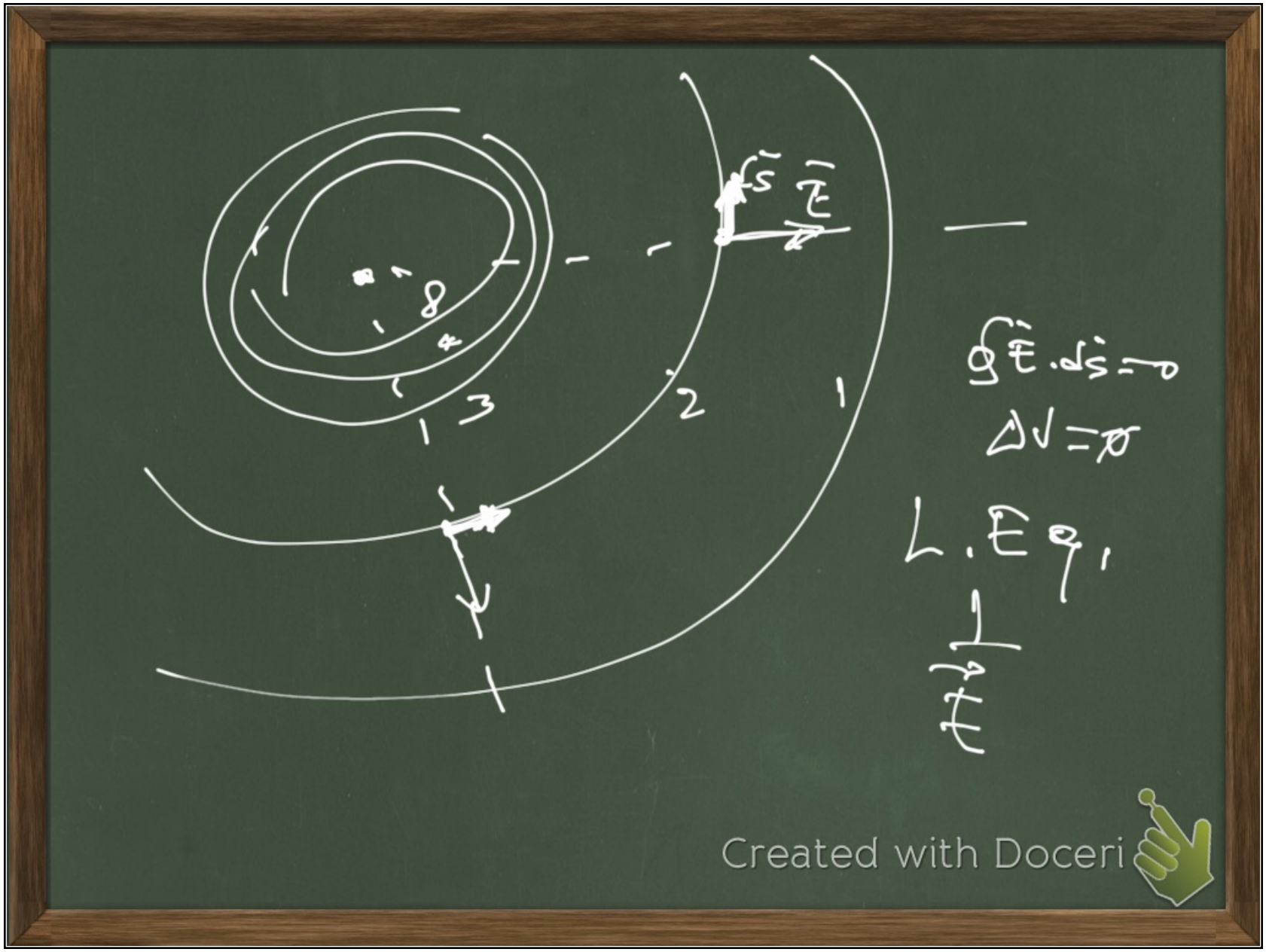
$$V(r) = k_e \frac{Q}{r}$$

$$-\vec{E} = \frac{\partial V}{\partial r}\hat{r} + \cdots = \frac{k_e Q}{r^2}\hat{r}$$


$\oint \vec{E} \cdot d\vec{s} = 0$
$\Delta V = 0$
L.Eq.
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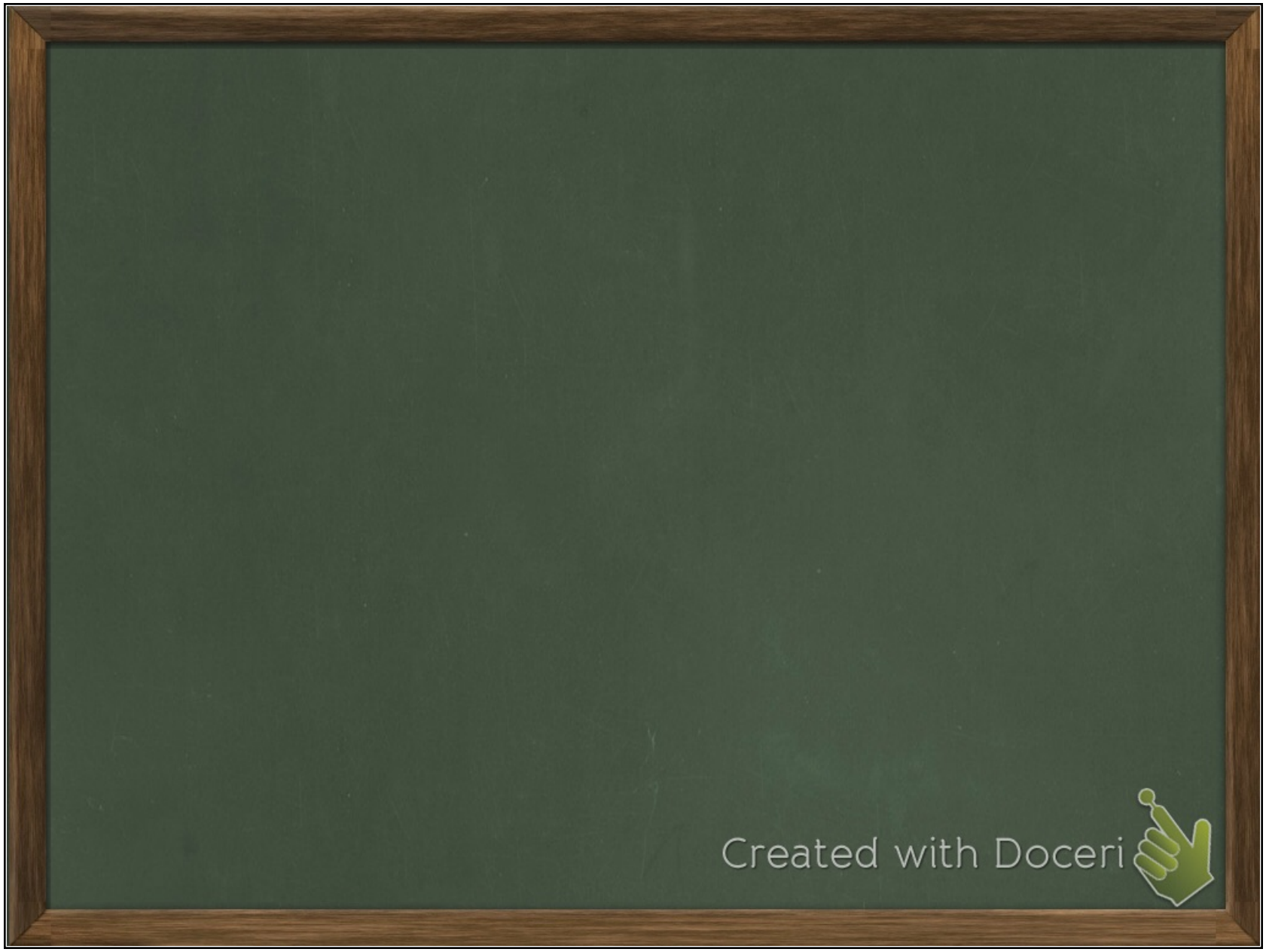
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