besonders wichtige Gradienten

$$\operatorname{grad} r = \operatorname{grad} \sqrt{x^2+y^2+z^2} = \frac{1}{r}\left(x\vec{i}+y\vec{j}+z\vec{k}\right) = \frac{\vec{r}}{r} \quad , \quad |\operatorname{grad} r| = 1$$

$$\operatorname{grad} \frac{1}{r} = \operatorname{grad} \frac{1}{\sqrt{x^2+y^2+z^2}} = -\frac{1}{r^3}\left(x\vec{i}+y\vec{j}+z\vec{k}\right) = -\frac{\vec{r}}{r^3}$$

$$= \frac{1}{r^2}\left(-\frac{\vec{r}}{r}\right) \quad , \quad \left|\operatorname{grad} \frac{1}{r}\right| = \frac{1}{r^2}$$