$\vec{p}$ at origin, points in $\vec{z}$ direction

$\Rightarrow \vec{p} = p\hat{z}$. $\quad p = qd$.

$V = k\frac{p\cos\theta}{r^2}$.

$\vec{E} = \cancel{-\nabla V} = \vec{\nabla}V = \frac{d}{dr}V\hat{r} + \frac{1}{r}\frac{d}{d\theta}V\hat{\theta} + \frac{1}{r\sin\theta}\frac{d}{d\phi}V\hat{\phi}$

$\Rightarrow \vec{E} = \frac{kp\,2\cos\theta}{r^3}\hat{r} + \frac{kp\sin\theta}{r^3}\hat{\theta}$

$= \frac{kp}{r^3}\left[2\cos\theta\hat{r} + \sin\theta\hat{\theta}\right]$.

$= \frac{kp}{r^3}\left[\cancel{2(\hat{x}+\hat{y})}\right.$

$\boxed{\text{Griffiths. 3.29}}$ Monopole term vanishes, dipole does not.

dip: $3qa\hat{z} - qa\hat{z} + (-2q)\,a\hat{y} + (-2q)(-a)\hat{y}$

$3qa\hat{z} + q(-a)\hat{z} + (-2q)\,a\hat{y} + (-2q)(-a)\hat{y}$

Made mistake in calculation, this should be 2qa \har{z} —>

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$= 4qa\hat{z} + (2qa - 2qa)\hat{y}$.

$= 4qa\hat{z}$.

$V_{dip} = k\frac{4qa\hat{z}\cdot\hat{x}}{r^2} = \boxed{\frac{k4qa\cos\theta}{r^2}}$