$$\vec{r}(x,y,z), \quad \vec{A}(a,b,c), \quad a,b,c = \text{const.}$$

$$\vec{r}^2 = x^2 + y^2 + z^2$$

$$\vec{r}^2\vec{A} = \big(a(x^2+y^2+z^2), b(x^2+y^2+z^2), c(x^2+y^2+z^2)\big)$$

$$\text{Div}(\vec{r}^2\vec{A}) = \left(\tfrac{\partial}{\partial x}, \tfrac{\partial}{\partial y}, \tfrac{\partial}{\partial z}\right).(\vec{r}^2\vec{A})$$

$$= \tfrac{\partial(a(x^2+y^2+z^2))}{\partial x} + \tfrac{\partial(b(x^2+y^2+z^2))}{\partial y} + \tfrac{\partial(c(x^2+y^2+z^2))}{\partial z} = 2ax + 2by + 2cz = 2(\vec{r}.\vec{A})$$

$$\vec{r} \times \vec{A} = (cy - bz, az - cx, bx - ay)$$

$$\text{Rot}(\vec{r} \times \vec{A}) = (\tfrac{\partial}{\partial x}, \tfrac{\partial}{\partial y}, \tfrac{\partial}{\partial z}) \times (\vec{r} \times \vec{A})$$

$$= \left(\tfrac{\partial}{\partial y}(bx - ay) - \tfrac{\partial}{\partial z}(az - cx), \tfrac{\partial}{\partial z}(cy - bz) - \tfrac{\partial}{\partial x}(bx - ay), \tfrac{\partial}{\partial x}(az - cx) - \tfrac{\partial}{\partial y}(cy - bz)\right)$$

$$= (-2a, -2b, -2c) = -2\vec{A}$$