You may wish to recall the following facts for $f \in \bigwedge^0(\mathbb{R}^n)$, $\alpha, \gamma \in \bigwedge^p(\mathbb{R}^n)$ and $\beta \in \bigwedge^q(\mathbb{R}^n)$:

$$
\begin{aligned}
*1 &= \omega \\
** &= (-1)^{p(n-p)+s} \\
df &= \frac{\partial f}{\partial x^i}\, dx^i \\
d^2 &= 0 \\
\beta \wedge \alpha &= (-1)^{pq}\, \alpha \wedge \beta \\
\alpha \wedge *\gamma &= g(\alpha, \gamma)\, \omega \\
d(f\, d\alpha) &= df \wedge d\alpha \\
d(\alpha \wedge \beta) &= d\alpha \wedge \beta + (-1)^p\, \alpha \wedge d\beta \\
d\vec{\boldsymbol{r}} &= \sigma^i \hat{\boldsymbol{e}}_i \\
ds^2 &= d\vec{\boldsymbol{r}} \cdot d\vec{\boldsymbol{r}}
\end{aligned}
$$

You may wish to use the following relationships in (Euclidean) $\mathbb{R}^3$:

$$
\begin{aligned}
\vec{\boldsymbol{F}} \cdot d\vec{\boldsymbol{r}} &= F \\
\vec{\boldsymbol{F}} \cdot \vec{\boldsymbol{G}} &= *(F \wedge *G) \\
(\vec{\boldsymbol{F}} \times \vec{\boldsymbol{G}}) \cdot d\vec{\boldsymbol{r}} &= *(F \wedge G) \\
\vec{\nabla} f \cdot d\vec{\boldsymbol{r}} &= df = \nabla f \\
(\vec{\nabla} \times \vec{\boldsymbol{F}}) \cdot d\vec{\boldsymbol{r}} &= *dF = \nabla \times F \\
\vec{\nabla} \cdot \vec{\boldsymbol{F}} &= *d{*F} = \nabla \cdot F \\
\triangle f = \vec{\nabla} \cdot \vec{\nabla} f &= *d{*df} = \nabla \cdot \nabla f \\
h_u &= \left| \frac{\partial \vec{\boldsymbol{r}}}{\partial u} \right|
\end{aligned}
$$