Q4: We first verify that $d^2\omega = 0$. We compute that

$$\begin{aligned}
d(d\omega) &= d(\sum_{i=1}^{3} dx_i \wedge \frac{\partial \omega}{\partial x_i}) \\
&= d(dx \wedge (ydx) + dy \wedge (xdx - zdz) + dz \wedge (-ydz)) \\
&= d(-xdx \wedge dy - zdy \wedge dz) \\
&= d(-xdx \wedge dy) - d(zdy \wedge dz) \\
&= dx \wedge (-dx \wedge dy) - dz \wedge (dy \wedge dz) \\
&= 0
\end{aligned}$$

Unsurprisingly $d^2\omega = 0$. We now will verify that $d(\omega \wedge \eta) = d\omega \wedge \eta - \omega \wedge d\eta$. We first compute the left side.

$$\begin{aligned}
d(\omega \wedge \eta) &= d((-xy^2z^2 - 3x)dx \wedge dy + (2x^2 + xz)dx \wedge dz + (6x - y^2z^3)dy \wedge dz) \\
&= 6dx \wedge dy \wedge dz - (2x^2 + xz)dx \wedge dy \wedge dz - 2xy^2zdx \wedge dy \wedge dz \\
&= (6 - 2x^2 - xz - 2xy^2z)dx \wedge dy \wedge dz
\end{aligned}$$

We will now compute the right side:

$$\begin{aligned}
d\omega \wedge \eta - \omega \wedge d\eta &= (-xdx \wedge dy - zdy \wedge dz) \wedge (xdx - yz^2dy + 2xdz) - (xydx + 3dy - yzdz) \wedge (2dx \wedge dz + 2yzdy \wedge dz) \\
&= (-2x^2 - xz)dx \wedge dy \wedge dz - (2xy^2z - 6)dx \wedge dy \wedge dz \\
&= (6 - 2x^2 - xz - 2xy^2z)dx \wedge dy \wedge dz
\end{aligned}$$

Once again we are not surprised to see that indeed $d(\omega \wedge \eta) = d\omega \wedge \eta - \omega \wedge d\eta$.