#3.3.4 For the computation of $\|\vec{\boldsymbol{r}}_u \times \vec{\boldsymbol{r}}_v\|$:

$$\|\vec{\boldsymbol{r}}_u \times \vec{\boldsymbol{r}}_v\| = \sqrt{81\cos^2 u \sin^4 v + 81\sin^2 u \sin^4 v + 81\sin^2 v \cos^2 v}$$
$$= \cdots \begin{pmatrix}\text{For first 2 terms, take out common factor, then simplify using } \cos^2 v + \sin^2 v = 1; \\ \text{fill in the details}\end{pmatrix} \cdots$$
$$= \sqrt{81\sin^4 v + 81\sin^2 v \cos^2 v}$$
$$= \cdots \begin{pmatrix}\text{Take out common factor, simplify using } \sin^2 v + \cos^2 v = 1, \text{then take square root;} \\ \text{fill in the details}\end{pmatrix} \cdots$$
$$= 9\sin v$$

Also note that
$\sqrt{81\cos^2 u \sin^4 v + 81\sin^2 u \sin^4 v + 81\sin^2 v \cos^2 v} \neq 9\cos u \sin^2 v + 9\sin u \sin^2 v +$
$9\sin v \cos v$;
in general, $\sqrt{a^2 + b^2 + c^2} \neq a + b + c$, for instance, consider $\sqrt{3^2 + 4^2 + 12^2}$ vs $3 + 4 + 12$.