$9\frac{1}{2}$

$= \alpha \wedge ((Vg)\theta^{p+1} \wedge \dots \theta^{p+k} + g L_V(\theta^{p+1} \wedge \dots \theta^{p+k}))$
$+ (Vf\,\theta^1 \wedge \dots \theta^p + f L_V(\theta^1 \wedge \dots \wedge \theta^p)) \wedge \beta$

$= \alpha \wedge (L_V \beta) + (L_V \alpha) \wedge \beta$

ie $L_V(\alpha \wedge \beta) = \alpha \wedge (L_V \beta) + (L_V \alpha) \wedge \beta$
so L_V is a derivative of degree zero.

2

iii) $D(fg\,\theta^1 \wedge \dots \theta^{p+k})$
$= V \lrcorner (fg\,\theta^1 \wedge \dots \theta^{p+k})$
$= fg\, V \lrcorner (\theta^1 \wedge \dots \theta^{p+k})$
$= fg\,(\sum_{r=1}^{p+k} (-1)^{r-1} \langle V, \theta^r \rangle \theta^1 \wedge \dots \hat{\theta}^r \wedge \dots \theta^{p+k})$
(where $\hat{}$ indicates that the character is missing from the expression)
$= f(\sum_{r=1}^{p} (-1)^{r-1} \langle V, \theta^r \rangle \theta^1 \wedge \dots \hat{\theta}^r \wedge \theta^p) \wedge g\theta^{p+1} \wedge \dots \theta^{p+k}$

$+ f\theta^1 \wedge \dots \theta^p \wedge g \sum_{r=p+1}^{p+k} (-1)^{r-1} \langle V, \theta^r \rangle \theta^{p+1} \wedge \dots \hat{\theta}^r \wedge \dots \theta^{p+k}$

$= (V \lrcorner \alpha) \wedge \beta + (-1)^p \alpha \wedge (V \lrcorner \beta)$
(the factor $(-1)^p$ appears because in last term summation starts from $r = p+1$).
$V \lrcorner \alpha$ is an anti derivation of degree -1.

2

ii)

$D_1(f\theta^1 \wedge \dots \theta^p) = (D_1 f) \wedge \theta^1 \wedge \dots \theta^p$
$+ f D_1(\theta^1 \wedge \dots \theta^p)$
$= (D_1 f) \wedge \theta^1 \wedge \dots \wedge \theta^p + f\,[D_1(\theta^1) \wedge \theta^2 \wedge \dots \theta^p$
$+ \theta^1 \wedge D_1(\theta^2 \wedge \dots \theta^p)]$