ace.

$$\pi^* D' \cdot \pi^* D = \int_{\widetilde{M}} \eta_{\pi^* D' \cdot \pi^* D} = \langle \eta_{\pi^* D' \cdot \pi^* D}, [\widetilde{M}] \rangle$$

$$= \langle \eta_{\pi^* D'} \wedge \eta_{\pi^* D}, [\widetilde{M}] \rangle = \langle \pi^* \eta_{D'} \wedge \pi^* \eta_D, [\widetilde{M}] \rangle$$

$$= \langle \pi^* (\eta_{D'} \wedge \eta_D), [\widetilde{M}] \rangle$$

$$= \langle \eta_{D'} \wedge \eta_D, \pi_* [\widetilde{M}] \rangle$$

$$= \langle \eta_{D'} \wedge \eta_D, [M] \rangle, \text{ since } \pi_* \text{ has degree } 1$$

$$= \int_M \eta_{D'} \wedge \eta_D = D' \cdot D. \quad (\because \ \pi \text{ is one to one on } \widetilde{M} - \pi^{-1}(p).)$$

$\pi^* D \cdot E = \pi^* D \cdot \pi^* * = {}^*(D \cdot \pi_* E) = 0$, since $\pi_* E = *$ is homologous to zero in $H_1(M)$.

$\widetilde{D}_1, \widetilde{D}_2 \in \mathrm{Div}(\widetilde{M})$.

$\Rightarrow \widetilde{D}_1 = \pi^* D_1 + n_1 E \ \ \& \ \ \widetilde{D}_2 = \pi^* D_2 + n_2 E$

$\Rightarrow \widetilde{D}_1 \cdot \widetilde{D}_2 = (\pi^* D_1 + n_1 E) \cdot (\pi^* D_2 + n_2 E) = \pi^* D_1 \cdot \pi^* D_2 + n_1 n_2 E \cdot E$

$\Rightarrow$ When we do a product on $\mathrm{Div}(\widetilde{M})$, we have only to product seperately on $\pi^* \mathrm{Div}(M)$ and $\mathbb{Z}\{E\}$.

$\widetilde{D}_1 = \pi^* D_1 + n_1 E = (\pi^* D_1, n_1 E) \quad \widetilde{D}_2 = (\pi^* D_2, n_2 E)$

$\widetilde{D}_1 \cdot \widetilde{D}_2 = (\pi^* D_1 \cdot \pi^* D_2, \ n_1 E \cdot n_2 E)$

Note in particular that if D, D' are two divisors on M intersecting transversely at p, $\widetilde{D}$ & $\widetilde{D}'$ their proper transforms in $\widetilde{M}$, we have

$$\widetilde{D} \cdot \widetilde{D}' = (\pi^* D - E) \cdot (\pi^* D' - E)$$

$$= \pi^* D \cdot \pi^* D' + E \cdot E$$

$$= D \cdot D' - 1.$$