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**Proposition 2.18.** *This is Proposition 2.18.*

*Proof.* We assume that $a$ and $b$ are type 2 integers and will prove that $a \cdot b$ is a type 1 integer. Since $a$ and $b$ are type 2 integers, there exist integers $m$ and $n$ such that

$$a = 3m + 2 \qquad \text{and} \qquad b = 3n + 2.$$

We can now use substitution and algebra .....

$$\begin{aligned} ab &= (3m + 2)(3n + 2) \\ &= 9mn + 6m + 6n + 4 \\ &= 9mn + 6m + 6n + 3 + 1 \end{aligned}$$

□

**Proposition 2.21.** *This is Proposition 2.21.*