5. Consider $\varphi\colon \mathbb{Z}_9 \to \mathbb{Z}_3$, given by $\varphi([a]_9) = [a]_3$. Is φ a FUNCTION? Explain.

(Yes) suppose $[a]_9 = [b]_9$. So $9 \mid a-b$ so $3 \mid a-b$ so $[a]_3 = [b]_3$

6. Suppose that $[a]_n = [a']_n$ and $[b]_n = [b']_n$ Prove $[ab]_n = [a'b']_n$.

we are told $a-a' = rn$ and $b-b' = \Delta n$ for some r and Δ in $\mathbb{Z}$

We see that $ab - a'b' = ab - ab' + ab' - a'b'$

$$= a(b-b') + (a-a')b'$$

$$= a\Delta n + rnb'$$

$$= n(a\Delta + rn)$$

Thus $ab - a'b'$ is divisible by n

and $[ab]_n = [a'b']_n$