

Consultation times?

~~Monday @ 12?~~

Tues dai 12:30-1, i

Carlslaw 635

"S is a subring" write $S \leq R$
'I is an ideal, write $I \triangleleft R$.

$$\varphi(z) = 2z$$

$$\varphi(4) = 8 \text{ but } \varphi(2)\varphi(2) = 4 \cdot 4 = 16 \neq 8$$

$\varphi(x) = \lambda x$ Multiplication
fails if $\lambda \neq 1$

$$\lambda xy = \varphi(xy) = \lambda^2 xy \neq \varphi(x)\varphi(y)$$

λxy

$$\begin{aligned}\varphi(M+N) &= A(M+N)A^{-1} \\ &= AMA^{-1} + ANA^{-1} \\ &= \varphi(M) + \varphi(N) \quad \checkmark\end{aligned}$$

$$\begin{aligned}\varphi(MN) &= AMNA^{-1} \\ &= (AMA^{-1})(ANA^{-1}) \\ &= \varphi(M)\varphi(N) \quad \checkmark\end{aligned}$$

Key point

$$p_i q_j r_i r_j = p_i r_i q_j r_j$$

since R is
commutative.