

## **Section 5 Lecture 36 – Euler's totient function**

### **Solutions**

Q1)

(i) Coprime numbers are 1, 3, 5, 7, there are 4 of them, so  $\varphi(8) = 4$

(ii) Coprime numbers are 1, 3, 7, 9, there are 4 of them, so  $\varphi(10) = 4$

(iii) Coprime numbers are 1, 2, 4, 7, 8, 11, 13, 14 there are 8 of them, so  $\varphi(15) = 8$

(iv) This is prime and so  $\varphi(23) = 23 - 1 = 22$

Q2)

(i)  $10 = 2 \times 5$  and so  $\varphi(10) = 1 \times 4 = 4$

(ii)  $15 = 3 \times 5$  and so  $\varphi(15) = 2 \times 4 = 8$

(iii)  $35 = 5 \times 7$  and so  $\varphi(35) = 4 \times 6 = 24$

(iv)  $143 = 11 \times 13$  and so  $\varphi(143) = 10 \times 12 = 120$

Q3) They are all even. Thus is true in general apart from  $\varphi(1) = \varphi(2) = 1$ .