Chapter 1

Chapter 2

Exercise 2 (c)

Either prove or show a counter example for the following statement. If the same primes divide m and n then

$$m\phi(n) = n\phi(m) \tag{2.1}$$

Exercise 2 (c) Solution 1

Let $n = p_1^{a_1} p_2^{a_2} ... p_k^{a_k}$ and $m = p_1^{b_1} p_2^{a_2} ... p_k^{b_k}$. Then,

$$n\phi(m) = p_1^{a_1} p_2^{a_2} ... p_k^{a_k} \phi(p_1^{b_1} p_2^{a_2} ... p_k^{b_k}) \tag{2.2}$$

$$= \Pi p_i^{a_i} \phi(\Pi p_i^{b_i}) \tag{2.3}$$

Exercise 2 (c) Solution 2

See Greg Hurst's solutions [1] for a similar approach starting with

$$\frac{\phi(m)}{m} = \frac{\phi(n)}{n}. \tag{2.4}$$

Bibliography

[1] Greg Hurst. Solutions to introduction to analytic number theory. 2014.