

MATH1061: Chapter 3 Practice Questions and Assignment 4

Chapter 3 (Sections 3.5–3.9) Practice Questions

The solutions to the Practice Questions are in the back of the textbook, so remember to check your solutions.

Section 3.5

Complete the following questions from page 153 of the textbook.

1, 3, 18, 19.

Section 3.6

Complete the following questions from page 161 of the textbook.

2, 6, 7, 9, 12.

Section 3.8 (alternate)

Complete the following questions from pages 178–179 of the textbook.

8, 9, 12, 24a.

Section 3.9

For each of the following Linear Diophantine equations, determine whether or not a solution exists. If a solution does exist, find one such solution. Answers are provided in brackets.

1. $91x + 221y = 1053$

($\gcd(91, 221) = 13$, so $x = 405$, $y = -162$ is one solution)

2. $158m + 57n = 20000$

($\gcd(158, 57) = 1$, so $m = -440000$, $n = 1220000$ is one solution)

3. $354a + 258b = 45$

($\gcd(354, 258) = 6$, and 6 does not divide 45, so there is no solution)

Assignment 4

Solutions to these questions are to be handed in to your tutors or to Mrs Diane Poke, Information Environments Program, UQ Ipswich, on Friday August 30, 2002.

Section 3.5, pages 153–154: Questions 28

Section 3.6, page 161: Questions 14 (See over for hint.)

Section 3.8, pages 177–179: Questions 14. In Questions 14 find integers m and n such that $m \cdot 3510 + n672 = 6$ respectively.

Section 4.1, Page 192: Questions 4, 7, 36, 38, 49, 50, 56.

To simplify the contrapositive statement in Question 14 of Section 3.6 we note the following.

Let p represent the statement $a \mid b$, q represent the statement $a \nmid c$ and r represent the statement $a \nmid (b + c)$. Then we get the equivalent arguments

$$\begin{aligned}(p \wedge q) \rightarrow r &\equiv \sim r \rightarrow \sim (p \wedge q) \\ &\equiv \sim r \rightarrow (\sim p \vee \sim q) \\ &\equiv \sim (\sim r) \vee (\sim p \vee \sim q) \\ &\equiv (\sim (\sim r) \vee \sim p) \vee \sim q \\ &\equiv \sim (\sim r \wedge p) \vee \sim q \\ &\equiv (\sim r \wedge p) \rightarrow \sim q\end{aligned}$$