MACM 101 (D200)
Homework WHW 3
Due October 6, 2020; 12:30 pm

September 30, 2020

Exercises from the text (To be handed in).

(A) 2.1.2, 2.1.6

(B) 2.2.1, 2.2.4, 2.2.5

(C) 2.3.1, 2.3.3

(D) 2.4.3, 2.4.4

(E) 2.5.1, 2.5.5

(F) 2.6.3, 2.6.6

(G) 2.7.1, 2.7.3

Other Problems (Not To be handed in).

1. Give an example to show that

$$(\forall y)(\exists x)\ p(x,y) \leftrightarrow (\exists y)(\forall x)\ p(y,x)$$

2. Suppose n is an arbitrary integer.
   (a) Show that $n(n+1)$ is divisible by 2.
   (b) Show that $n(n+1)(n+2)$ is divisible by 3!.

3. (a) Prove that $\sqrt{7}$ is an irrational number.

   (b) Show where your arguments in (a) get violated if you want to show in a similar manner that $\sqrt{9}$ is an irrational number.

4. Find a counterexample to the statement that every positive integers can be written as the sum of the squares of three integers. What is the smallest integer for which it is a counterexample.