MTH1001 – Algebra – Coursework assignment

Please submit your solutions through Turnitin no later than Monday, 16 October at 3pm.

General rules:

- Best write your solutions on paper sheets, then scan them and submit through Turnitin. If you have no scanner available you may also take photos on your phone, but note that you may have to bundle those together in a single file for uploading to Turnitin. Submissions after the deadline are possible but will be penalised with a mark reduction according to University's rules.
- Follow the procedures required (no guesswork or shortcuts because of small numbers, where you have learnt a general and explicit procedure).
- Write down all the steps of your calculations.
- Conclude with a clear sentence stating your final answer (no ambiguities).
- Submit only one version of each solution (cross out wrong attempts).
- You may use a pocket calculator, but you can easily do without.
- Although this is not an exercise in handwriting skills, some tidiness and legible writing will be appreciated and will avoid misunderstandings.

Problem 1. Use Euclid's algorithm to compute the greatest common divisor d of 442 and 273. Use negative remainders whenever convenient. [25]

Problem 2. Extend the calculations in the previous exercise (that is, apply the extended Euclidean algorithm) to find integers x and y such that $442x + 273y = d$, where $d = (442, 273)$ is the greatest common divisor found before. [25]

Problem 3. Find all integer solutions of $442x + 273y = 52$. Then find the solution such that $|x|$ is smallest. [25]

Problem 4. Convert the decimal number 862.4 to a periodic number in base 7. [25]