

Note: Please deposit your answers in the appropriate box outside the Student Resource Centre in the basement of the Mathematics/Physics building **by 4 pm on the due date**. Late assignments will not be marked. Use a Mathematics Department cover sheet which is available from outside the Resource Centre. **PLEASE SHOW ALL WORKING.**

1. (6.3.2) A non-constant polynomial is *reducible* if it can be written as the product of two polynomials of smaller degree. Otherwise, it is *irreducible*.

Prove that every non-constant polynomial is irreducible or can be written as a product of non-constant irreducible polynomials.

2. (7.2.7) Prove that the sum of the cubes of any three consecutive natural numbers is divisible by 9.

3. (7.2.19) Let b, c be relatively prime integers. Show that for all integers a , $\gcd(a, b)$ and $\gcd(a, c)$ are relatively prime.

4. (7.3.3) Use the Euclidean Algorithm to find the greatest common divisor d of 1452679 and 2306347 and find integers u, v such that $d = 1452679 u + 2306347 v$.