# Homework 2 Sets

1. (a) Complete the tables to show the definitions of sets.

[3]

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| **Definition** | **Set Comprehension** |
| S = {2, 3, 5, 7, 11, 13, 17, …} |  |
|  | A = {x | x is a letter in the English alphabet ᴧ x is a vowel} |

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| **Definition (Strings)** | **Compact Representation** |
| T = {110, 11100, 1111000, 111110000, …} |  |

1. Given sets: A = {0, 1} B = {1, 2}

[5]

* A ∪ B =
* A ∩ B =
* A \ B =
* A x B =
* 3 ∈ B =

1. In the table below, AliceCourses represents the set of courses that Alice takes, and KevinCourses represents the set of courses that Kevin takes.

e.g. AliceCourses = {French, German, History}

Write expressions showing the relationships between the given sets.   
The first one has been done for you. [2]

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| The set of common courses between Alice and Kevin | AliceCourses ∩ KevinCourses |
| Kevin takes courses that James takes except for the ones that Alice takes |  |
| Alice takes all the courses that are taken by either James or Kevin |  |

1. Given sets: A = {1, 2} B = {a, b, c}
2. Write an expression, using the cardinality symbol, that represents the cardinality of   
   A x B. Demonstrate that it works using sets A and B. [2]
3. Is it true that A x B = B x A? Show your working. [3]
4. Given sets: ∅ A = {1} B = {1,3} C = {1,5,9} D = {1,2,3,4,5} E = {1,3,5,7,9} U={1,2,…8,9}

Complete the table to show the relationships between the sets and write your reasoning in the last column. [4]

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| **Sets** | **Relationship (⊆, ⊈, ⊂)** | **Reason** |
| ∅, A |  |  |
| B, C |  |  |
| C, E |  |  |
| D, U |  |  |

1. Explain why X = {4, 6, 7, 8} is not a subset of Y = {y | y ∈ **P** Λ y MOD 2 = 0}. [1]

[Total 20 Marks]