

**MATHEMATICS  
Applications Units 3 & 4**

**Test 3 – Graphs**

**Chapter 5**

**Semester 1 2018**

# 

**Section One – Calculator Free**

Time allowed for this section

Working time for this section: 25 minutes

Marks available: 21 marks

## Material required/recommended for this section

##### To be provided by the supervisor

This Question/Answer booklet

Formula sheet

##### To be provided by the candidate

Standard items: pens, pencils, pencil sharpener, eraser, correction fluid, ruler, highlighters

Special items: Nil

## Important note to candidates

No other items may be used in this section of the examination. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

1. (5 marks)  
   The table shows whether some Big Bash clubs and some National Test teams share players.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Scorchers | Sydney Sixers | Melbourne Stars |
| Australia | Yes | Yes | Yes |
| England | Yes | Yes | Yes |
| West Indies | Yes | Yes | No |

1. Draw a bipartite graph to represent the information. [3]
2. Is this a complete bipartite graph? Explain. [2]

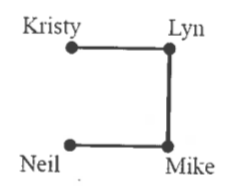
1. (4 marks)   
   Decide whether each graph is planar or non-planar. Where possible, draw a planar representation of the graph.

|  |  |  |
| --- | --- | --- |
| Screen%20Shot%202018-05-11%20at%208.22.14%20am.png | Screen%20Shot%202018-05-11%20at%208.22.07%20am.png | Screen%20Shot%202018-05-11%20at%208.22.00%20am.png |

1. (9 marks)  
   Each of these networks contains a Semi-Eulerian path.
2. Define ‘a Semi-Eulerian path’. [1]
3. Show a starting point, and a finishing point for each Semi-Eulerian path. [3]

|  |  |  |
| --- | --- | --- |
| Screen%20Shot%202018-05-11%20at%208.25.33%20am.png | Screen%20Shot%202018-05-11%20at%208.25.40%20am.png | Screen%20Shot%202018-05-11%20at%208.25.45%20am.png |

1. Complete this statement: [1]  
     
   If a network with two odd vertices is traversed, one odd vertex will be the starting point and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Which of the networks given contain a Hamiltonian cycle? [1]
3. Verify that Euler’s rule applies to each of the given networks. [3]
4. (3 mark)   
   The members of one team are Kristy (K), Lyn (L), Mike (M) and Neil (N). In one of the challenges, these four team members are only allowed to communicate directly with each other as indicated by the edges of the following network.



The adjacency matrix below also shows the allowed lines of communication.

1. Explain the meaning of the zero in the adjacency matrix. [1]
2. Write down the values of *f* and ***g*** in the adjacency matrix. [2]

**End of Section One**