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**MATHEMATICS  
Methods Units 1 & 2**

**Test 1 – Relationships, Functions, Linear and Quadratic Functions**

**Semester 1 2020**

# 

**Section Two - Calculator Assumed**

Time allowed for this section

Working time for this section: 40 minutes

Marks available: 41 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: drawing instruments, templates, notes on one unfolded sheet of A4 paper, and up to three calculators satisfying the conditions set by the Curriculum Council for this course.

## 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. (2 marks)  
   Find the equation of the line passing through and .
2. (4 marks)

Determine the equation of the line that passes through the point and is perpendicular to the line with equation . Give your answer in the form .

1. (6 marks)

State the natural domain and natural range for each of the functions/relations below.

|  |  |  |
| --- | --- | --- |
| Function/Relation | Natural Domain | Natural Range |
|  |  |  |
|  |  |  |
|  |  |  |

1. (8 marks: 1,1,2,2,2)

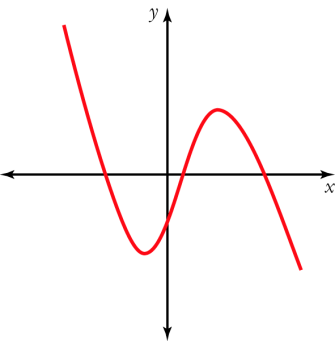
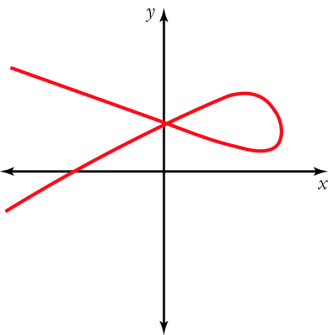
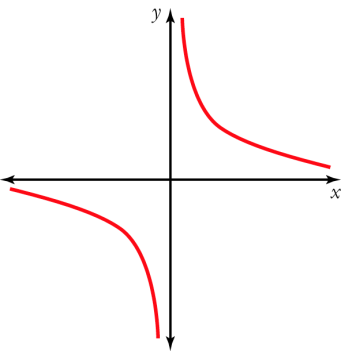
Given that , and

6. (9 marks: 3,3,3)

Consider the three graphs shown below.

1. **State** whether each is a relation or a function.
2. **Show** justification with an appropriate test.
3. **Describe** each graph using one of the terms one-to-one, one-to-many, many-to-one.

Graph A Graph B Graph C

1. (3 marks)

If the function defined passes through the points and , find the possible values of *p* and *q*.

1. (9 marks)

A farmer wants to make an enclosure for her sheep. She has 50 metres of fencing and will use it to make a rectangular enclosure using and existing fence along one side.

1. Show that the area of the enclosure is given by . [2]
2. On the axes below, sketch the area function labelling key features. [3]

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1. Use your calculator, or otherwise, to determine the maximum area of this enclosure. [1]
2. What are the dimensions of the enclosure for maximum area. [1]
3. The enclosure must have an area of at least 120 square metres. What value(s) of *x* will meet this requirement. [2]

**End of Test**