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**CHURCHLANDS SENIOR HIGH SCHOOL**

**MATHEMATICS SPECIALIST 3, 4 TEST TWO 2017**

**Non Calculator**

**Chapters 3, 4,**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Time: 40minutes**

**Total: 41 marks**

1. [ 8 marks: 1,1,2,2,2]

Given that and

a) State the natural domain of .

b) Explain clearly why the domain for has to be restricted if is to be a function.

c) State the largest possible domain for and the corresponding range.

d) Evaluate .

e) Express in simplest form .

2.[11 marks:2,1,3,2,1,2]

.

a) Sketch the graph of on the axes provided.



b)Explain why has an inverse function .

c) Find algebraically, a formula for .

d) Sketch the graph of on the same axes as above.

e) Find the range of .

f) Find the domain and range of .

3.[12 marks:2,1,2,2,5]

Consider the curve with equation

a) State the equation of all asymptotes.

b) Identify the point of discontinuity on this curve.

c) State the and intercepts

d) i) State the limit as

ii) State the limit as

e) Sketch the curve on the axes provided highlighting all the main features clearly.



4.[7 marks:3,3]

a) On the axes provided neatly sketch the graph of .

Clearly indicate the i) intercepts

ii) the intercept

iii) the coordinates of the turning point.



b) Use your previous graph to help you draw the graph of on the same set of axes.

Clearly indicate any asymptotes, turning points, intersection with axes and behaviour as .

5. [3 marks]

The equation has exactly two solutions and

Find the value(s) of .

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**MATHEMATICS SPECIALIST 3, 4 TEST TWO 2017**

**Calculator Section**

**Chapters 3, 4,**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Time: 15 minutes**

**Total: 14 marks**

1. [9 marks: 2,1,2,4]

The position vectors of A and B, hours after 10 am are and

respectively.

a) Find the vector **AB** t hours after 10 am.

b) Find in terms of and , the distance between A and B, hours after 10 am.

c) Explain why when collision between A and B occurs,

d) Find the value of if the two particles never collide.

2. [ 5 marks]

Find the parametric and hence the Cartesian equation of the line perpendicular to the vector and passing through the point (-9,12).

4. [7 marks:2,2,3]

Solve the following

a)

b)

c)

5. [ 4 marks]

Given that and , find