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| **2021 Year 12 ViSN Mathematics Specialist Unit 3**  **Test 2 – Functions**  **Section One – Calculator Free** | |
| Mr Daniel Comtesse  Mandurah Catholic College | Calculator Free:\_\_\_\_\_\_/32  Calculator Assumed:\_\_\_\_\_/11 |
| daniel.comtesse@cewa.edu.au | Result: \_\_\_\_\_/43 \_\_\_\_\_\_% |

**Student Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**School:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Time allowed:** Section One - 35 minutes

Section Two – 15 minutes

**Assessment Date: 22 March 2021**

**Material required/recommended**

***To be provided by the supervisor***

This Question/Answer Paper

SCSA Formula Sheet

***To be provided by the candidate***

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

**Submission Details**

Timed Assessments are to be returned to the ViSN teacher by the ViSN mentor (scan completed assessment and email to teacher above) within 24 hours of assessment date (above).

**Instructions to Students**

1. **ALL** questions should be attempted.

2. Write your answers in the spaces provided in this Question/Answer Booklet.

3. **SHOW ALL YOUR WORKING CLEARLY**. Your working should be sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Correct answers given without supporting reasoning may not be allocated full marks. Incorrect answers given without supporting reasoning cannot be allocated any marks.

4. If you repeat an answer to any question, ensure that you cancel the answers you do not wish to have marked.

5. It is recommended that you **do not use pencil**, except in diagrams.

**Question 1 [1, 3 = 4 marks]**

Consider the function .

1. Explain why it is necessary to restrict the natural domain of f(x) so that its inverse is also a function.
2. State a minimal restriction to the domain of f(x) that includes , and then use this restriction to show that .

**Question 2 [3, 3 = 6 marks]**

The graph of is shown below.

Chart, scatter chart

Description automatically generated

1. Draw the graph of on the same axes.
2. Given that , determine the defining rule for .

**Question 3 [1, 1, 2, 2 = 6 marks]**

Functions and are defined as

1. Determine
2. .
3. the defining rule for .
4. Determine the domain of .
5. Determine the range of .

**Question 4 [2, 2, 1, 3 = 8 marks]**

The graph of is shown below.

Chart, line chart

Description automatically generated

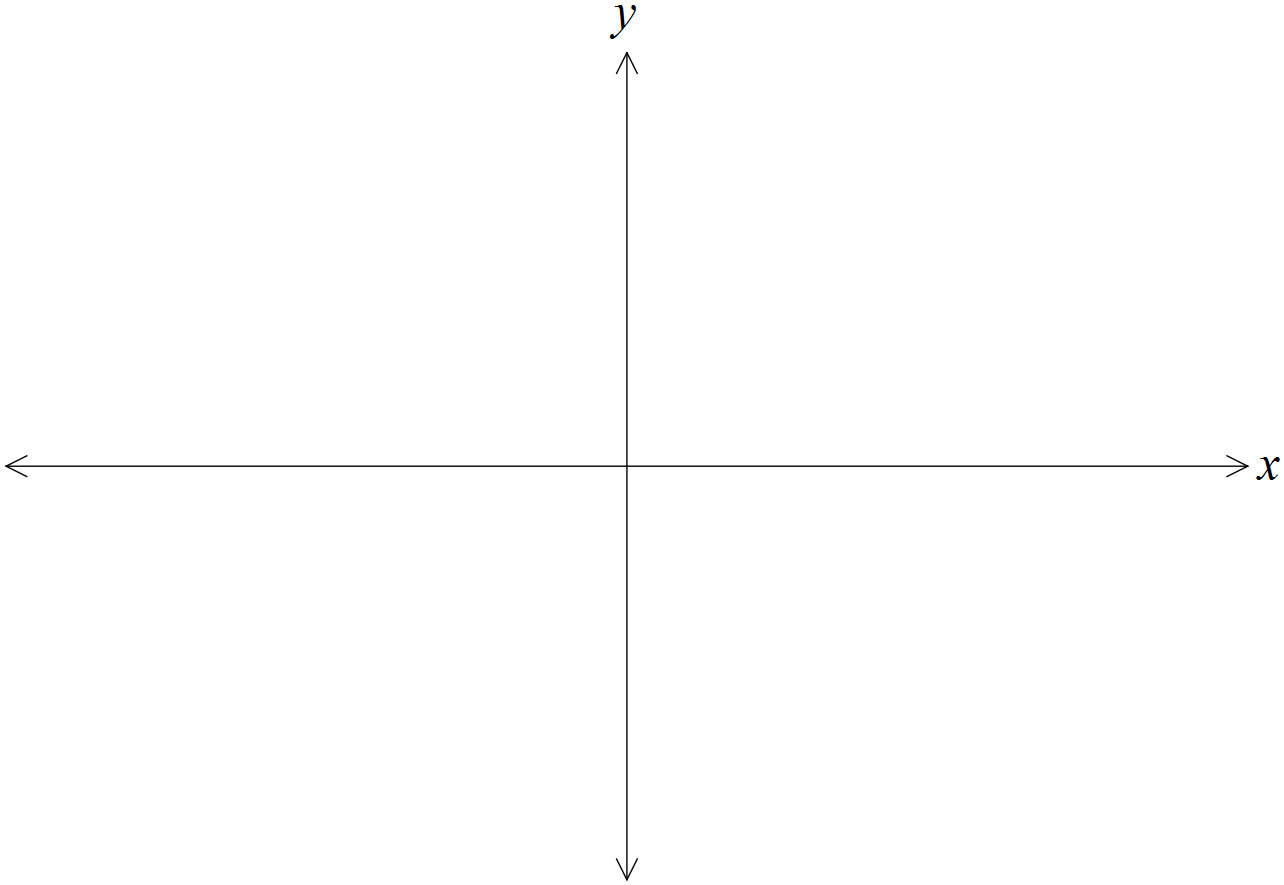
(a) Using the graph, or otherwise, solve

1. .
2. .
3. .

(b)Determine the values of

**Question 5 [4 marks]**

Let . Sketch on the axes provided below.



**Question 6 [1, 1, 2 = 4 marks]**

Let .

1. State the equation of the horizontal asymptote of the graph of .
2. State the values of and .
3. Use your previous two answers to explain why the graph of must have a local maximum to the right of .

**End of Section One**

Extra Working Space

Question number: \_\_\_\_\_\_\_\_\_

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**2021 Year 12 ViSN**

**Mathematics Specialist Unit 3**

|  |  |
| --- | --- |
| **Test 2 – Functions**  **Section Two – Calculator Assumed** | |
| Mr Daniel Comtesse  Mandurah Catholic College | Calculator Assumed:\_\_\_\_\_/10 |
| daniel.comtesse@cewa.edu.au |  |

**Student Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**School:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Time allowed: Section One - 35 minutes**

**Section Two – 15 minutes**

**Assessment Date: 22 March 2021**

**Material required/recommended**

***To be provided by the supervisor***

This Question/Answer Paper

SCSA Formula Sheet

***To be provided by the candidate***

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

Special items: scientific and/or CAS calculator, 1 A4 (one sided) page of notes.

**Instructions to Students**

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2. Write your answers in the spaces provided in this Question/Answer Booklet.

3. **SHOW ALL YOUR WORKING CLEARLY**. Your working should be sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Correct answers given without supporting reasoning may not be allocated full marks. Incorrect answers given without supporting reasoning cannot be allocated any marks.

4. If you repeat an answer to any question, ensure that you cancel the answers you do not wish to have marked.

5. It is recommended that you **do not use pencil**, except in diagrams.

**Question 7 [2, 4, 1 = 7 marks]**

The graph of is shown below over the domain .

Chart, line chart

Description automatically generated

(a) Sketch the graph of over the domain on the axes below.

A picture containing line chart

Description automatically generated

(b) Sketch the graph of on the axes below over the domain .

Table

Description automatically generated with medium confidence

(c) Sketch the graph of on the axes below over the domain .

Table

Description automatically generated with medium confidence

**Question 8 [3 marks]**

The function is graphed on the axes below with oblique asymptote . Determine the equation for .

Shape

Description automatically generated with low confidence

**End of Assessment**

Extra Working Space

Question number: \_\_\_\_\_\_\_\_\_