Mathematics Specialist Unit 3

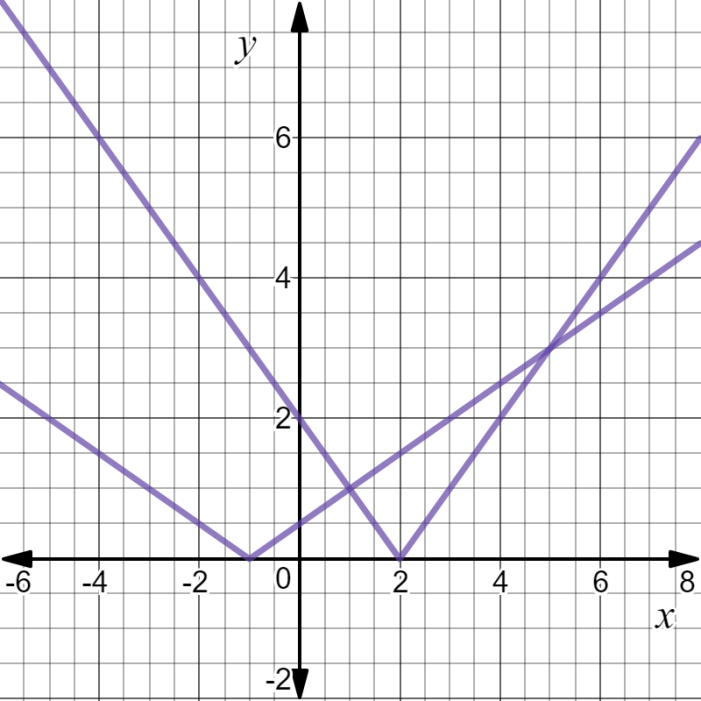
Test 2: Functions & Sketching Graphs

**Solutions**

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

**Section I – calculator-free section solutions**

**Question 1. (3 marks)**

Use the diagram opposite to assist you to solve:

✓

✓

✓

**Question 2. (4 marks)**

Consider the nature of the graph of . Describe the effect on the y values of the

graph as

= = ,

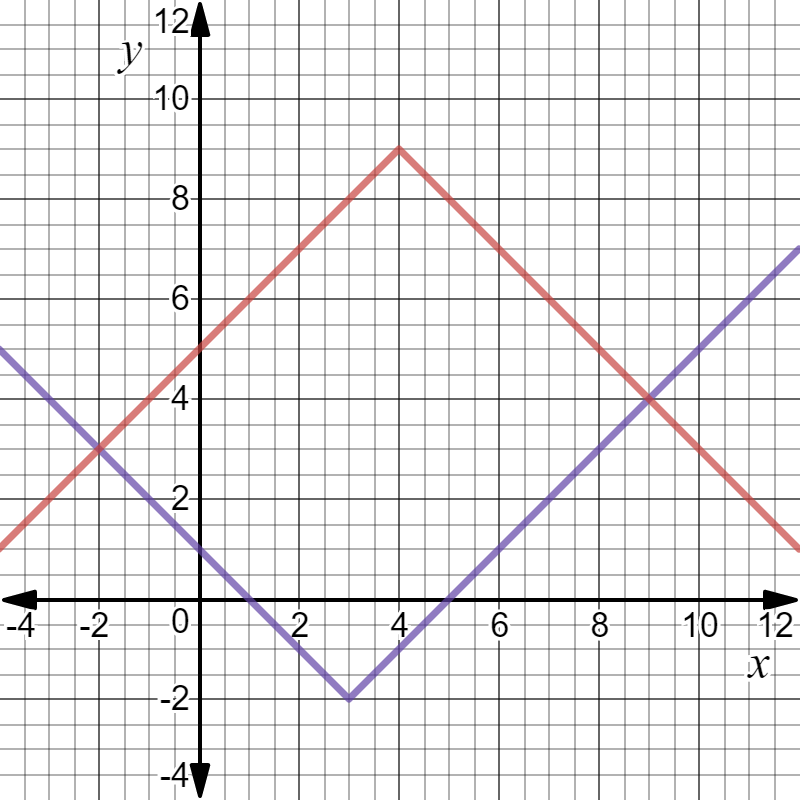
1. x tends to ✓

1. x tends to = ✓
2. x tends to ✓
3. x tends to  ✓

**Question 3. (3 marks)**

The graph of is shown below. Find and equation

is .



✓

Gradient vertex at ✓✓

**Question 4. (4 marks)**

If determine

1. Put ✓ (2)

, 4)

✓

1. The value(s) of x such that . (2)

✓

✓

**Question 5. (4 marks)**

If and find the natural domain and corresponding range for

1. fog(x) = + 2 (2)

✓

✓

1. gof(x) = (2)

✓

✓

**Question 6. (4 marks)**

Find an expression for the inverse function of where and state the domain and range of .

,

invert 2+*y =*

✓✓

✓

✓

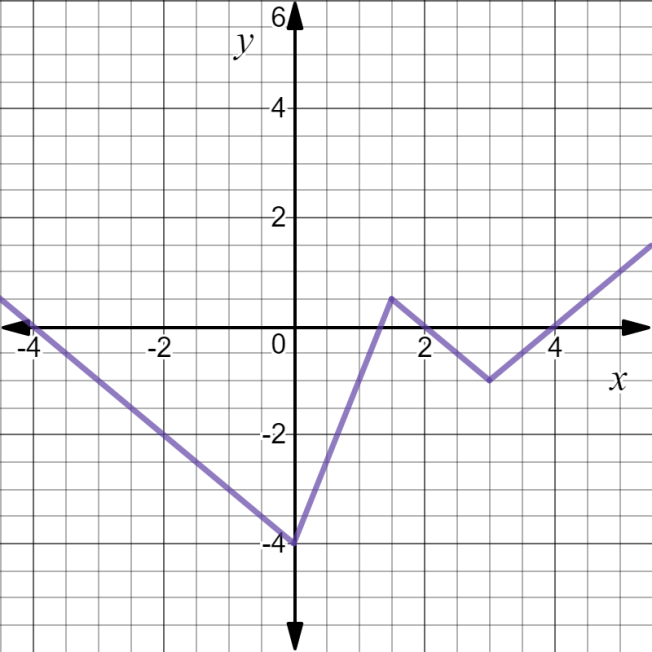
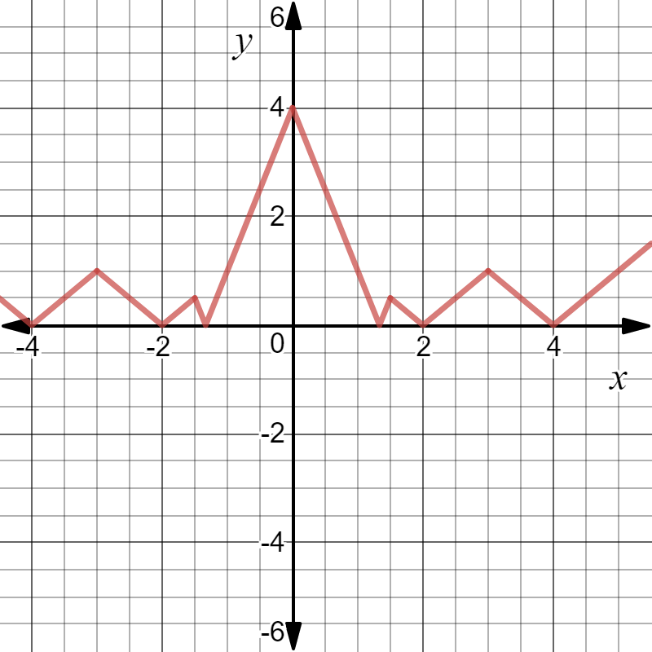
**End of Section One**

**Section II – calculator-assumed section solutions**

**Question 7. (4 marks)**

The graph of is shown below in diagram (a). Show the graph of in diagram (b).

(a) (b)



✓✓✓✓

**Question 8. (3 marks)**

Find an expression for the inverse function of where and state its

domain and range.

Use solve ( on classpad ✓

✓

✓

**Question 9. (4 marks)**

Consider the graph of = ,

1. Locate any asymptotes. ✓ (2)

✓

1. Describe any other discontinuities. ✓ (2)

open circle at point **)** ✓

**Question 10*.* (6 marks)**

Determine all of the asymptotes for each of the following functions:

1. F(x) = (2)

✓

✓

1. G(x) = = = , ✓ (2)

✓

✓

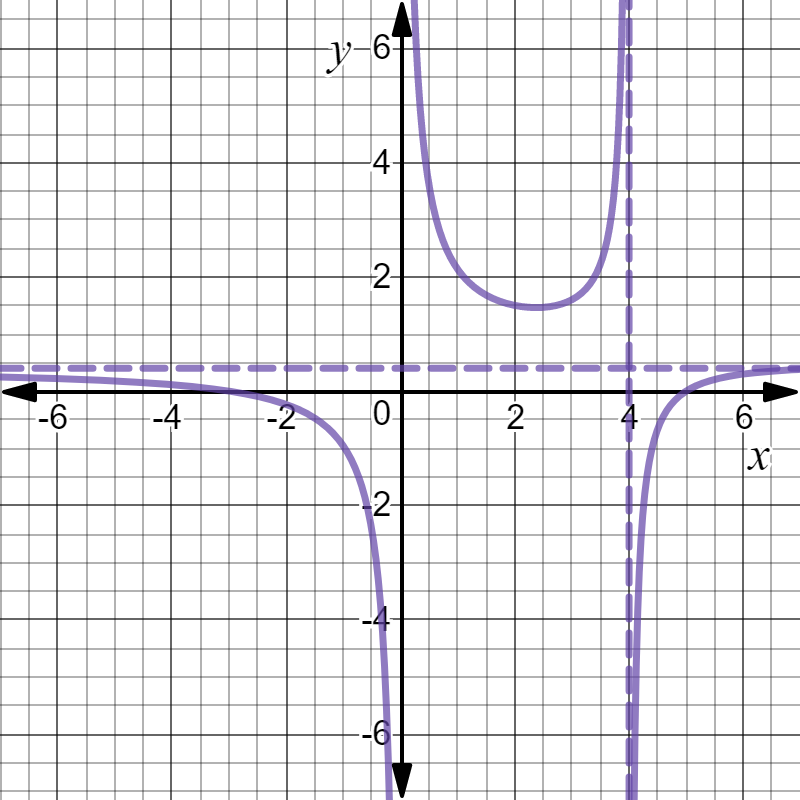
1. H(x) = (2)

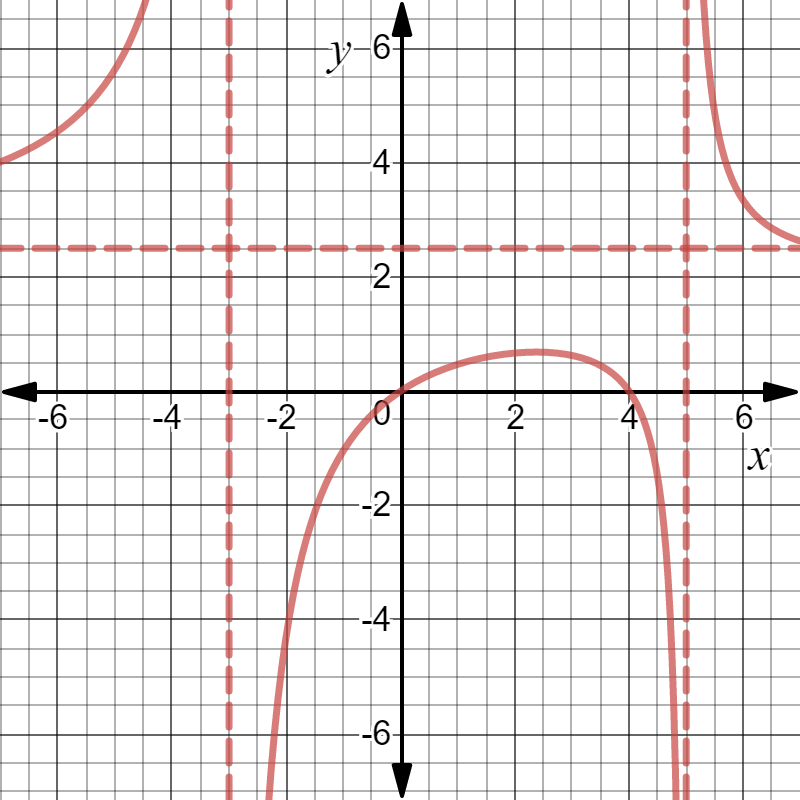
✓

✓

**Question 11. (5 marks)**

The graph of is shown below. It has asymptotes at . On the next set of axes draw the graph of , clearly showing any roots and asymptotes.





Roots at ✓

Asymptotes at and ✓✓

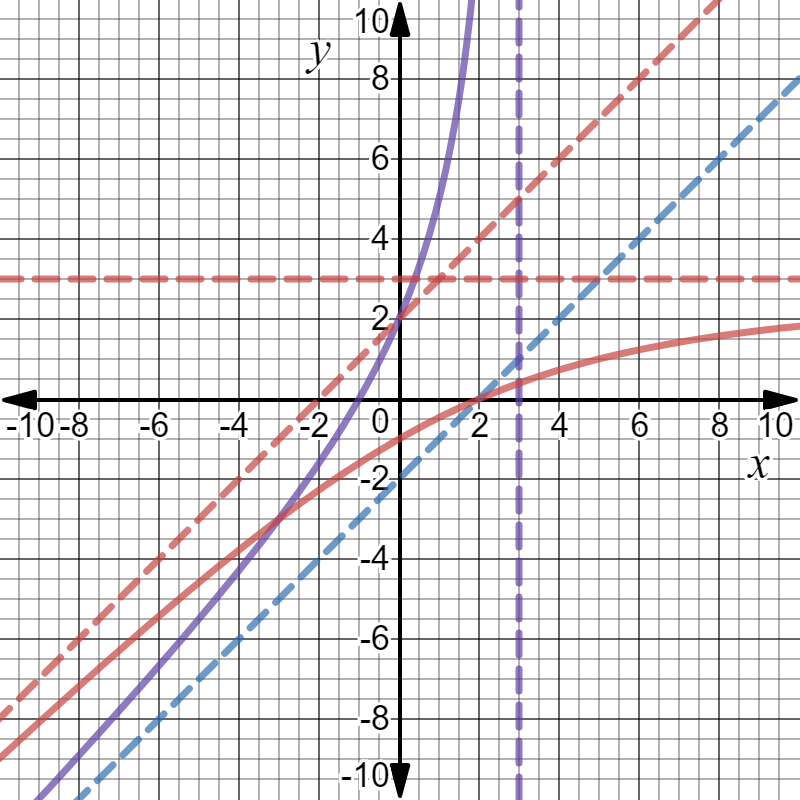
Turning point at ✓

Graph has same x values as at points with y-ordinates ✓

i.e. ) and

**Question 12. (7 marks)**

The graph of , has asymptotes as is shown below:



Asymptotes, curve symmetry in line , curves meet at ✓✓✓

1. Explain why has an inverse function and find . (2)

is a **one to one function** ✓

passes through passes through

✓

1. Sketch the graph of on the same set of axes above. Include any

asymptotes in your sketch. (3)

The graphs, including asymptotes, of and have symmetry about the line

1. Solve for . (2)

✓

✓

**Question 13. (4 marks)**

Given that and state the natural domain and the corresponding

range of each of the following functions:

1. = (2)

✓

✓

1. = (2)

✓

✓

**End of Test Paper**