**West Coast Collaborative**

**Test 2 2016**

**Calculator Free Section**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score: \_\_\_\_\_ / 31**

**Section 1 is worth 50% of your final test mark.**

**No calculators or notes are to be used.**

**Access to approved Sample Mathematics Specialist formulae sheet**

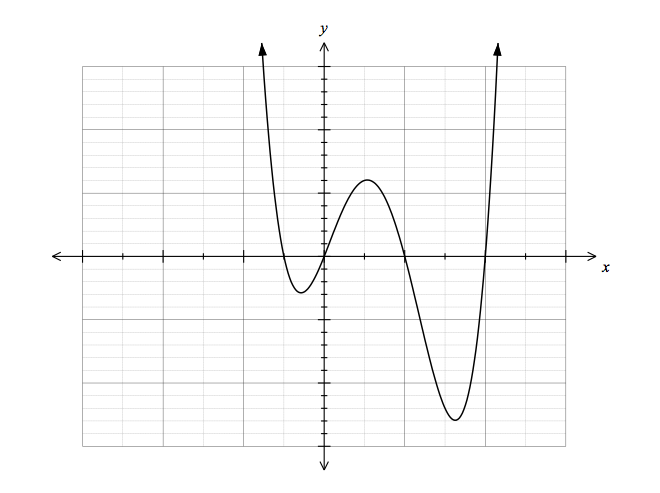
**is permitted. Time limit = 35 minutes.**

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

The functions and are given by and .

1. Determine and simplify .
2. State the largest possible domain for *g(x)*  so that is a function, and the range of .
3. **[3 marks: 2, 1]**

The graph of is shown.



1. Draw the graph of on the same axes.
2. Briefly explain how to obtain the graph of from .
3. **[1, 2, 2, 4 = 9 marks]**

Given  and  , determine:

**a)** f(0)

**b)** fg(3)

**c)** Explain why fg(x) is a function for the natural domain of g(x) whereas gf(x) is not a function for the natural domain of f(x).

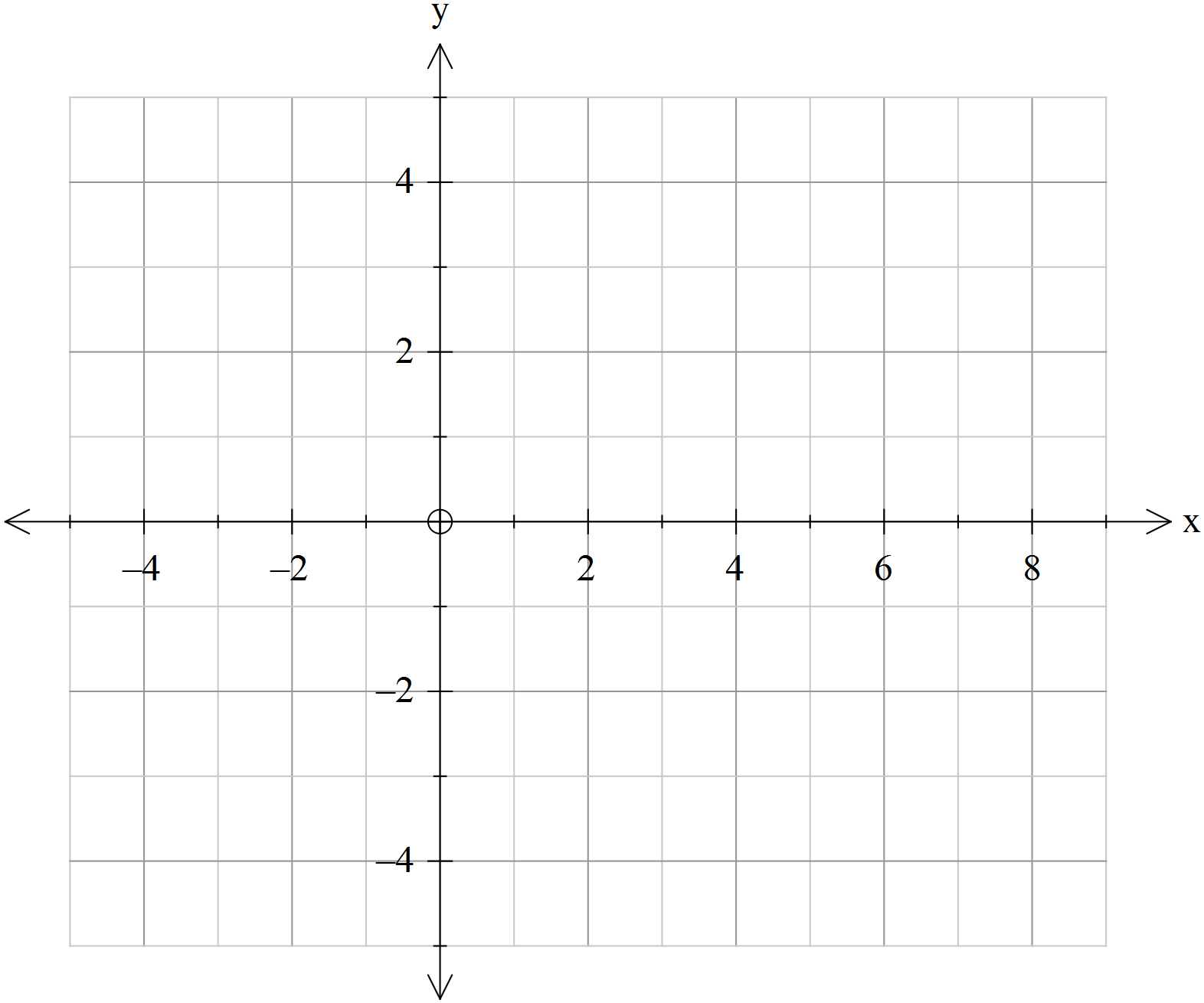
**d)** Find the largest possible domain for f(x) so that the inverse of f(x) is a function. Using this

domain for f(x), state the equation of  and state the domain and range of .

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

**a)** Sketch the function on the axes below

**b)** Sketch the function also on the axes below, and label each graph clearly



**c)** Use your sketch to state the domain of

1. **[8 marks]**

Sketch the following curve on the axes provided, showing any working out in the space provided. Consider important features such as intercepts, asymptotes, turning points, behaviour of the function approaching asymptotes and behaviour of the function for very large and very small values of x.

*y*

*x*

**West Coast Collaborative**

**Test 2 2016**

**Calculator Section**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score: \_\_\_\_\_ / 28**

**Section 2 is worth 50% of your final test mark.**

**Calculators allowed and 1 page of A4 notes, writing on both sides.**

**Access to approved Sample Mathematics Specialist formulae sheet**

**is permitted. Time limit = 25 minutes.**

**6. [6 marks]**

Use an algebraic method to solve: |3*x*+3 | ≥ |*x* – 2 |

**7. [2, 2, 2, 3 = 9 marks]**

a) Solve , giving your solution(s) in terms of .

b) The graphs of  and  are shown below.



(i) Solve .

(ii) Solve 

(iii) Given that the solution to  is -5 ≤ *x*, determine all possible values for  and .

**8. [6 marks]**

Rewrite as a piecewise function.

**9. [3, 2, 2 = 7 marks]**

**a)** For each graph below that shows a function, on the same axes sketch the inverse function. For those that do not show a function, clearly indicate which graph(s) and briefly give your reasoning in the space below the graph.



**b)**  and

**i)** Obtain an expression for

**ii)** Draw on the axes below

