**SACRED HEART GIRLS’ COLLEGE**

**OAKLEIGH**



**Mathematical Methods CAS 2012**

**Unit 3 SAC 2: TEST**

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

**Teacher (please circle)**: Ms Gates Mr Smith

**Part 1: 5 short answer questions.**

**No CAS and no summary notes permitted**

**Reading: 5 minutes**

**Writing: 30 minutes**

**SHORT ANSWER QUESTIONS**

**Instructions:**

Answer **all** questions in the spaces provided.

In all questions where a numerical answer is required an exact value must be given unless otherwise specified.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this test are **not** drawn to scale.

**Question 1**

1. Describe the transformations required to transform the graph of to the graph of

2 marks

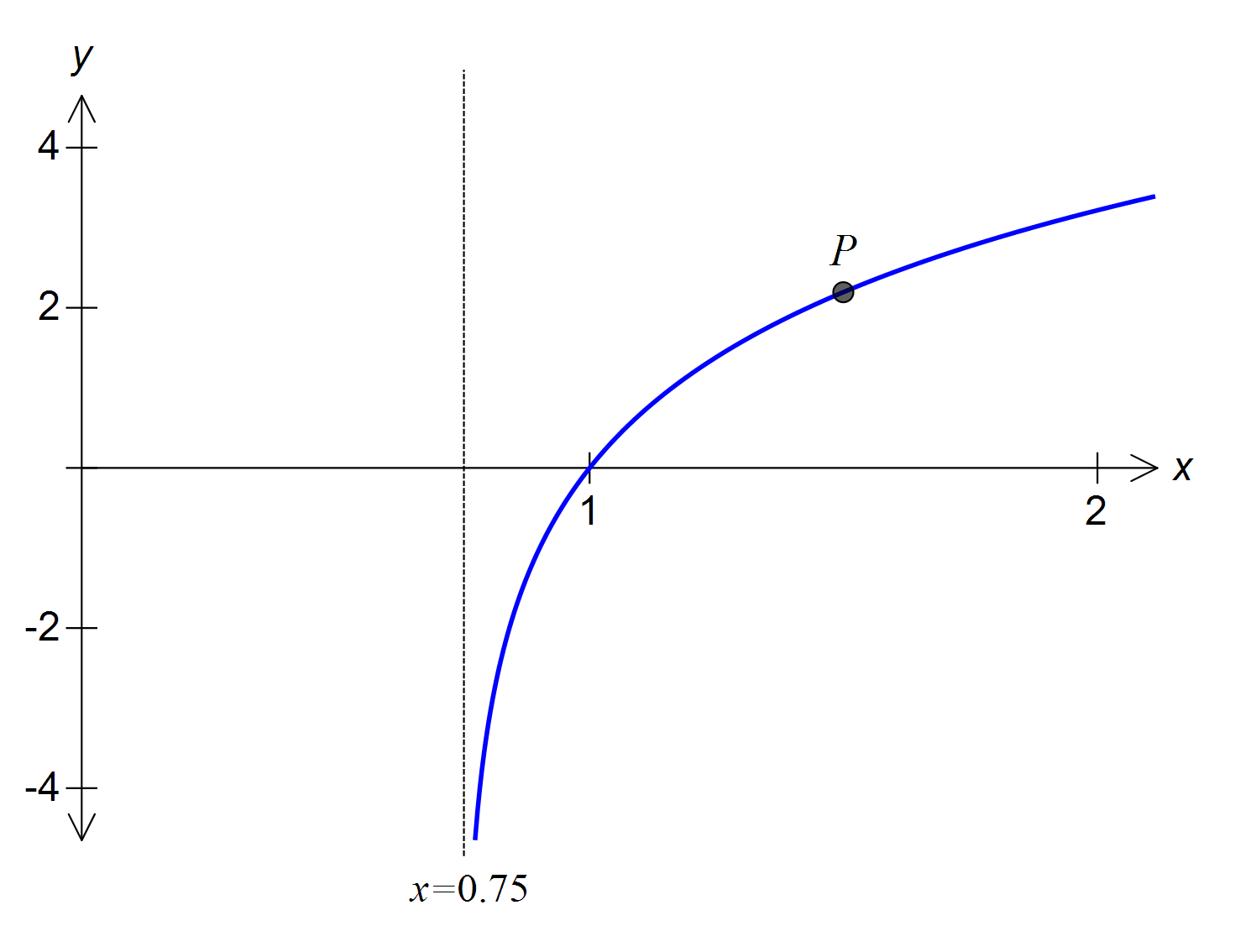
1. State the range and period of the function

2 marks

1. Find the exact solutions of over the domain

2 marks

**Question 2**



A graph of a function of the form is shown above.

The graph has a vertical asymptote at and an *x*-intercept at (1, 0)

1. Find the values of b and c.

3 marks

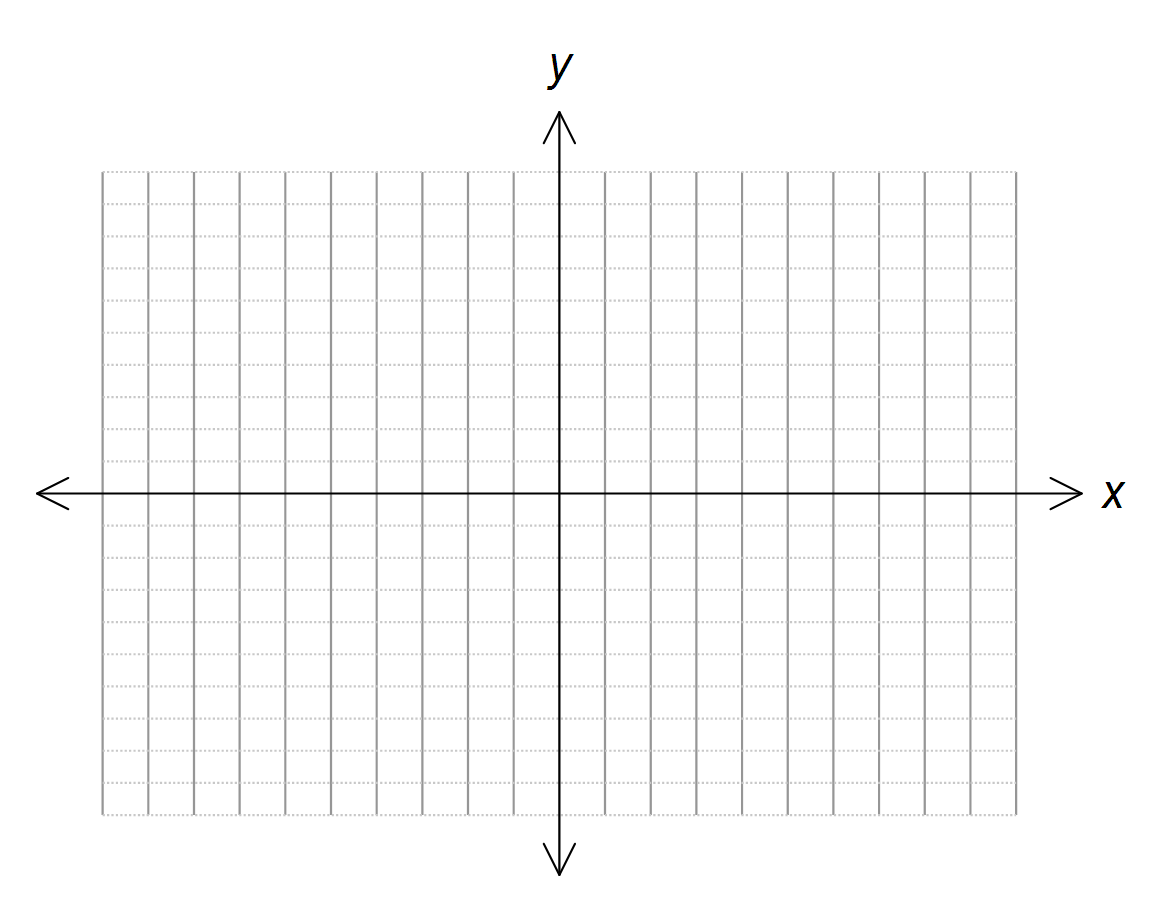
The graph passes through the point, *P*, with co-ordinates (1.5,).

1. Find the value of a.

1 mark

**Question 3**

Sketch the graph of the function on the axes below. Label any axis intercepts with coordinates and any asymptotes with equations.



3 marks

**Question 4**

Solve the equation for *x*.

3 marks

**Question 5**

If the function *f* has the rule and the function *g* has the rule state the maximal domain for which is defined.

2 marks

END OF SAC PART 1

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**Unit 3 SAC 2: TEST**

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

**Teacher (please circle)**: Ms Gates Mr Smith

**Part 2: 12 multiple choice questions and 2 extended response questions. 18 Marks**

**CAS and 2 A4 pages of summary notes permitted**

**Reading: 5 minutes**

**Writing: 35 minutes**

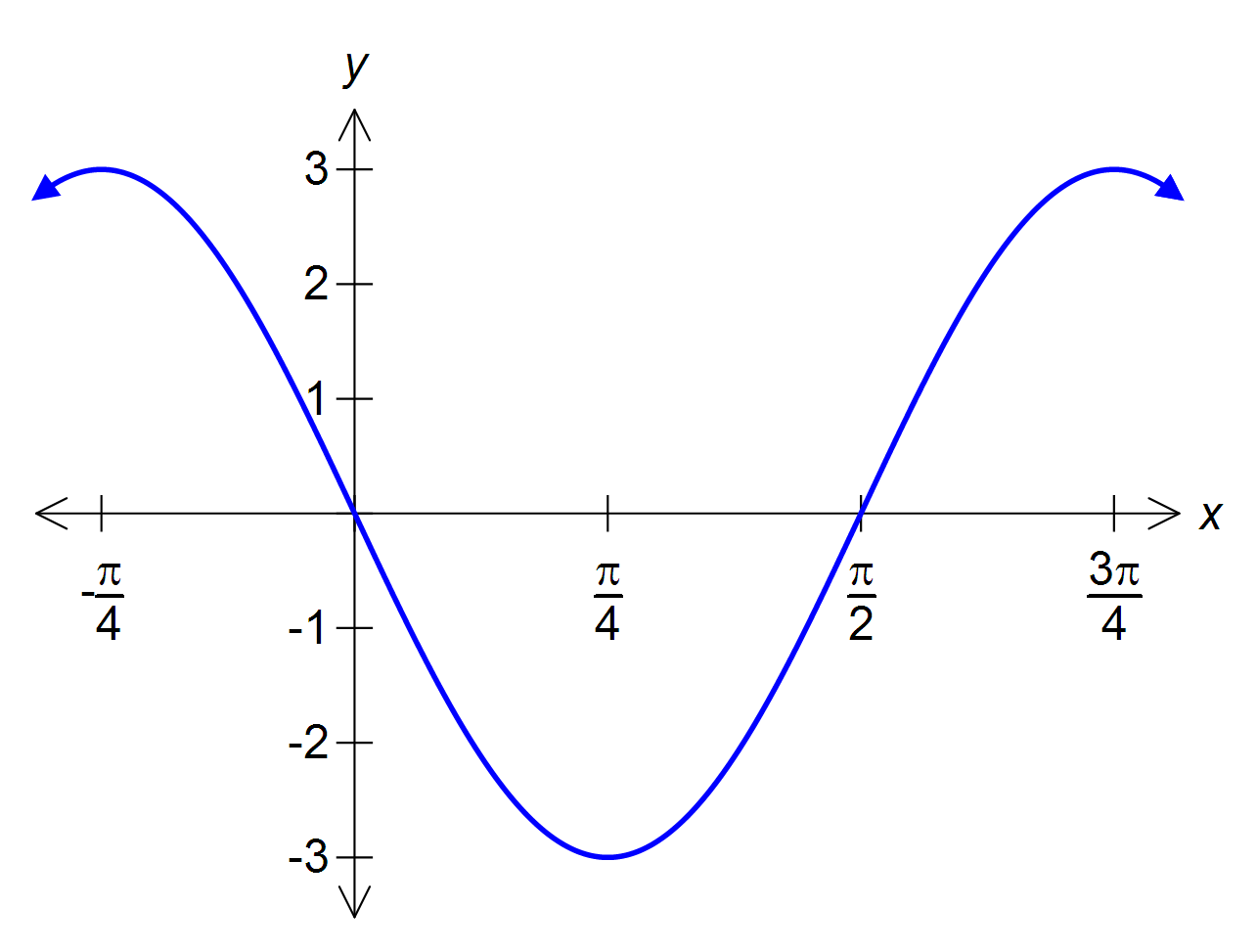
**Multiple Choice Section**

**Instructions:**

Answer questions on the Multiple Choice answer sheet provided.

**Question 1**

The equation of the following graph could be



**Question 2**

Which of the following does not have an inverse function?

**Question 3**

The *x*-intercept of is

**Question 4**

If the function is dilated away from the *x*-axis, which of the following would remain unchanged?

1. The *x*-intercept only
2. The *y*-intercept only
3. The asymptote only
4. The *x*-intercept and the *y*-intercept
5. The *x*-intercept and the asymptote

**Question 5**

If the graph of is

* translated 2 units in the negative *x* direction
* translated 1 unit in the positive *y* direction
* reflected in the *x*-axis

in that order, the equation of the resulting graph would be

**Question 6**

The period of the function with the rule is

**Question 7**

The transformation T: *R*2 *R*2 is defined by

The equation of the image of the curve with equation , under the transformation is given by:

**Question 8**

The sum of the solutions to the equation for is

**Question 9**

The function has an inverse function The function is given by

**Question 10**

The general solution to the equation is

**Question 11**

The number of solutions for *x* of the equation where and a is a non-zero constant, is

1. 3
2. 4
3. 5
4. 7
5. 9

**Question 12**

The maximal domain, D, of the function with rule is

**EXTENDED RESPONSE**

**Instructions:**

Answer **all** questions in the spaces provided.

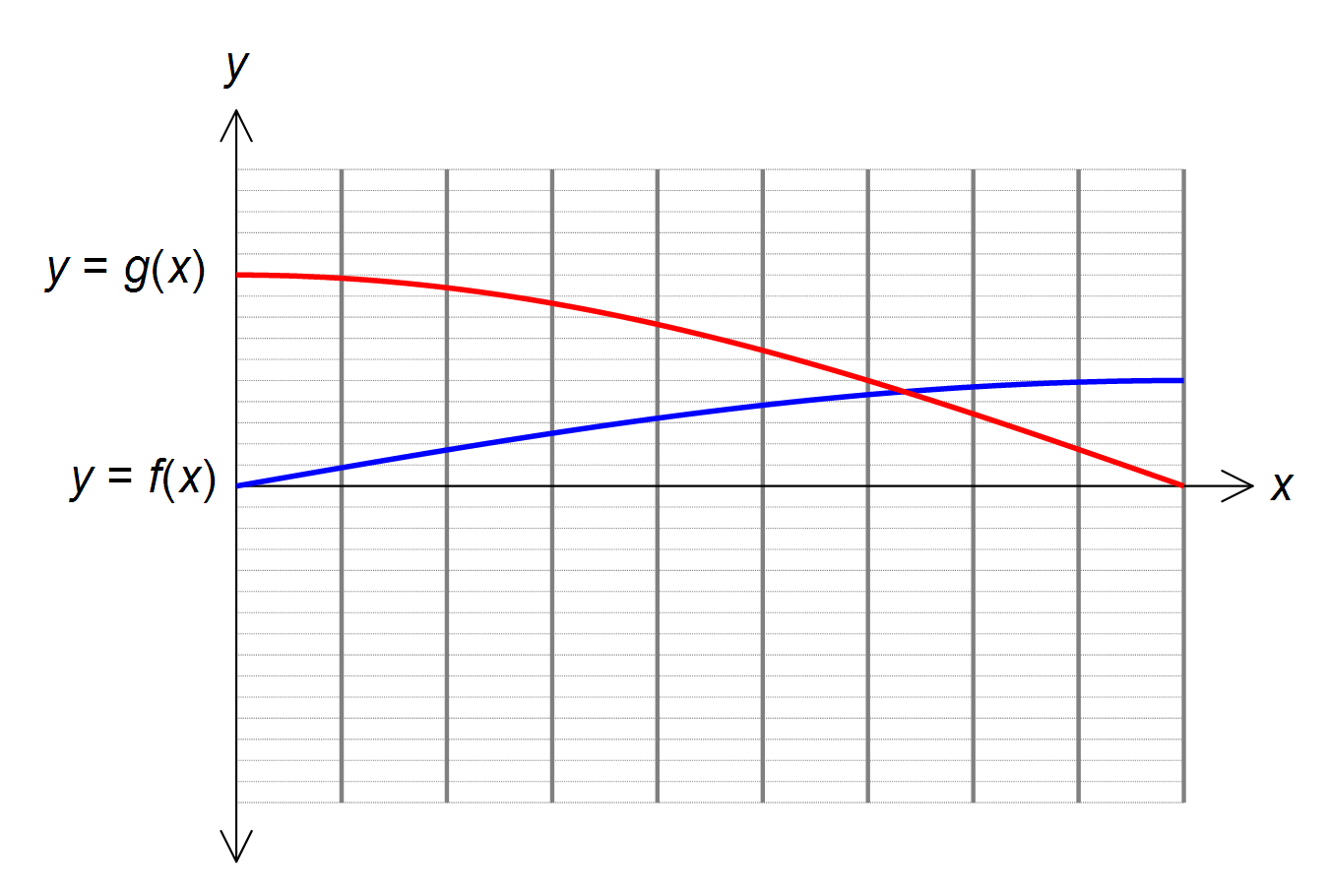
In all questions where a numerical answer is required an exact value must be given unless otherwise specified.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this test are **not** drawn to scale.

**Question 1**

The graphs of the functions and are shown below. Sketch the graph of on the same set of axes.



2 marks

**Question 2**

Dorothy Smart the trampolinist trains on a trampoline that is level with the ground and has a pit dug under it. Her height in metres (where 0 metres is level with the ground) as a function of time in seconds can be modelled by

,

1. Correct to one decimal place, what is her initial height?

1 mark

1. Correct to one decimal place, what is the maximum height Dorothy reaches and when does she first reach it?

2 marks

1. Dorothy needs to reach a height of 4 metres above the ground before she can successfully perform a somersault. Correct to one decimal place, when can she first perform a somersault?

1 mark

END OF PART 2