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### Semester One Examination, 2019

### Question/Answer booklet

# MATHEMATICS

**UNIT Methods 1 & 2**

## Section One:

## Calculator-free

**Name:**

**Teacher’s Name:**

## Time allowed for this section

Reading time before commencing work: five minutes

Working time: fifty minutes

## Materials required/recommended for this section

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

This Question/Answer booklet

Formula sheet

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

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: nil

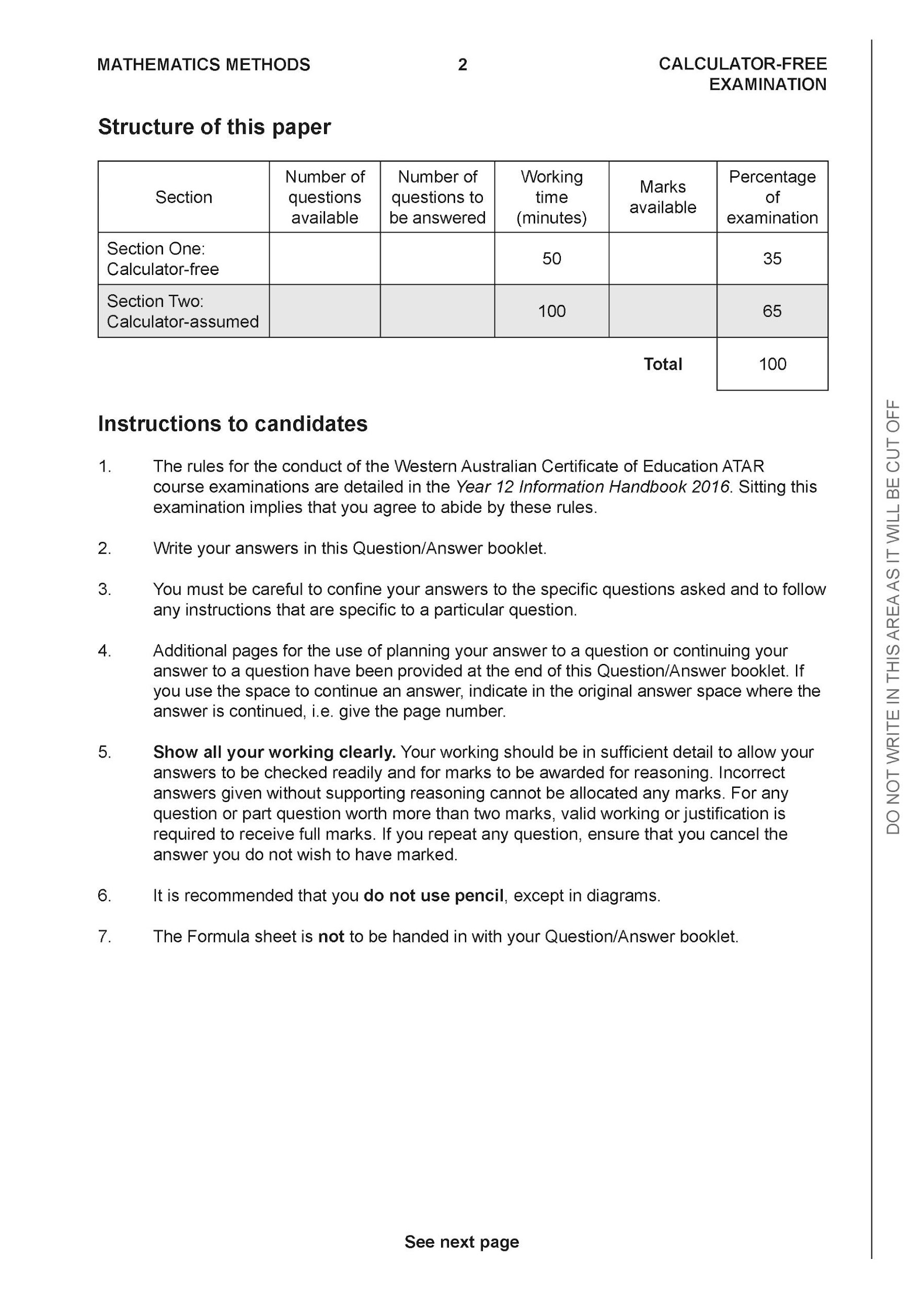
## Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

| **Question** | **Mark** | **Question** | **Mark** |
| --- | --- | --- | --- |
| **1** |  | **6** |  |
| **2** |  | **7** |  |
| **3** |  | **8** |  |
| **4** |  | **9** |  |
| **5** |  | **Total** | **/52** |

**Structure of this paper**

| Section | Number of questions available | Number of questions to be answered | Working time (minutes) | Marks available | Percentage of examination |
| --- | --- | --- | --- | --- | --- |
| Section One:  Calculator-free | 9 | 9 | 50 | **52** | 36 |
| Section Two:  Calculator-assumed | 14 | 14 | 100 | 92 | 64 |
|  |  |  |  | **Total** | 100 |



**Section One: Calculator-free (52 Marks)**

This section has **nine (9)** questions. Answer **all** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

● Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.

● Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Working time: 50 minutes.

**Question 1 (5 marks)**

Solve the following

(a) (1 mark)

(b) (2 marks)

(c) (2 marks)

**Question 2 (12 marks)**

Brodie and his sister Ryanne are out playing fetch with their Dog, on a straight slope. The three are spread out evenly with the Dog being directly (half-way) in between the Brodie and Ryanne.

When modelled on a cartesian plane, the Dog’s position can be considered as (7.5, 2.5) and Ryanne’s position can be considered as (10, 3).

(a) Determine the coordinates of Brodie. (2 marks)

(b) Determine the equation of the slope. (3 marks)

(c) Brodie is flying a kite. If the line of the kite is running perpendicular to the slope, determine the equation that models the line. (3 marks)

(d) Ryanne throws the ball away from the Dog and the path of the ball can be modelled by the following quadratic equation.

Determine the coordinates that the ball first lands on the slope. (4 marks)

**Question 3 (3 marks)**

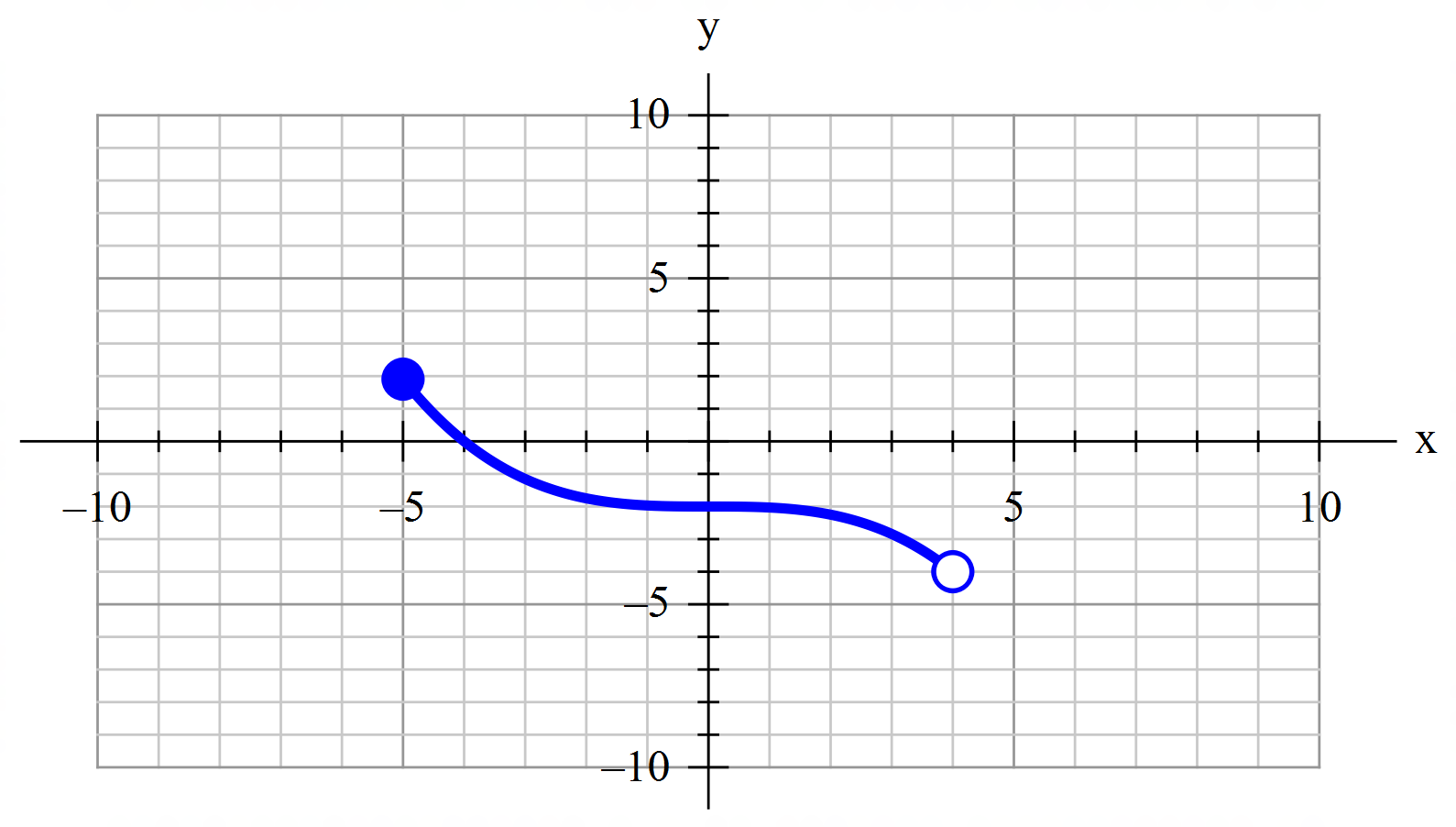
Find in terms of the remainder when is divided by

**Question 4 (3 marks)**

Points M(p,6) and N(1,-2) are the end points of line segment MN. If the midpoint of line is (-3, q). Determine the value of *p* and *q*.

**Question 5 (6 marks)**

The function is shown below.



(a) State the range of . (1 mark)

(b) Another function is given by .

(i) Describe the transformation required to produce from . (2 marks)

(ii) State the coordinate of the y-intercept under this transformation. (1 mark)

(c) On the same axes above, sketch the graph of . (2 marks)

**Question 6 (7 marks)**

Given the equation

(a) use a suitable substitution to rewrite the equation above as a quadratic equation,

(3 marks)

(b) hence, determine the solution(s) to the exponential equation. (4 marks)

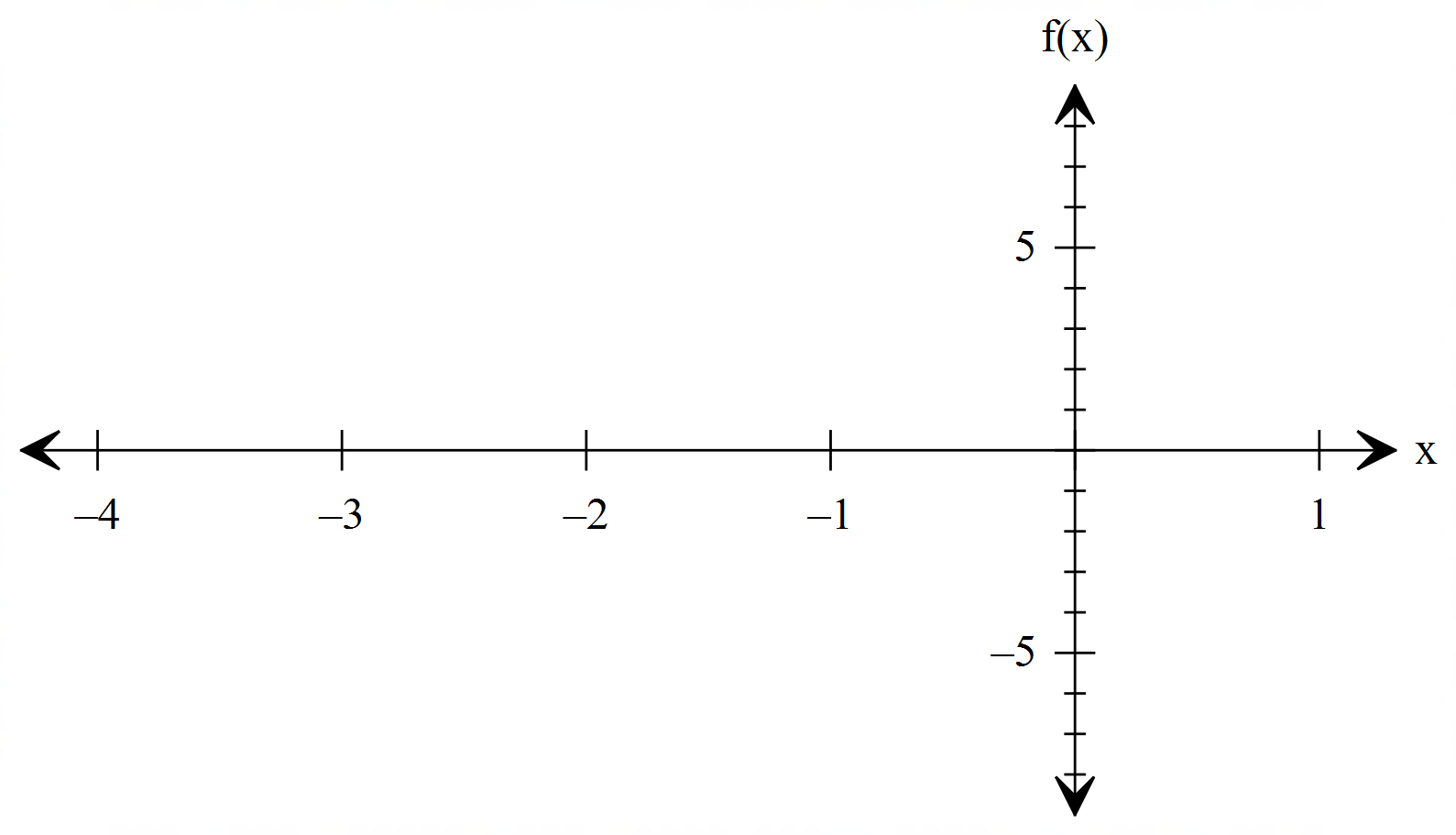
**Question 7 (6 marks)**

Given and

(a) Rewrite the function in factorised form, stating the value of (3 marks)

t

(b) Sketch the function on the given domain.(3 marks)



**Question 8 (6 marks)**

A relationship between and is given by .

(a) Determine when . (2 marks)

(b) State, with justification, whether is a function of . (2 marks)

(c) State, with justification, whether is proportional to . (2 marks)

**Question 9 (4 marks)**

The quantity of light, , given out by a lamp is proportional to the square of the current, , passing through the lamp. When , .

(a) Write an equation that relates and . (2 marks)

(b) Find the value of when . (1 mark)

(c) What happens to when is doubled. (1 mark)

**Additional working space**

Question number:

**Additional working space**

Question number: