

**Rossmoyne Senior High School**

Semester One Examination, 2014  
Question/Answer Booklet

**MATHEMATICS 3C**  
Section One:  
Calculator-free

**SOLUTIONS**

Student Number: In figures

<input type="text"/>				
----------------------	----------------------	----------------------	----------------------	----------------------

In words \_\_\_\_\_

Your name \_\_\_\_\_

**Time allowed for this section**

Reading time before commencing work: five minutes

Working time for this section: 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, pencils, pencil sharpener, eraser, correction fluid/tape, ruler, highlighters

Special items: nil

**Important note to candidates**

No other items may be used in this section of the examination. It is **your responsibility** to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor before reading any further.

This examination paper may be freely copied, or communicated on an intranet, for non-commercial purposes within educational institutes that have purchased the paper from WA Examination Papers provided that WA Examination Papers is acknowledged as the copyright owner. Teachers within Rossmoyne Senior High School may change the paper provided that WA Examination Paper's moral rights are not infringed.

Copying or communication for any other purposes can only be done within the terms of the Copyright Act or with prior written permission of WA Examination papers.

Published by WA Examination Papers  
PO Box 445 Claremont WA 6910

**Structure of this paper**

Section	Number of questions available	Number of questions to be answered	Working time (minutes)	Marks available	Percentage of exam
Section One: Calculator-free	7	7	50	50	33½%
Section Two: Calculator-assumed	12	12	100	100	66%
<b>Total</b>			<b>150</b>	<b>100</b>	

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

This section has seven (7) questions. Answer all questions. Write your answers in the spaces provided.

Working time for this section is 50 minutes.

## Question 1

(5 marks)

Express  $\frac{x+5}{x+1} - \frac{4-x}{x}$  as a single algebraic fraction, with both the numerator and denominator factorised as far as possible.

$$\begin{aligned} & \frac{x(x+5) - (x+1)(4-x)}{x(x+1)} \\ &= \frac{x^2 + 5x - (4x + x^2 + 4 - x)}{x(x+1)} \\ &= \frac{2x^2 + 2x - 4}{x(x+1)} \\ &= \frac{2(x^2 + x + 2)}{x(x+1)} \\ &= \frac{2(x+2)(x+1)}{x(x+1)} \end{aligned}$$

See next page

See next page

$$\begin{aligned} & 16 \\ & ((1+x)^2)^2 = \\ & x^2(1+x)^4 = x^2 \left(\int_0^x 1 \right)^4 = \int_0^x x^2 \left(\int_0^x 1 \right)^3 dx \end{aligned}$$

(iii)

$$\begin{aligned} & 0 = \\ & (2x^2 + ((1-x)^2 - 4)) \int_0^1 x^2 dx = x^3 \int_0^1 (1-x)^2 dx \end{aligned}$$

(iv)

$$\begin{aligned} & 0 = \\ & \int_0^1 f(x) dx \end{aligned}$$

(v)

(2 marks)

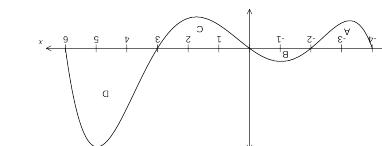
(2 marks)

(2 marks)

(a) Determine the area enclosed between the graph of  $y = f(x)$  and the  $x$ -axis, from  $x = 1$  to  $x = 6$ .

Region	A	B	C	D	E
Area of region	5	3	11	25	

The area of each region enclosed by the curve and the  $x$ -axis is shown in the following table.



The graph of the function  $y = f(x)$  is shown below for  $-4 \leq x \leq 6$ .

Determine the values of  $a$ ,  $b$  and  $c$ .

$$\begin{aligned} & a = c \\ & b = q \\ & 1 = a \\ & \int_a^b x^2 + 10(x^2)dx = \int_a^b x^2 + 10x^2 dx = \int_a^b x^2(1+10)dx = \\ & \int_a^b x^2(11)dx = 11 \int_a^b x^2 dx = 11 \left[ \frac{x^3}{3} \right]_a^b = 11 \left[ \frac{b^3}{3} - \frac{a^3}{3} \right] = 11 \left[ \frac{q^3}{3} - \frac{(-a)^3}{3} \right] = 11 \left[ \frac{q^3}{3} + \frac{a^3}{3} \right] = 11 \left[ \frac{q^3 + a^3}{3} \right] = 11 \left[ (q+a)(q^2 - qa + a^2) \right] = \\ & 11(q+a)(q^2 - qa + a^2) = 11(q+a)(q-a)^2 = 11(q+a)(q-a)(q-a) = 11(q-a)^3 = 11(1-1)^3 = 11(0)^3 = 11(0) = 0 \end{aligned}$$

$\frac{d}{dx}(a^2(1+x^2)^3)$  can be written in the form  $a(bx+c)^2(1+x^2)^3$ .

See next page

