ROSSMOYNE SHS   SEMESTER 1, 2009

UNIT 2C MATHEMATICS EXAMINATION

SECTION A   NON-CALCULATOR SECTION

STUDENT'S NAME   _____

TEACHER:-
(Circle one name)   KNOBLAUCH   LONGLEY   SUTTON   TAY

TIME ALLOWED FOR THIS PAPER
Reading time before commencing Section A   **Five minutes**
Working time for Section A (non calculator) **Forty minutes**
Changeover time between Sections A and B   Five minutes
Reading time before commencing Section B   Five minutes
Working time for Section B   Eighty minutes

Available marks for Section A: 40 marks
Available marks for Section B: 80 marks

MATERIAL REQUIRED / RECOMMENDED FOR THIS PAPER
TO BE PROVIDED BY THE SCHOOL:
   This Question/Answer booklet
TO BE PROVIDED BY THE CANDIDATE
   Standard Items   Pens, pencils, eraser, ruler
Special items Curriculum Council Mathematical Formulae and Statistics Tables Book, drawing instruments, templates, notes on two sheets (4 sides) of A4 paper and calculators (Section B only) satisfying the conditions set by the Curriculum Council.

   NOTE: Personal copies of the Tables Book should not contain any handwritten notes, symbols, signs, formulae or any other marks (including underlining and highlighting), except the name and address of the candidate, and may be inspected during the examination.

IMPORTANT NOTE TO CANDIDATES

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SECTION A
NO CALCULATORS PERMITTED FOR THIS SECTION
TIME   40 minutes
AVAILABLE MARKS   40 marks

Question 1.   [6 marks]

Round each as required

a) Express 8 760 000 in scientific notation

[1]

$$8.76 \times 10^6 \quad \checkmark$$

b) Use division to find whether or not the decimal equivalent of $\frac{4}{7}$ terminates or recurs

[1]

$$7 \overline{\smash)4.0000}$$
$$0.5714257$$

$$\frac{4}{7} = 0.\overline{57142} \quad \checkmark$$
must show division
recurs

c) Round each as required

i.   35.82 to 1 decimal place $\underline{35.9 \quad \checkmark}$ [1]

ii.   8.764 to two significant figures $\underline{8.8 \quad \checkmark}$ [1]

d) Evaluate, giving your answer in scientific form

i. $52\,000\,000 \div 2\,000$ $\underline{2.6 \times 10^4 \quad \checkmark}$ [1]

ii. $925\,000 \times 500\,000$ $\underline{4.625 \times 10^{11} \quad \checkmark}$ [1]

Question 2.   [4 marks]

Fill in the missing numbers in the tables below and determine whether linear, quadratic or neither (Give reasons)

x	1	2	3	4	5	6	7	8	9	10
y	15	19	19	15	7	-5	-21	−41	−65	−93

4   0   −4   −8   −12   −18

−4   −4   −4

[2]

quadratic

2nd difference is constant ✓

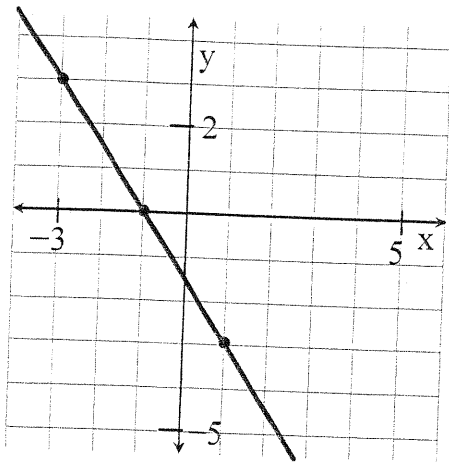| x	1	2	3	4	5	6	7	8	9
y	7	2	-3	-8	-13	-18	−23	−28	−33

−5   −5   −5   −5   −5

[2]

linear

1st difference is constant ✓

NOTE   MUST SHOW DIFFERENCES

Question 3.   [8 marks]

For each of the lines shown below, write down (where possible)

a)   the coordinates of where the graph crosses the x-axis

$$(-1, 0)$$ ✓

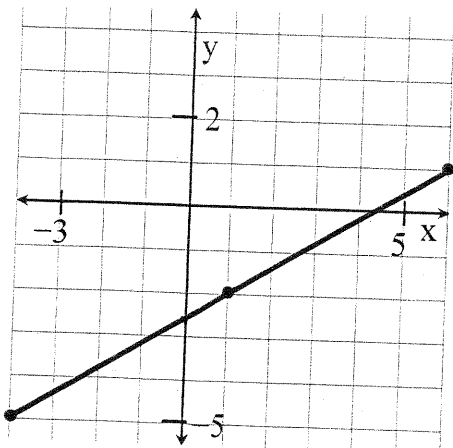(b)   the coordinates of where the graph crosses the y-axis

$$(0, -1.5)$$ ✓

(c)   the gradient of the line

$$-1.5$$ ✓

(d)   the equation of the line

$$y = -1.5x - 1.5$$ ✓

allow f/t   [4]

a)   the coordinates of where the graph crosses the x-axis

$$(4.\overline{3}, 0)$$ ✓

(b)   the coordinates of where the graph crosses the y-axis

$$(0, -2.6)$$ ✓

(c)   the gradient of the line

$$\tfrac{3}{5}, = 0.6$$ ✓

(d)   the equation of the line

$$y = 0.6x - 2.6$$ ✓

allow f/t   [4]

Question 4. [6 marks]

Solve algebraically, showing your working

a) $(2x-3)(x-3)=0$

[2]

$$2x - 3 = 0 \quad \text{or} \quad x - 3 = 0$$
$$x = 1.5 \quad \text{or} \quad x = 3 \checkmark\checkmark$$

R/w

b) $x^2 - 7x + 12 = 0$

[2]

$$(x - 4)(x - 3) = 0 \quad \checkmark$$
$$x = 4 \text{ or } 3 \checkmark$$

c) $x^2 = 30 - x$
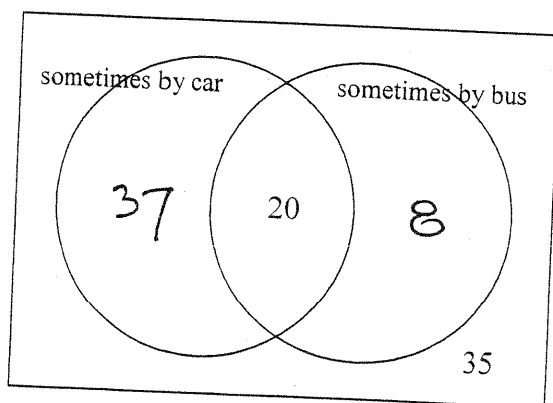
[2]

$$x^2 + x - 30 = 0$$
$$(x + 6)(x - 5) = 0 \quad \checkmark$$
$$x = -6 \text{ or } 5 \checkmark$$

Question 5. [4 marks]

In a survey concerning modes of transportation, interviewees were asked whether they went to work by car or whether they used public transport. The numbers responding in various ways to the questions are shown in the appropriate sections in the Venn diagram and in the table below. Complete **both** the Venn diagram and the table.

sometimes by car   sometimes by bus

37   20   8

35

		sometimes by car		
		YES	NO	TOTAL
some-times by bus	YES	20	8	28
	NO	37	35	72
	TOTAL	57	43	100

[4]

Question 6. [4 marks]

The universal set, U and the two sets, A and B contained within it are such that :

$|A \cap B| = 8$ $|A| = 25$ $|B| = 30$ $|\bar{B}| = 40$

Find

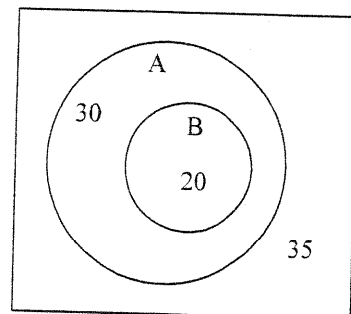a) $|U|$

70 ✓ [1]

b) $|\bar{A}|$

45 ✓ [1]

c) $|A \cup B|$

23 ✓ [1]

d) $|A \cap \bar{B}|$

17 ✓ [1]

Question 7. [4 marks]

Using the information in the accompanying Venn diagram, determine the following

a) $P(A)$

$\dfrac{50}{85}$ ✓ [1]

b) $P(A \cup B)$

$\dfrac{50}{85}$ ✓ [1]

c) $P(A \cap \bar{B})$
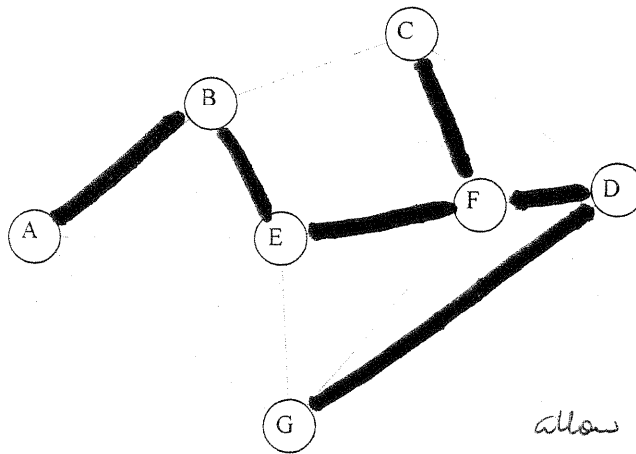
$\dfrac{30}{85}$ ✓ [1]

d) $P(A \mid B)$

1 ✓ [1]

Question 8.   [4 marks]

Use Prim's algorithm to determine the minimum spanning tree for the network described in the following table and use your results to show the tree in the network below

	A	B	C	D	E	F	G
A		20			25		30
B	(20)		30		15		
C		30		15		(15)	
D					(10)	20	
E	25	(15)				15	40
F			15	10	(15)		
G	30			(20)	40		

evidence
of method

[2]

allow f/t
from table

[2]

the

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SECTION B   APPROVED CALCULATORS PERMITTED

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