SYDNEY BOYS HIGH SCHOOL

YEAR 7 MATHEMATICS

Half Yearly Examination: May 2010

Time Allowed: 60 minutes

Examiner: Mr R Dowdell

INSTRUCTIONS:

- All questions may be attempted.
- Marks may be deducted for careless or badly arranged work.
- All working and answers are to be written in this test booklet.
- If you wish to rewrite an answer, draw a line through your faulty answer. If necessary, rewrite your answer on the back page of this booklet. Show the section, number and part of the answer being rewritten.
- **Calculators may not be used.**

Name: _____

Class	
7E Mr Gainford	
7F Mr Elliott	
7M Mr Boros	
7R Mr Choy	
7S Ms Roessler	
7T Mr Choy	

Section A	/ 20
Section B	/ 20
Section C	/ 20
Section D	/ 20
Section E	/ 20
Total	/100

Section A
(20 marks)

1	$3+2\times5$	
2	-3^2	
3	$(-4)^2$	
4	$16\div2\times8$	
5	$3+5-4+1$	
6	$-3--4$	
7	$7-3\times-2$	
8	$-8\div4+2$	
9	$7-8\div-2$	
10	$3-2(5-7)$	
11	$-5-8$	
12	$-2\times(-4)$	
13	$16\div(-2)$	
14	$5-3\times4$	
15	$5+9\times3-12\div3$	
16	Insert grouping symbols to make the statement true.	$16 - 3 \times 2 + 4 = 30$
17	Plot the following values on a number line: 5, -3, 0, 2 (2 marks)	

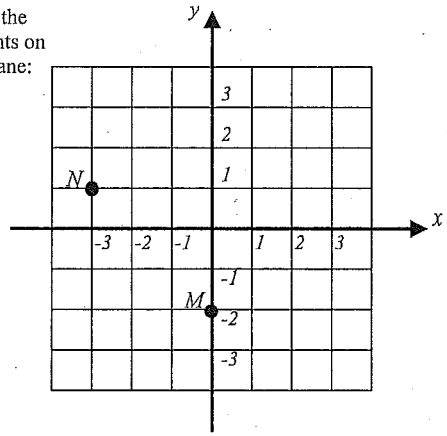
18	Insert grouping symbols and mathematical operators ($^{+}$, $^{-}$, $\times$, $\div$) to make the following expression equal to 12.	4 4 4 4
19	The digits of the number 3197 are arranged in descending order and then ascending order. Find the difference between the resulting two numbers.	

END OF SECTION A

Section B
(20 marks)

1 Plot and label the following points on the number plane:

A (2, 4)
B (-2, -1)
C (0, -3)
D (3,-2)



Write down the coordinates of

M (,)

N (,)

2 Write in simplest form

(a)	$m+m+m+m+m$	
(b)	$m+n+m+n+m$	
(c)	$b\times b\times c\times c\times c\times c$	
(d)	$7-x\times y$	
(e)	$4\times x\times 5\times y$	
(f)	$b\div(c\times d)$	
(g)	$a\times b\div c$	
(h)	$a\div b\times c$	
(i)	$2x+3y-5x$	
(j)	$3xy+4xy$	

3	Write $2\times100+3\times10+5$ in simplest form.	
4	Write down the basic numeral for $5\times10^4+7\times10^3+2\times10+5$	
5	Write 4,387 in expanded form.	
6	What is the value of the 6 in 23,614?	

END OF SECTION B

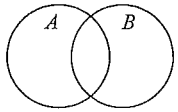
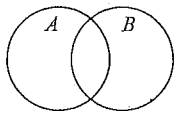
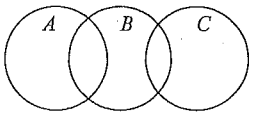
Section C
(20 marks)

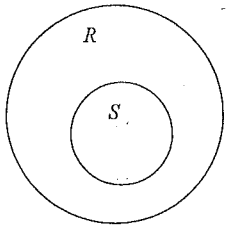
1	Write  in Hindu-Arabic numerals	
2	Write 123 as an Egyptian numeral.	
3	Write 1892 as a Roman numeral	
4	Write 5 000 in briefest Roman numeral form	
5	Write in Hindu-Arabic numerals: (a) LIV	
	(b) DLV	
	(c) CMXCIX	
6	Write in Roman numerals: (a) XLIV + XXIX	
	(b) MCX ÷ X	
7	Write 10101_2 as a base ten numeral. (2 marks)	
8	Convert 45 to a base two numeral. (2 marks)	
9	Write $111_2 + 101_2$ as a base 2 numeral. (2 marks)	
10	Write $111_2 \times 101_2$ as a base 10 numeral. (2 marks)	

11	Write 108,425 in words.	
12	Write as a simple numeral: twenty seven thousand five hundred and seven.	
13	What number is 7 less than 5?	

END OF SECTION C

Section D
(20 marks)

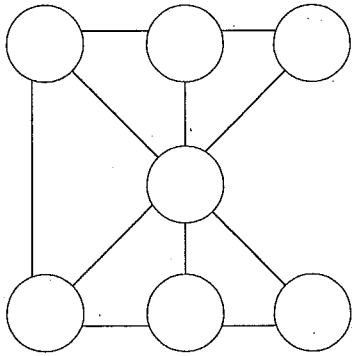
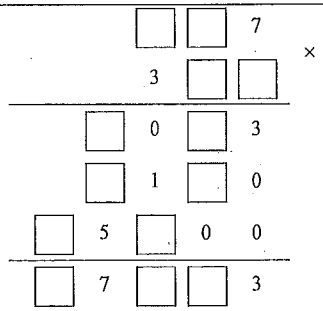
1	What is the average of 5, 12 and 15?	
2	Find the average of 5, -7, 11, 15	
3	The average of two numbers is 7. One of the numbers is 11. What is the other number?	
4	Two numbers multiply to give 24. When they are subtracted, the result is 10. What are the two numbers?	
5	If A = {a, b, c, d, e} and B = {a, e, i, o, u}, write down:	
	(a) $A \cup B$	
	(b) $A \cap B$	
	(c) $n(A) + n(B)$	
6	List all subsets of {A, B, C}. (2 marks)	
7	Shade $A \cup B$	
8	Shade $A \cap B$	
9	Shade $(A \cap B) \cup C$	

10	If R is the set of all rectangles and S is the set of all squares, write a statement which describes the relationship between rectangles and squares shown by this Venn diagram.  	
11	Of 20 boys in a group, 1 plays football only, 5 play basketball only, 7 play tennis only. No boy plays all three games. 3 play football and basketball, 2 play football and tennis. Every boy participates in at least one sport. (4 marks) (a) How many play basketball and tennis?	
	(b) How many play tennis?	
12	Jason has 20 coins in his pocket. They are 10c, 20c and 50c coins and the total value of the coins is $5. If he has more 50c than 10c coins, how many 10c coins does he have? (3 marks)	

END OF SECTION D

Section E
(20 marks)

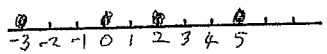
1	153 students entered a knockout chess competition. How many matches must be played to determine the two finalists?	
2	A certain substance doubles its volume every minute. At 9am a small amount is placed in a jar. At 10am the container just fills. At what time was the jar a quarter full?	
3	One electronic device makes a "bip" each 60 seconds. Another electronic device makes a "bip" each 63 seconds. They both "bip" at 9:00am. At what time will they next make a "bip" together?	
4	Adam, Bill and Chris decide to split a large packet of Smarties. Adam takes half of the packet and Bill takes a third of the packet. There are 25 Smarties left for Chris. How many smarties were in the packet originally? (2 marks)	
5	Ann, Wendy and Christopher each take two Vitamin C tablets each day, while Bill takes a single tablet each day. There are enough tablets in a full bottle to last exactly 18 days. How many days will a full bottle last if Bill also takes two tablets each day? (2 marks)	
6	If $\#_3^9 = 9+8+7$ and $\#_4^6 = 6+5+4+3$, find the value of $\#_5^{10}$ in simplest form (2 marks)	

7	The five tyres of a car (four road tyres and a spare) were used equally on a car that had travelled 60 000km. How many kilometres of use did each tyre have? (2 marks)	
8	Find the digits represented by A, P, R and T in the multiplication P A R T 4 × --- T R A P (3 marks)	
9	Using the numbers 1 through 7, place a different number in each circle in such a way that the numbers on all connecting lines add to 12. (2 marks)	
10	Write in the missing numbers in this multiplication problem. (4 marks)	

END OF PAPER

You may use this space to rewrite answers if necessary. Show the section, number and part of any answer rewritten.

Section A
(20 marks)

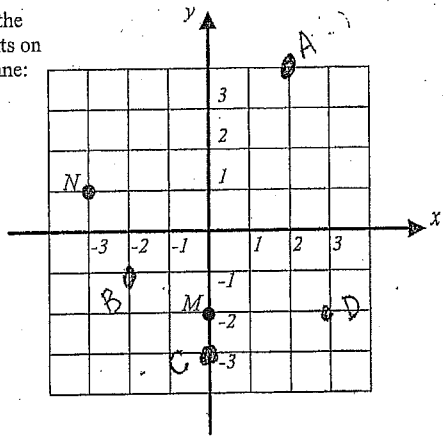
1	$3+2\times5$	13
2	-3^2	-9
3	$(-4)^2$	16
4	$16\div2\times8$	64
5	$3+5-4+1$	5
6	$-3--4$	1
7	$7-3\times-2$	13
8	$-8\div4+2$	0
9	$7-8\div-2$	11
10	$3-2(5-7)$	7
11	$-5-8$	-13
12	$-2\times(-4)$	8
13	$16\div(-2)$	-8
14	$5-3\times4$	-7
15	$5+9\times3-12\div3$	28
16	Insert grouping symbols to make the statement true.	$(16-3)\times 2+4=30$
17	Plot the following values on a number line: 5, -3, 0, 2 (2 marks)	

18	Insert grouping symbols and mathematical operators ($+, -, \times, \div$) to make the following expression equal to 12.	4 4 4 4 $4\times(4-4\div4)$
19	The digits of the number 3197 are arranged in descending order and then ascending order. Find the difference between the resulting two numbers.	8352

END OF SECTION A

Section B
(20 marks)

1 each

1	Plot and label the following points on the number plane: *A* (2, 4) *B* (-2, -1) *C* (0, -3) *D* (3,-2)  	Write down the coordinates of *M* (0 , -2) *N* (-3 , 1)
2	Write in simplest form	
	(a) $m+m+m+m+m$	$5m$
	(b) $m+n+m+n+m$	$3m+2n$
	(c) $b\times b\times c\times c\times c\times c$	b^2c^4
	(d) $7-x\times y$	$7-xy$
	(e) $4\times x\times 5\times y$	$20xy$
	(f) $b\div(c\times d)$	$\frac{b}{cd}$
	(g) $a\times b\div c$	$\frac{ab}{c}$
	(h) $a\div b\times c$	$\frac{a/c}{b}$
	(i) $2x+3y-5x$	$-3x+3y$ or $3y-3x$
	(j) $3xy+4xy$	$7xy$

3	Write $2\times100+3\times10+5$ in simplest form.	235
4	Write down the basic numeral for $5\times10^4+7\times10^3+2\times10+5$	57025
5	Write 4,387 in expanded form.	$4\times10^3+3\times10^2+8\times10+7\times1$
6	What is the value of the 6 in 23,614?	600

END OF SECTION B

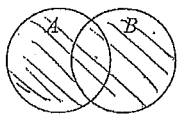
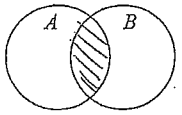
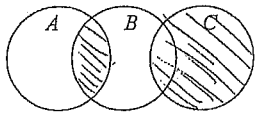
Section C
(20 marks)

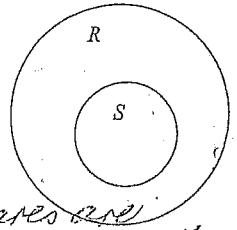
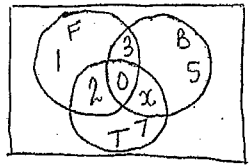
1	Write 𓍢𓎆𓎆𓏺 in Hindu-Arabic numerals	131
2	Write 123 as an Egyptian numeral.	𓍢𓎆𓎆𓏺𓏺𓏺
3	Write 1892 as a Roman numeral	MDCCCXCII
4	Write 5 000 in briefest Roman numeral form	$\overline{V}$
5	Write in Hindu-Arabic numerals: (a) LIV	54
	(b) DLV	555
	(c) CMXCIX	999
6	Write in Roman numerals: (a) XLIV + XXIX	LXVIII
	(b) MCX ÷ X	CXI
7	Write 10101_2 as a base ten numeral. (2 marks)	21
8	Convert 45 to a base two numeral. (2 marks)	101101
9	Write $111_2 + 101_2$ as a base 2 numeral. (2 marks)	1100
10	Write $111_2 \times 101_2$ as a base 10 numeral. (2 marks)	35

11	Write 108,425 in words.	One hundred & eight thousand four hundred & twenty five
12	Write as a simple numeral: twenty seven thousand five hundred and seven.	27507
13	What number is 7 less than 5?	−2

END OF SECTION C

Section D
(20 marks)

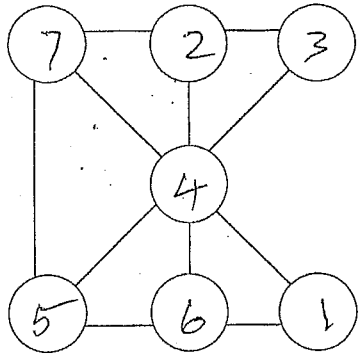
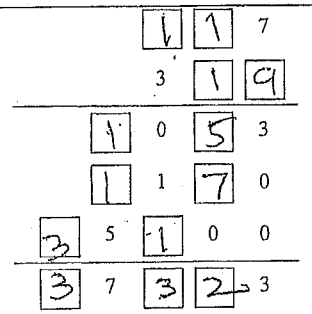
1	What is the average of 5, 12 and 15?	$\frac{5+12+15}{3} = \frac{32}{3} = 10.6 = 10\frac{2}{3}$ (1)
2	Find the average of 5, -7, 11, 15	$\frac{5-7+11+15}{4} = \frac{24}{4} = 6$ (1)
3	The average of two numbers is 7. One of the numbers is 11. What is the other number?	$\frac{n+11}{2} = 7$ $n+11=14$ number is 3 (1)
4	Two numbers multiply to give 24. When they are subtracted, the result is 10. What are the two numbers?	trial and error: $xy=24$ $x-y=10$ {12, 2} {-12, -2} (1)
5	If A = {a, b, c, d, e} and B = {a, e, i, o, u}, write down:	
	(a) $A \cup B$	{a, b, c, d, e, i, o, u} (1)
	(b) $A \cap B$	{a, e} (1)
	(c) $n(A)+n(B)$	5 + 5 = 10 (1)
6	List all subsets of {A, B, C}. (2 marks)	{A} {B} {C} {AB} {AC} {BC} {ABC} ϕ (2)
7	Shade $A \cup B$	 (1)
8	Shade $A \cap B$	 (1)
9	Shade $(A \cap B) \cup C$	 (1)

10	If R is the set of all rectangles and S is the set of all squares, write a statement which describes the relationship between rectangles and squares shown by this Venn diagram. 	Similar properties that squares and also rectangles have eg 4 sides 4 right angles opposite sides parallel angle sum quad. Squares are a subset of the set of rectangles (1) OR// All squares are rectangles but not all rectangles are squares
11	Of 20 boys in a group, 1 plays football only, 5 play basketball only, 7 play tennis only. No boy plays all three games. 3 play football and basketball, 2 play football and tennis. Every boy participates in at least one sport. (4 marks)	
	(a) How many play basketball and tennis?	2 (3)
	(b) How many play tennis?	11 (1)
12	Jason has 20 coins in his pocket. They are 10c, 20c and 50c coins and the total value of the coins is $5. If he has more 50c than 10c coins, how many 10c coins does he have? (3 marks)	2 10¢ coins (3)

END OF SECTION D

Section E
(20 marks)

1	153 students entered a knockout chess competition. How many matches must be played to determine the two finalists?	151 1
2	A certain substance doubles its volume every minute. At 9am a small amount is placed in a jar. At 10am the container just fills. At what time was the jar a quarter full?	9:58 1
3	One electronic device makes a "bip" each 60 seconds. Another electronic device makes a "bip" each 63 seconds. They both "bip" at 9:00am. At what time will they next make a "bip" together?	9:21 am 1
4	Adam, Bill and Chris decide to split a large packet of Smarties. Adam takes half of the packet and Bill takes a third of the packet. There are 25 Smarties left for Chris. How many smarties were in the packet originally? (2 marks)	$25 = \frac{1}{6}n$ $n = 150$ 2
5	Ann, Wendy and Christopher each take two Vitamin C tablets each day, while Bill takes a single tablet each day. There are enough tablets in a full bottle to last exactly 18 days. How many days will a full bottle last if Bill also takes two tablets each day? (2 marks)	No. of Tablets = 7 x 18 = 126 8 tabs a day → 126 ÷ 8 2 $15\frac{3}{4}$ or (15) whole days
6	If $\#^{9}_{3} = 9 + 8 + 7$ and $\#^{6}_{4} = 6+5+4+3$ find the value of $\#^{10}_{5}$ in simplest form (2 marks)	$\#^{10}_{5} = 10+9+8+7+6$ $= 40$ 2

7	The five tyres of a car (four road tyres and a spare) were used equally on a car that had travelled 60 000km. How many kilometres of use did each tyre have? (2 marks)	$60000 \times \frac{4}{5} =$ 48000 2
8	Find the digits represented by A, P, R and T in the multiplication PART 4 × TRAP (3 marks)	A=1 P=2 R=7 T=8 2178 ×4 8712 3
9	Using the numbers 1 through 7, place a different number in each circle in such a way that the numbers on all connecting lines add to 12. (2 marks)	 2
10	Write in the missing numbers in this multiplication problem. (4 marks)	 4

END OF PAPER