SYDNEY TECHNICAL HIGH SCHOOL

(Established 1911)

YEAR 7
MAY COMMON TEST
2015

Mathematics

General Instuctions

- Working time - 65 minutes
- Write using black or blue pen
- Calculators may not be used

Total marks - 75

- Attempt Questions 1 – 5
- All questions are of equal value

Name :_____

Teacher :_____

Question 1	Question 2	Question 3	Question 4	Question 5	**Total**

Section 1 : Number (15 marks – 1 each)

1. Evaluate $8 + 18 + 28$.	7. Evaluate $\sqrt{16 + 9}$.
2. Find the product of 23 and 9.	8. Write $5 \times 10^4 + 3 \times 10^3 + 6 \times 10 + 8$ as a simple numeral.
3. Find the difference between 682 and 146.	9. Evaluate $12 + 3 \times 4$.
4. Evaluate $2024 \div 8$.	10. Write down a numeral that will replace the square to make the number sentence true. $176 + \square = 423$.
5. Evaluate $2 \times 73 \times 5$.	11. A street of houses numbered from 1 to 100 inclusive is to be numbered with new brass numerals. How many of the digit "2" would be needed to complete the job ?
6. Write in words the value of the 6 in the number 56382.	12. What is the mathematical symbol for "approximately equal to" ?

13. What numeral should replace the square ? $83 \times 13 + 17 \times 13 = \square \times 13$	15. Evaluate $693 \div 16$
14. Evaluate $\sqrt[3]{125}$.	

Section 2 : Number Theory (15 marks - 1 mark each)

1. List the factors of 16.	4. Write down the next palindromic number after 13431.
2. What is the next odd number after 8012 ?	5. Find the sum of the first 5 even counting numbers.
3. Write down the first 4 square numbers.	6. Write down the first 4 triangular numbers.

7. Express 8 as a product of prime factors.	12. Write down the prime numbers between 30 and 40.
8. Write down the first 4 multiples of 6.	13. Find the lowest common multiple of 5 and 4.
9. Write down the multiples of 7 between 90 and 100.	14. Which of the following are divisible by both 3 and 4 ? **516 , 3414 , 3732 , 27820**
10. Find the highest common factor of 18 and 12.	15. The first 4 Fibonacci numbers are 1 , 1 , 2 , 3. Find the 7^{th} Fibonacci number.
11. Evaluate $\sqrt{3 \times 3 \times 7 \times 7}$.	

Section 3 : Introductory Algebra (15 marks)

1. Fill in the next 2 numbers in the patterns below.

a) **3 , 5 , 8 , 12 , __ , __**

b) **64 , 16 , 4 , __ , __**

2. Given the rule $y = 12 - x$, find the value of y if $x = 7$.

3. Given the rule $b = a^2 - 10$, find the value of b if $a = 6$.

4. Given the rule $h = 2 \times g + 4$ complete the Table below. (1 mark each answer)

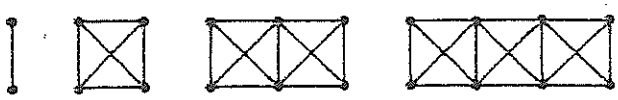
g	3	
h		20

5. Write the rule that connects m and n.

m	1	2	3	4
n	6	8	10	12

$n =$ _____

6. Look at the pattern of dots and triangles.



a) Complete the table for the above pattern

Dots	2	4	6	8
Small Triangles	0	4		

b) How many small triangles would there be with 12 dots ?

c) How many small triangles would there be with 200 dots ?

7. Write the rule that connects x and y.

x	1	2	3	4
y	0	3	8	15

$y =$ _____

8. Given the rule $w = (d - 3) \times (d - 2)$ find the value of w if $d = 10$.

9. Write the rule that connects a and b.

a	1	2	3	4
b	17	14	11	8

$b =$ _____

10. Fill in the next number in the sequence

a) 2 , 5 , 14 , 41 , ____

b) 1 , 2 , 4 , 7 , 12 , 20 , 33 , ____

Section 4 : More Number Theory (15 marks – 1 each)

1. Write down all the factors of 36.

2. Express 9 as the sum of two prime numbers.

3. Find the highest common factor of 75 and 30.

4. How many numbers between 10 and 100 have 7 as the smallest prime factor ?

5. Find the lowest common multiple of 6 and 15.

6. True or False :
The difference between 2 odd numbers is even.

7. True of False :
The product of 2 prime numbers is prime.

8. Evaluate
$\sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$

9. Find the highest common factor of 27 and 45.

10. Find the lowest common multiple of 8, 12 and 15.

11. Given $2100 = 2 \times 2 \times 3 \times 5 \times 5 \times 7$ and $990 = 2 \times 3 \times 3 \times 5 \times 11$

Find

a) The highest common factor of 2100 and 990.

b) The lowest common multiple of 2100 and 990. (You may leave your answer in index form)

12. A 4 digit number was written on a piece of paper. Kevin spilled ink on it and now the last 2 digits are no longer visible, as shown below:

86??

If this 4 digit number is divisible by three, four and five find the 4 digit number.

13. Which numbers between 1 and 100 have exactly 3 factors ?

14. Use a factor tree to express 126 as a product of prime factors.

126

Section 5 : Even More Number Questions (15 marks – 1 each)

1. Evaluate 2^5.	6. Evaluate $4 \times (17 + 3)$.
2. If 9 people share \$72,630, how much do they each receive ?	7. A sequence is formed by adding the two previous numbers together. Fill in the missing two numbers in this sequence. **4 , ____ , ____ , 22**
3. Given that $12 \times 1257 = 15084$, Evaluate 120×12570.	8. Find 2 numbers whose product is 60 and whose sum is 19.
4. Evaluate $8 + 6 - 4 + 3$.	9. Two of the operations $+, -, \times, \div$ have been left out of this number sentence. $8 \square 6 \square 3 = 6$ Insert an operation in each square to make the sentence true.
5. Evaluate $5 \times 6 + 3 \times 4$.	10. Place whole numbers less than 10 in the triangle and square to make the following statement true. $\frac{\triangle}{3 \times \square} > 2$

11. Evaluate $8 \times 10 \div 2 \times 5$.	14. Evaluate $4 \times (5 \times (8 - 2) + 6)$.
12. Evaluate $2 \times 14 - 12 \div 2$.	15. Insert $+, -, \times, \div$ or grouping symbols into the number sentence below to make a true statement. 4 6 3 5 = 7
13. Evaluate $7 + 7 \div 7 + 7 \times 7 - 7$.	

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Mathematics

General Instuctions

- Working time - 65 minutes
- Write using black or blue pen
- Calculators may not be used

Total marks - 75

- Attempt Questions 1 – 5
- All questions are of equal value

Name : Solutions

Teacher : _____

Question 1	Question 2	Question 3	Question 4	Question 5	**Total**

Section 1 : Number (15 marks – 1 each)

1. Evaluate $8 + 18 + 28$.

54

2. Find the product of 23 and 9.

207

3. Find the difference between 682 and 146.

536

4. Evaluate $2024 \div 8$.

253

5. Evaluate $2 \times 73 \times 5$.

730

6. Write in words the value of the 6 in the number 56382.

SIX THOUSAND

7. Evaluate $\sqrt{16 + 9}$.

5

8. Write $5 \times 10^4 + 3 \times 10^3 + 6 \times 10 + 8$ as a simple numeral.

53068

9. Evaluate $12 + 3 \times 4$.

24

10. Write down a numeral that will replace the square to make the number sentence true.

$176 + \square = 423$.

247

11. A street of houses numbered from 1 to 100 inclusive is to be numbered with new brass numerals. How many of the digit "2" would be needed to complete the job ?

20

12. What is the mathematical symbol for "approximately equal to" ?

$\approx$ or $\doteq$

13. What numeral should replace the square ?	15. Evaluate $693 \div 16$
$83 \times 13 + 17 \times 13 = \square \times 13$ 100	$43\frac{5}{16}$
14. Evaluate $\sqrt[3]{125}$. 5	

Section 2 : Number Theory (15 marks - 1 mark each)

1. List the factors of 16.	4. Write down the next palindromic number after 13431.
1, 2, 4, 8, 16	13531
2. What is the next odd number after 8012 ?	5. Find the sum of the first 5 even counting numbers.
8013	30
3. Write down the first 4 square numbers.	6. Write down the first 4 triangular numbers.
1, 4, 9, 16	1, 3, 6, 10

7. Express 8 as a product of prime factors. $2 \times 2 \times 2$ or 2^3	12. Write down the prime numbers between 30 and 40. 31, 37
8. Write down the first 4 multiples of 6. 6, 12, 18, 24	13. Find the lowest common multiple of 5 and 4. 20
9. Write down the multiples of 7 between 90 and 100. 91, 98	14. Which of the following are divisible by both 3 and 4 ? **516 , 3414 , 3732 , 27820** 516, 3732
10. Find the highest common factor of 18 and 12. 6	15. The first 4 Fibonacci numbers are 1 , 1 , 2 , 3. Find the 7th Fibonacci number. 13
11. Evaluate $\sqrt{3 \times 3 \times 7 \times 7}$. 21	

Section 3 : Introductory Algebra (15 marks)

1. Fill in the next 2 numbers in the patterns below.

a) 3, 5, 8, 12, 17, 23

b) 64, 16, 4, 1, $\frac{1}{4}$

2. Given the rule $y = 12 - x$, find the value of y if $x = 7$.

$y = 5$

3. Given the rule $b = a^2 - 10$, find the value of b if $a = 6$.

$b = 26$

4. Given the rule $h = 2 \times g + 4$ complete the Table below. (1 mark each answer)

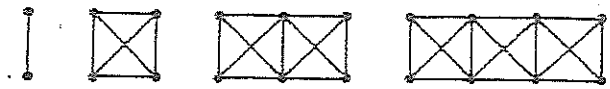
g	3	8
h	10	20

5. Write the rule that connects m and n.

m	1	2	3	4
n	6	8	10	12

$n = 2m + 4$

6. Look at the pattern of dots and triangles.



a) Complete the table for the above pattern

Dots	2	4	6	8
Small Triangles	0	4	8	12

b) How many small triangles would there be with 12 dots ?

20

c) How many small triangles would there be with 200 dots ?

396

7. Write the rule that connects x and y.

x	1	2	3	4
y	0	3	8	15

$y = x^2 - 1$

8. Given the rule $w = (d - 3) \times (d - 2)$ find the value of w if $d = 10$.

$w = 56$

9. Write the rule that connects a and b.

a	1	2	3	4
b	17	14	11	8

$b = 20 - 3a$

10. Fill in the next number in the sequence

a) $2, 5, 14, 41, \underline{122}$

b) $1, 2, 4, 7, 12, 20, 33, \underline{54}$

Section 4 : More Number Theory (15 marks – 1 each)

1. Write down all the factors of 36.

1, 2, 3, 4, 6, 9, 12, 18, 36

2. Express 9 as the sum of two prime numbers.

$9 = 2 + 7$

3. Find the highest common factor of 75 and 30.

15

4. How many numbers between 10 and 100 have 7 as the smallest prime factor ?

3

(49, 77, 91)

5. Find the lowest common multiple of 6 and 15.

30

6. True or False :
The difference between 2 odd numbers is even.

True

7. True of False :
The product of 2 prime numbers is prime.

False

8. Evaluate
$\sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$

$= 2 \times 3 \times 3$

$= 18$

9. Find the highest common factor of 27 and 45.

9

10. Find the lowest common multiple of 8, 12 and 15.

120

11. Given $2100 = 2 \times 2 \times 3 \times 5 \times 5 \times 7$ and $990 = 2 \times 3 \times 3 \times 5 \times 11$

Find

a) The highest common factor of 2100 and 990.

$2 \times 3 \times 5$

$= 30$

b) The lowest common multiple of 2100 and 990.

$2^2 \times 3^2 \times 5^2 \times 7 \times 11$

$= 69300$

12. A 4 digit number was written on a piece of paper. Kevin spilled ink on it and now the last 2 digits are no longer visible, as shown below:

86??

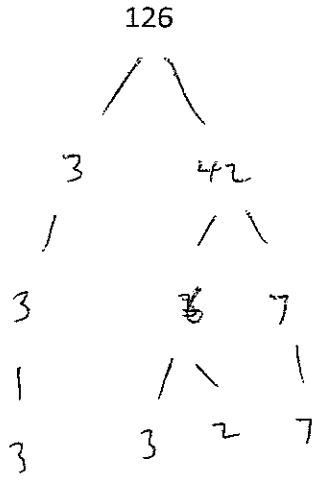
If this 4 digit number is divisible by three, four and five find the 4 digit number.

8640

13. Which numbers between 1 and 100 have exactly 3 factors ?

4, 9, 25, 49

14. Use a factor tree to express 126 as a product of prime factors.



$126 = 2 \times 3 \times 3 \times 7$

Section 5 : Even More Number Questions (15 marks – 1 each)

1. Evaluate 2^5.

32

2. If 9 people share $72,630, how much do they each receive ?

8070

3. Given that $12 \times 1257 = 15084$, Evaluate 120×12570.

1508400

4. Evaluate $8 + 6 - 4 + 3$.

13

5. Evaluate $5 \times 6 + 3 \times 4$.

42

6. Evaluate $4 \times (17 + 3)$.

80

7. A sequence is formed by adding the two previous numbers together. Fill in the missing two numbers in this sequence.

4 , 9 , 13 , 22

8. Find 2 numbers whose product is 60 and whose sum is 19.

4, 15

9. Two of the operations $+, -, \times, \div$ have been left out of this number sentence.

$8 \square 6 \square 3 = 6$

Insert an operation in each square to make the sentence true.

10. Place whole numbers less than 10 in the triangle and square to make the following statement true.

$\frac{\triangle}{3 \times \square} > 2$

$\triangle$ = 9 or 8 or 7

$\square$ = 1

11. Evaluate $8 \times 10 \div 2 \times 5$.

200

12. Evaluate $2 \times 14 - 12 \div 2$.

22

13. Evaluate $7 + 7 \div 7 + 7 \times 7 - 7$.

50

14. Evaluate $4 \times (5 \times (8 - 2) + 6)$.

144

15. Insert $+, -, \times, \div$ or grouping symbols into the number sentence below to make a true statement.

$4 \times (6 - 3) - 5 = 7$