Name: ..... Teacher: .....

SYDNEY TECHNICAL HIGH SCHOOL

(Est. 1911)

Year 7 Yearly

Mathematics

Examination

Time allowed: 70 mins

Instructions:

- Write your name and class at the top of this page.
- These questions must be answered in the space provided
- Attempt all questions.
- Calculators may **NOT** be used
- Use blue or black pen only

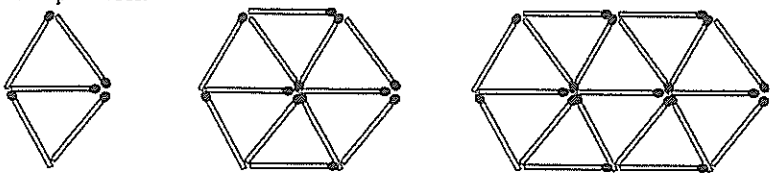
Topic	Section	Topic Total
Number	1	/15
Algebra and Directed Number	2	/15
Measurement	3	/15
Plane Shapes	4	/15
Miscellaneous	5	/15
	TOTAL	/75

NUMBER

1. Evaluate 0.07×0.2 .	**(1)**	
2. Write the next line in this pattern: $14 \times 9 + 114 = 240$ $13 \times 9 + 103 = 220$ $12 \times 9 + 92 = 200$	**(1)**	
3. Evaluate $(-8) - (-15)$	**(1)**	
4. What is the reciprocal of $7\frac{3}{4}$?	**(1)**	
5. Evaluate $8 \div 0.04$.	**(1)**	
6. Evaluate $2 + 8 \div 4 - 2$.	**(1)**	
7. Evaluate $3\frac{4}{5} \times 1\frac{1}{3}$.	**(2)**	
8. What is half way between $1\frac{2}{3}$ and $7\frac{1}{8}$.	**(2)**	
9. Evaluate $8 \div 1\frac{1}{4}$	**(2)**	
10. Evaluate $\sqrt{1.21}$	**(1)**	
12. Evaluate $\{24 - [18 \div (8 - 6)]\} \div 3$.	**(2)**	

ALGEBRA AND DIRECTED NUMBER

Questions 1 and 2 refer to the diagram below where matchsticks have been used to make the first 3 steps in a pattern.



Step 1 5 matches | *Step 2* 12 matches | *Step 3* 19 matches

1. How many matches would be needed to make step 6 of the pattern? **(1)**

2. Write a formula for N, the number of matches that would be needed to make step s of the pattern. **(2)**

3. Simplify the expression $2b - 3a + 5b$ **(1)**

4. Simplify: **(2)**

a) $a \times a \times a \times b \times b$

b) $2 \times (x - 1) \div (7 + 3)$

a)

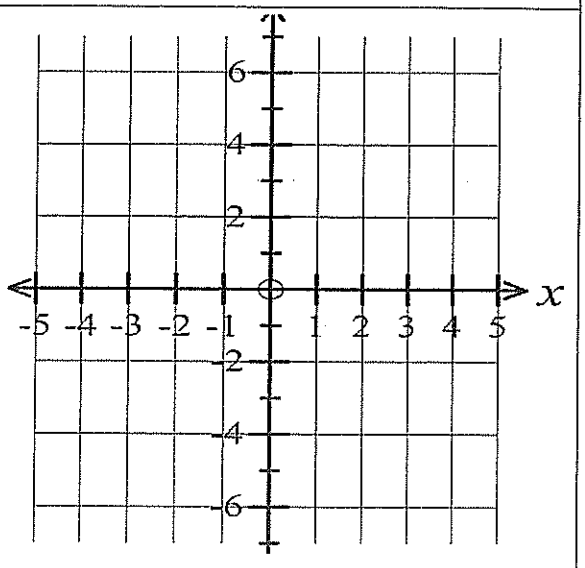
b)

5. Simplify the expression: **(2)**

$$3a \times 2a + 2a \times 3b + 3ab - 2a^2$$

6. Complete the table and draw the graph of the line $y = 3x - 4$ on the number plane provided. **(2)**

x	-1		1
y		-4	



6. Write the equation linking m and n: **(2)**

m	-1	0	1	2
n	$3\frac{1}{2}$	3	$2\frac{1}{2}$	1

7. The lengths of the sides of a triangle are $2x$, $4x$ and $6x$. If the perimeter is 144cm, evaluate the difference between the shortest and longest side. **(2)**

8. Peter entered a lift in a tall building. He went up 3 floors, down 5 floors, up 7 floors and down 4 floors. He then found himself on the 23rd floor. On what floor did he enter? **(1)**

Measurement

1. Convert 1860 cm to metres **(1)**

2. How many mL in 2.7 Litres? **(1)**

3. How many minutes in 2.2 hours? **(1)**

4. A train ride takes $2\frac{1}{3}$ hours, if it left the station at 11:11 am, what time does it finish. **(1)**

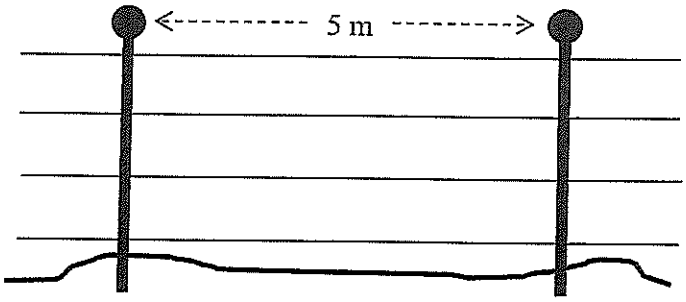
5. Each sheet of paper in a stack of one million sheets is 0.2 mm thick. What is the height of the stack in metres? **(2)**

6. What is the date and time 83 hours before 10:12 am on the 9th September 2014. **(2)**

7. Karrie calculates that the average length of her pace is 80 cm. In walking home from school she takes 2000 paces. How far is it from school to home? (give your answer in metres) **(1)**

8. Gil, Kelly and Rhys measure the masses of their school bags. Gil's bag has a mass of 7 400 grams, Kelly's bag has a mass of 4.8 kg and Rhys' bag has a mass of 6 600 g. What is the total mass of the three bags in kilograms? **(1)**

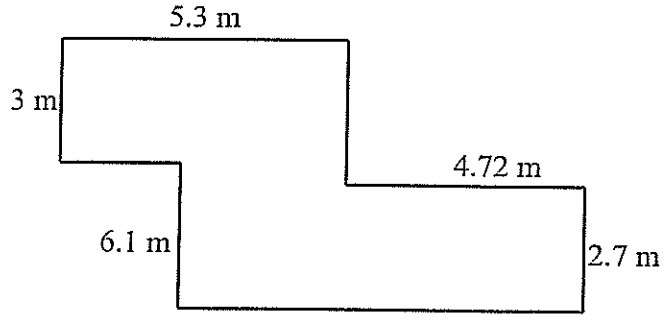
9. A fence that is 40 metres long has post 5 metres apart with a post at each end. Four strands of wire run the length of the fence.



a) How many posts are needed? **(1)**

b) How much length of wire is needed? **(1)**

10. a) Find the perimeter of this yard: **(2)**



b) If fencing costs $6/m, find the cost of surrounding this yard **(1)**

a)

b)

a)

b)

Plane Shapes

1. What is my name? **(2)**

a) I am a 3 sided figure with two of my sides equal in length.

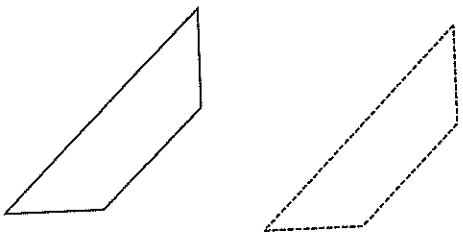
b) I am a 4 sided figure with all my sides equal in length.

a)

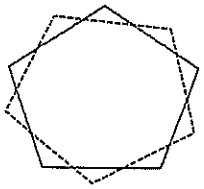
b)

2. Describe each transformation: **(3)**

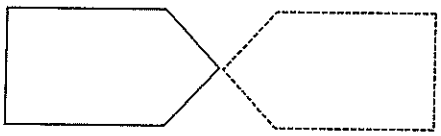
a)



b)



c)

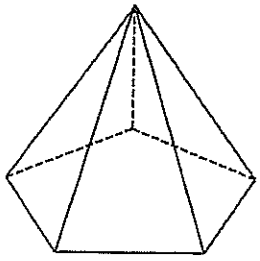


a)

b)

c)

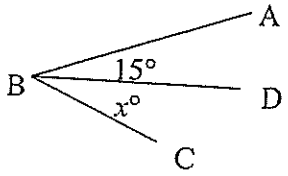
3. Complete the table to Illustrate Euler's Rule for a Pentagonal Pyramid. **(4)**



Faces (F)	
Vertices (V)	
Edges (E)	
F + V – E	

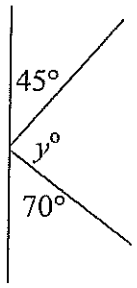
4. Find the value of the pronumerals: **(2)**

a)



Angle ABC = 50°

b)

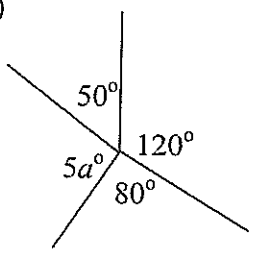


a)

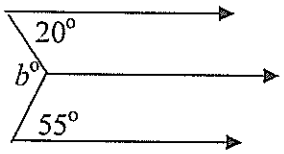
b)

(2)

c)



d)

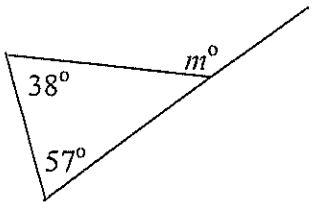


c)

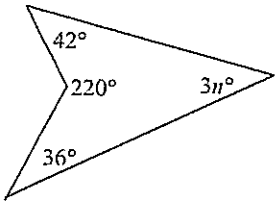
d)

(2)

(e)



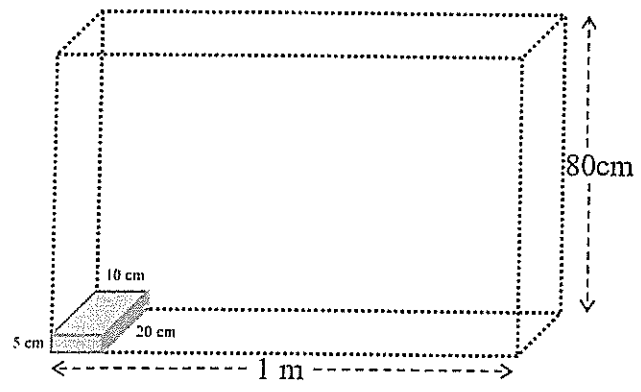
(f)

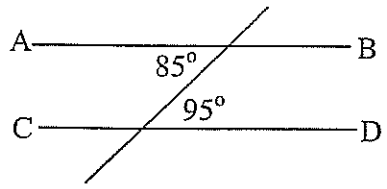
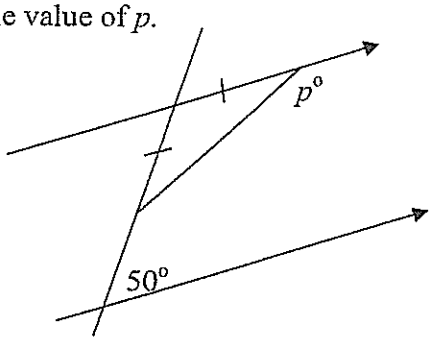


e)

f)

MISCELLANEOUS

1. The average of 3 numbers is 21. What must be added to give the average of 4 numbers to become 25.	**(1)**	
2. Calculate $\frac{12-0.4}{(0.2)^2}$	**(2)**	
3. If $p = 3$ and $q = -8$, then find value of $\frac{1}{q} + \frac{1}{q-p}$.	**(1)**	
4. What must be added to a – b to give b?	**(1)**	
5. $\frac{\frac{3}{4}-2}{5-7\frac{1}{2}} =$	**(2)**	
6.  Marco is making a stack of bricks 1 m long and 80 cm high, as shown. How many bricks will be in the stack?	**(2)**	

7. The length of a 50 metre swimming pool must be accurate to within 3 cm. For a 1500 m race, what is the difference between the distance swum in the longest possible pool and the shortest possible pool?	**(2)**	
8. State whether or not AB is parallel to CD, and briefly explain why or why not.  	**(2)**	
9. Find the value of p.  	**(2)**	

END OF EXAMINATION

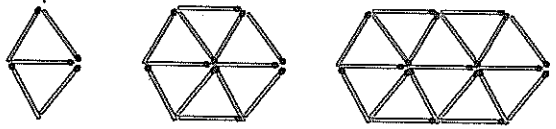
1/17 Yearly Solutions

NUMBER

1. Evaluate 0.07×0.2.	(1)	0.014
2. Write the next line in this pattern: $14 \times 9 + 114 = 240$ $13 \times 9 + 103 = 220$ $12 \times 9 + 92 = 200$	(1)	$11 \times 9 + 81 = 180$
3. Evaluate $(-8) - (-15)$	(1)	7
4. What is the reciprocal of $7\frac{3}{4}$?	(1)	$\frac{4}{31}$
5. Evaluate $8 \div 0.04$.	(1)	200
6. Evaluate $2 + 8 \div 4 - 2$.	(1)	2
7. Evaluate $3\frac{4}{5} \times 1\frac{1}{3}$. $\frac{19}{5} \times \frac{4}{3}$	(2)	$\frac{76}{15} = 5\frac{1}{15}$
8. What is half way between $1\frac{2}{3}$ and $7\frac{1}{8}$. $\left(\frac{5}{3} + \frac{57}{8}\right) \div 2$	(2)	$\left(\frac{40}{24} + \frac{171}{24}\right) \div 2 = \frac{211}{24} \div 2$ $= \frac{211}{48} = 4\frac{19}{48}$
9. Evaluate $8 \div 1\frac{1}{4}$	(2)	$8 \div \frac{5}{4} = 8 \times \frac{4}{5}$ $= \frac{32}{5} = 10\frac{2}{5}$
10. Evaluate $\sqrt{1.21}$	(1)	1.1
12. Evaluate $\{24 - [18 \div (8-6)]\} \div 3$. $(24-9)^2 \div 2$. =	(2)	$15 \div 3$ $= 5$

ALGEBRA AND DIRECTED NUMBER

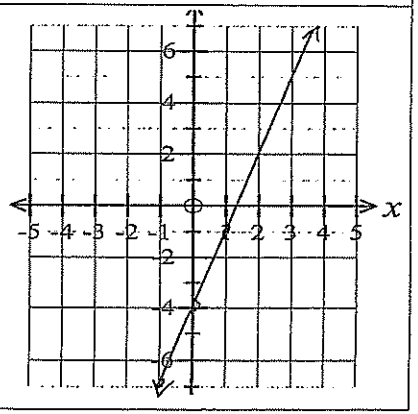
Questions 1 and 2 refer to the diagram below where matchsticks have been used to make the first 3 steps in a pattern.



Step 1 5 matches — *Step 2* 12 matches — *Step 3* 19 matches

1. How many matches would be needed to make step 6 of the pattern?	(1)	40
2. Write a formula for N, the number of matches that would be needed to make step s of the pattern.	(2)	$N = 7s - 2$
3. Simplify the expression $2b - 3a + 5b$	(1)	$7b - 3a$
4. Simplify: a) $a \times a \times a \times b \times b$ b) $2 \times (x-1) \div (7+3)$	(2)	a) a^3b^2 b) $\frac{2(x-1)}{10}$
5. Simplify the expression: $3a \times 2a + 2a \times 3b + 3ab - 2a^2$ $6a^2 + 6ab + 3ab - 2a^2$	(2)	$4a^2 + 9ab$
6. Complete the table and draw the graph of the line $y = 3x - 4$ on the number plane provided.	(2)	

x	−1	0	1
y	−7	−4	−1



6. Write the equation linking m and n: (2)

m	-1	0	1	2
n	$3\frac{1}{2}$	3	$2\frac{1}{2}$	1

$n = -\frac{1}{2}m + 3$

7. The lengths of the sides of a triangle are $2x$, $4x$ and $6x$. If the perimeter is 144cm, evaluate the difference between the shortest and longest side. (2)

$2x + 4x + 6x = 144$

$12x = 144$

$x = 12$

$72 - 24 = 48$

8. Peter entered a lift in a tall building. He went up 3 floors, down 5 floors, up 7 floors and down 4 floors. He then found himself on the 23rd floor. On what floor did he enter? (1)

22nd Floor.

Measurement

1. Convert 1860 cm to metres (1)

18.6 m

2. How many mL in 2.7 Litres? (1)

2700

3. How many minutes in 2.2 hours? (1)

$120 + 0.2 \times 60$

$= 120 + 12 = 132$ min

4. A train ride takes $2\frac{1}{3}$ hours, if it left the station at 11:11 am, what time does it finish. (1)

1:31 pm

5. Each sheet of paper in a stack of one million sheets is 0.2 mm thick. What is the height of the stack in metres? (2)

0.2×1000000

$= 200\,000$ mm

$= 200$ m

6. What is the date and time 83 hours before 10:12 am on the 9th September 2014. (2)

5th Sep at 11:12 pm

7. Karrie calculates that the average length of her pace is 80 cm. In walking home from school she takes 2000 paces. How far is it from school to home? (give your answer in metres) (1)

$2000 \times 80 = 160000$ cm

$= 1600$ m

8. Gil, Kelly and Rhys measure the masses of their school bags. Gil's bag has a mass of 7 400 grams, Kelly's bag has a mass of 4.8 kg and Rhys' bag has a mass of 6 600 g. What is the total mass of the three bags in kilograms? (1)

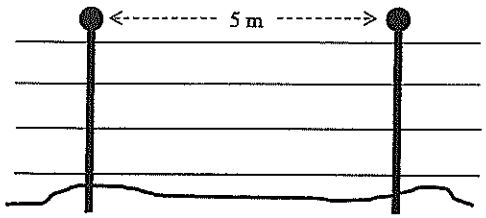
7.4

4.8

6.6

18.8 kg.

9. A fence that is 40 metres long has post 5 metres apart with a post at each end. Four strands of wire run the length of the fence.



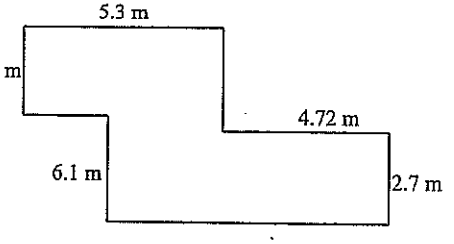
a) How many posts are needed? (1)

9

b) How much length of wire is needed? (1)

160m

10. a) Find the perimeter of this yard: (2)



a) $2 \times (5.3 + 4.72) + 2 \times (3 \times 6.1)$

$= 38.24$ m.

b) If fencing costs \$6/m, find the cost of surrounding this yard (1)

b) 38.24×6

\$229.44

Plane Shapes

1. What is my name? **(2)**

a) I am a 3 sided figure with two of my sides equal in length.

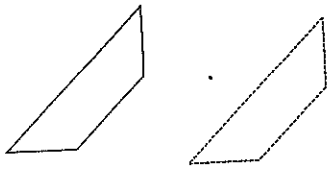
a) isosceles triangle.

b) I am a 4 sided figure with all my sides equal in length.

b) Square or rhombus.

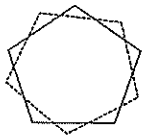
2. Describe each transformation: **(3)**

a)



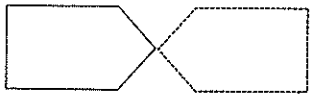
a) translation.

b)



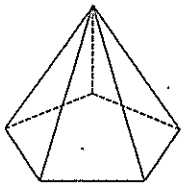
b) rotation.

c)



c) reflection.

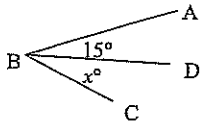
3. Complete the table to Illustrate Euler's Rule for a Pentagonal Pyramid. **(4)**



Faces (F)	6
Vertices (V)	6
Edges (E)	10.
F + V − E	2.

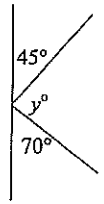
4. Find the value of the pronumerals: **(2)**

a)



Angle ABC = 50°

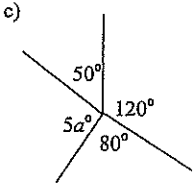
b)



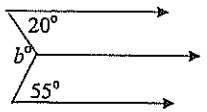
a) $x = 35$

b) $y = 65$

c)



d)

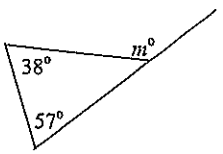


(2)

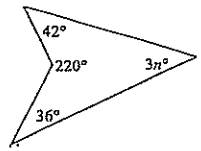
c) $a = 22$

d) $y = 75$

(e)



(f)

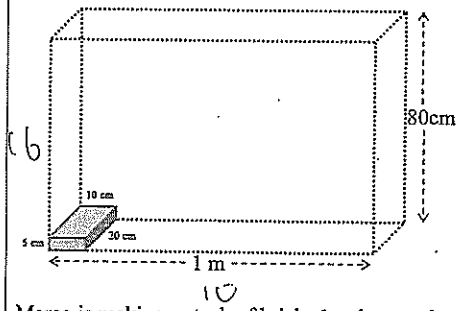


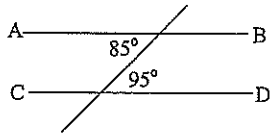
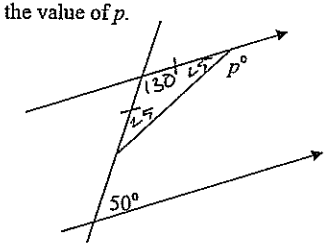
(2)

e) $m = 95$

f) $n = 20\frac{2}{3}$

MISCELLANEOUS

1. The average of 3 numbers is 21. What must be added to give the average of 4 numbers to become 25. (1)	37.
2. Calculate $\frac{12-0.4}{(0.2)^2}$ (2)	$11.6 \div 0.04 = 290$
3. If $p = 3$ and $q = -8$, then find value of $\frac{1}{q} + \frac{1}{q-p}$. (1)	$\frac{1}{-8} + \frac{1}{-11} = -\frac{11}{88} - \frac{8}{88} = -\frac{19}{88}$
4. What must be added to a – b to give b? (1)	2b-a
5. $\frac{\frac{3}{4}-2}{5-7\frac{1}{2}} =$ (2)	$-1\frac{1}{4} \div -2\frac{1}{2} = \frac{1}{2}$.
6.  Marco is making a stack of bricks 1 m long and 80 cm high, as shown. How many bricks will be in the stack? (2)	10 x 16 = 160

7. The length of a 50 metre swimming pool must be accurate to within 3 cm. For a 1500 m race, what is the difference between the distance swum in the longest possible pool and the shortest possible pool? (2)	6cm + 30 = 180
8. State whether or not AB is parallel to CD, and briefly explain why or why not. (2) 	No. because the alternate angles are not equal
9. Find the value of p. (2) 	p = 155

END OF EXAMINATION