Name: FILE Maths Teacher: .....

SYDNEY TECHNICAL HIGH SCHOOL

Year 9

Assessment 2

August, 2016

Time allowed: 70 minutes

General Instructions:

- Marks for each question are indicated on the question.
- Approved calculators may be used
- All necessary working should be shown
- Full marks may not be awarded for careless work or illegible writing
- Write using black or blue pen
- Write your answers in the spaces provided

Section A: Multiple Choice	**/15**
Q1: Miscellaneous	**/8**
Q2: Inequalities	**/6**
Q3: Equations and Formula	**/10**
Q4: Probability	**/8**
Q5: Statistics	**/8**
Total	**/55**

Section A Multiple Choice (15 marks)

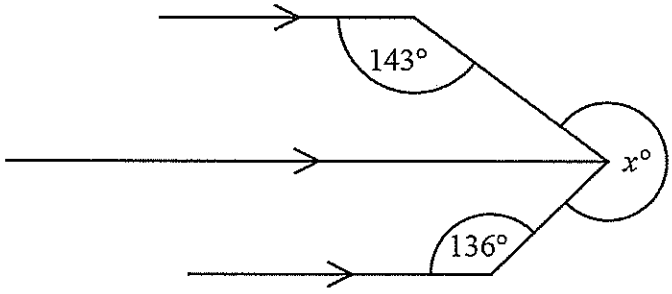
On the answer sheet provided, fill in the answer of your choice.
If you make a mistake, cross it out neatly and clearly mark in your correct response

1. How many significant figures in 0.0001305?
   A) 3
   B) 4
   C) 5
   D) 7

2. Between which 2 consecutive integers does $\sqrt{11}$ lie?
   A) 2 and 3
   B) 3 and 4
   C) 7 and 8
   D) 10 and 12

3. Which expression is equivalent to $2 + p \times 4$?
   A) $2p + 4$
   B) $8 + 4p$
   C) $2 + 4p$
   D) $8p$

4. Which types of angles can you use to find $x°$?



   A) Co-interior angles and angles at a point
   B) Corresponding angles and co-interior angles
   C) Corresponding angles and vertically opposite angles
   D) Co-interior angles and vertically opposite angles

5. To rationalise the denominator of $\frac{1}{\sqrt{5}-3}$ you must multiply by:

A) $\frac{\sqrt{5}-3}{1}$

B) $\frac{\sqrt{5}-3}{\sqrt{5}-3}$

C) $\frac{1}{\sqrt{5}+3}$

D) $\frac{\sqrt{5}+3}{\sqrt{5}+3}$

6. $\frac{2}{3a}+\frac{5}{2a}=$

A) $\frac{2}{a}$

B) $\frac{19}{6a}$

C) $\frac{5}{3a}$

D) $\frac{8}{3a}$

7. $-x > 9$ is the same as:

A) $x > 9$
B) $x < 9$
C) $x > -9$
D) $x < -9$

8. Jimmy rolled a die many times and obtained the following results:

2, 5, 6, 1, 4, 6, 2, 4, 2, 5, 3, 2

What is the relative frequency of rolling a 2?

A) $\frac{1}{4}$

B) $\frac{1}{6}$

C) $\frac{1}{2}$

D) $\frac{1}{3}$

9. Given that $r = \sqrt[3]{\frac{V}{4\pi}}$ which of the following will give the correct value of V?

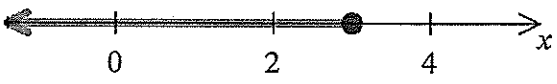
A) $V = 4\pi r$

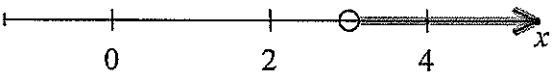
B) $V = 64\pi^3 r^3$

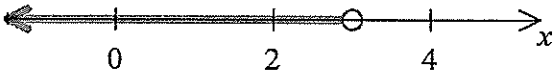
C) $V = 4\pi r^3$

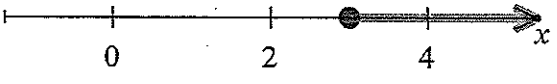
D) $V = (4\pi r)^3$

10. Which number line shows $x \geq 3$?

A) 

B) 

C) 

D) 

11. Which of the following is the solution to the equation $5(x - 1) = -2(x - 1)$?

A) $x = 0$

B) $x = 1$

C) $x = 2$

D) $x = 3$

12. The table below shows the number of cars which took each of the four roads that come off a large roundabout in a one hour period:

Road	Ella Avenue	Willow Way	Shaun Street	Can Crescent
No. of cars	23	34	16	7

A car enters the roundabout. What is the probability that it will not take Ella Avenue when it comes off the roundabout?

A) $\frac{23}{80}$

B) $\frac{34}{80}$

C) $\frac{57}{80}$

D) $\frac{7}{80}$

13. Dennis surveyed 120 students in his year group about how much fruit they consume in a day. The results are displayed in the table below:

Amount of fruit consumed	Number of Students
4	43
3	20
2	33
1	8
0	16

What is the mode amount of fruit consumed daily?

A) 2.55
B) 43
C) 4
D) 1

14. Find the value of $x^2 + 4x - y$ given that $x = -1$ and $y = 2$

A) -7
B) -5
C) 5
D) 6

15. The marks out of 10 for an arithmetic test were:

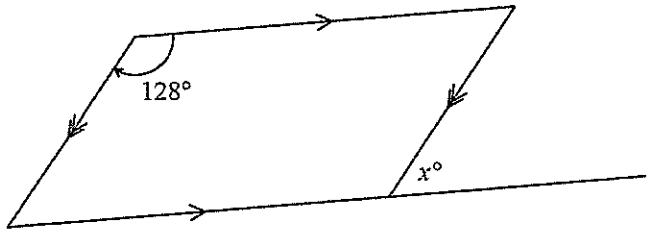
7, 8, 6, 8, 6, 5, 6, 4, 7, 10

The mean for the test was:

A) 5.6
B) 6
C) 6.5
D) 6.7

Section B (40 marks)

Marks as indicated. Write your answers neatly in the space provided. Include any necessary working out.

Question 1 (8 marks)		Solution
a)	If $2^2(2^k)^7 = 1$, find the value of k. (1 mark)	
b)	Write $\frac{2+\sqrt{5}}{2-\sqrt{5}}$ with a rational demonimator. (1 mark)	
c)	Simplify $\sqrt{192} + \sqrt{75}$ (1 mark)	
d)	Find the value of x, giving reasons. (2 marks)  	$x =$ _____ Reason: _____
e)	Simplify $\frac{6}{5xy} \div \frac{2y}{x}$ (1 mark)	
f)	Find $(6.3 \times 10^{-4}) + (8.6 \times 10^{-2})$, giving your answer in scientific notation. (1 mark)	
g)	Express the following with only positive integer indices: $\frac{yx^4z^{-4}}{y^{-1}}$ (1 mark)	

Question 2 (6 marks)

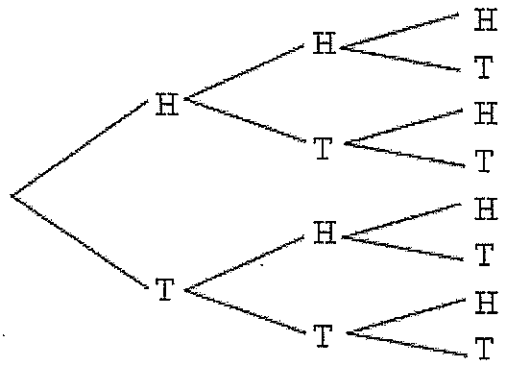
		Solution
a)	Show the solution of $y - 3 > 2$ on a number line. (1 mark)	
b)	Solve $\frac{x}{4} - 3 \leq 7$ (1 mark)	
c)	Solve $-9 \geq 5p - 1$ (1 mark)	
d)	Solve $\frac{3a}{2} - 1 \leq 3$ (1 mark)	
e)	Solve $\frac{1 - 3x}{8} < \frac{1 - x}{3}$ (2 mark)	

Question 3 (10 marks)		**Solution**
a)	Solve the following literal equation for m: $mb = m + 6$ (1 mark)	
b)	If $y = 10$ and $d = 7$, solve for x if $d = \frac{3x}{5} + y$ (1 mark)	
c)	Solve for m if: $8(m + 2) - 4(m - 3) = 46$ (1 mark)	
d)	Solve $3x + 10 = 100$ (1 mark)	
e)	Solve $\frac{2y}{5} + \frac{y}{3} = 11$ (1 mark)	
f)	Solve $\frac{2x + 1}{4} - \frac{2x - 2}{5} = \frac{x}{2}$ (2 mark)	
g)	Solve $\frac{h + 3}{4} = 2$ (1 mark)	

h)	A father is currently 3 times his son's age. In 10 years, he will be twice his son's age. Let the son's age be x. i. Write an equation for the son's age. ii. How old is the son currently? (2 marks)	i) ii)

Question 4 (8 marks) Solution

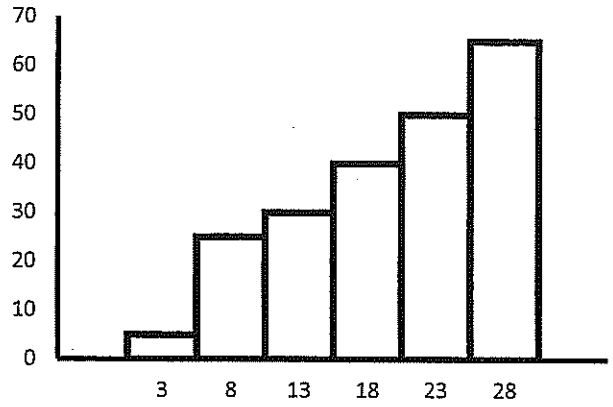
a)	A letter is selected at random from the word MATHEMATICS. What is the probability of selecting a vowel? (1 mark)	
b)	In a pond of 1000 fish, 80 are selected at random. If 10 of those fish are goldfish, how many goldfish would you expect to find in the pond altogether? (1 mark)	
c)	Which bag of white and pink marshmallows gives you the best chance of selecting a pink marshmallow: • Bag A with 11 pink and 12 white marshmallows • Bag B with 8 pink and 9 white marshmallows or • Bag C with 20 pink and 21 white marshmallows? (1 mark)	

d)	Cory, Eric and Shawn are standing in line. i. Write a list showing all possible arrangement. ii. What is the probability that Cory and Eric stand next to each other in the line? (2 marks)	
e)	Using the tree diagram below, what is the probability of throwing:  i. Exactly one head? ii. At least one head? (2 marks)	
f)	Alan and Bob are drawing cards from a standard 52-card deck to try and win by drawing a higher card than the other. (Ace is highest, then K, Q, J, 10, 9 etc...) If Alan draws a 10 and without replacing it, what is the chance Bob can win by drawing a card higher than 10? (1 mark)	

Question 5 (8 marks)

Solution

a) From the cumulative histogram shown below:



i. Draw the ogive.

ii. Determine the mode.

(2 marks)

b) Calculate the mean of this data set to 2 decimal places

x	f	fx
9	5	
10	7	
11	14	
12	10	
13	6	

(1 mark)

c) Having taken 4 maths tests, Adam's mean test score is 26 out of 50. What would he have to achieve on his next test to raise his mean to 30?

(1 mark)

d) The stem-and-leaf plot shows the heights in the Blue Soccer Team and the Red Soccer Team (in cm).

Blue					Red		
			2	14	1	5	
	8	6	0	15	5	8	9
8	7	5	2	16	3	6	8
			1	17	0	3	
			0	18			

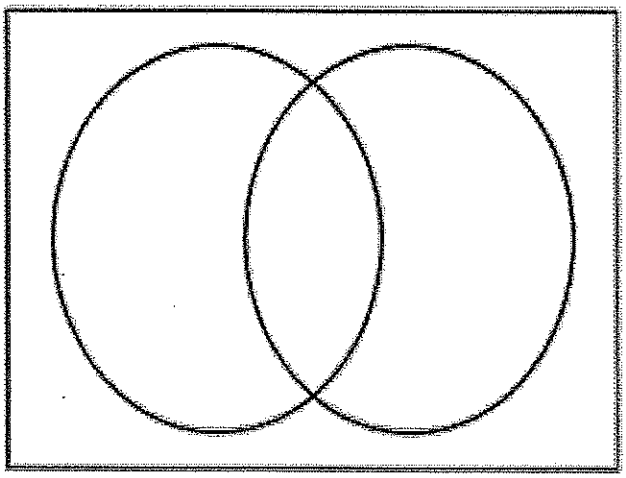
i. What is the difference between the 2 medians?

ii. Which team has the larger range?

(2 marks)

e) Of 30 people surveyed, 5 like neither oranges nor apples while 18 like apples and 16 like oranges.

i. Fill this information into the Venn Diagram below:



ii. How many people like apples but not oranges?

(2 marks)

SYDNEY TECHNICAL HIGH SCHOOL

MULTIPLE CHOICE ANSWER SHEET

Name : .....

Teacher: .....

Course: Year 9

Completely fill the response oval representing the most correct answer.

Do not remove this sheet from the answer booklet.

1. A ○ B ○ C ○ D ○
2. A ○ B ○ C ○ D ○
3. A ○ B ○ C ○ D ○
4. A ○ B ○ C ○ D ○
5. A ○ B ○ C ○ D ○
6. A ○ B ○ C ○ D ○
7. A ○ B ○ C ○ D ○
8. A ○ B ○ C ○ D ○
9. A ○ B ○ C ○ D ○
10. A ○ B ○ C ○ D ○
11. A ○ B ○ C ○ D ○
12. A ○ B ○ C ○ D ○
13. A ○ B ○ C ○ D ○
14. A ○ B ○ C ○ D ○
15. A ○ B ○ C ○ D ○

Yr 9 Solutions

Section A

1. B	6. B	11. B
2. B	7. D	12. C
3. C	8. D	13. C
4. A	9. C	14. B
5. D	10. D	15. D

Section B

Q1. a. $2^2(2^k)^7 = 1$

$2^{2+7k} = 2^0$

$2+7k = 0$

$7k = -2$

$k = \frac{-2}{7}$

b. $\frac{2+\sqrt{5}}{2-\sqrt{5}} \times \frac{2+\sqrt{5}}{2+\sqrt{5}}$

$= \frac{(2+\sqrt{5})^2}{4-5}$

$= -(2+\sqrt{5})^2$

$= -4-4\sqrt{5}-5$

$= -9-4\sqrt{5}$

c. $\sqrt{192}+\sqrt{75}$

$= 8\sqrt{3}+5\sqrt{3}$

$= 13\sqrt{3}$

d. $x^\circ + 128^\circ = 180^\circ$

$x^\circ = 52^\circ$

Opposite angles in parallelogram equal and supplementary angles.

e. $\frac{6}{5xy} \div \frac{2y}{x}$

$= \frac{6}{5xy} \times \frac{x}{2y} = \frac{3}{5y^2}$

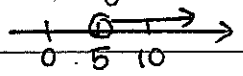
f. 8.663×10^{-2}

g. $\frac{yx^4z^{-4}}{y^{-1}}$

$= \frac{y^2x^4}{z^4}$

Q2. a. $y-3>2$

$y>5$



b. $\frac{x}{4}-3 \leq 7$

$\frac{x}{4} \leq 10$

$x \leq 40$

c. $-9 \geq 5p-1$

$-8 \geq 5p$

$-\frac{8}{5} \geq p$

$p \leq -\frac{8}{5}$

d. $\frac{3a}{2}-1 \leq 3$

$\frac{3a}{2} \leq 4$

$3a \leq 8$

$a \leq \frac{8}{3}$

e. $\frac{1-3x}{8} < \frac{1-x}{3}$

$3(1-3x) < 8(1-x)$

$3-9x < 8-8x$

$-x < 5$

$x > -5$

Q3. a. $mb = m+6$

$m(b-1) = 6$

$m = \frac{6}{b-1}$

b. $7 = \frac{3x}{5} + 10$

$-3 = \frac{3x}{5}$

$-1 = \frac{x}{5}$

$x = -5$

c. $8m+16-4m+12 = 46$

$4m = 18$

$m = \frac{9}{2}$

d. $3x+10 = 100$

$3x = 90$

$x = 30$

e. $6y+5y = 165$

$11y = 165$

$y = 15$

f. $5(2x+1)-4(2x-2) = 10x$

$10x+5-8x+8 = 10x$

$-8x = -13$

$x = \frac{13}{8}$

g. $h+3 = 8$

$h = 5$

h. i) $F = 3x$

$F+10 = 2(x+10)$

$3x+10 = 2(x+10)$

ii) $3x+10 = 2x+20$

$x = 10$

Son is 10 yrs.

Q4 a. $P(\text{vowel}) = \frac{4}{11}$

b. $\frac{1}{8} \times 1000 = 125$

Find 125 goldfish

c. $A \doteq 0.48$

$B \doteq 0.47$

$C \doteq 0.49$

$\therefore$ C is best chance

d. i) CES ✓

CSE

ECS ✓

ESC

SEC ✓

SCE ✓

ii) $P(CE) = \frac{4}{6}$

$= \frac{2}{3}$

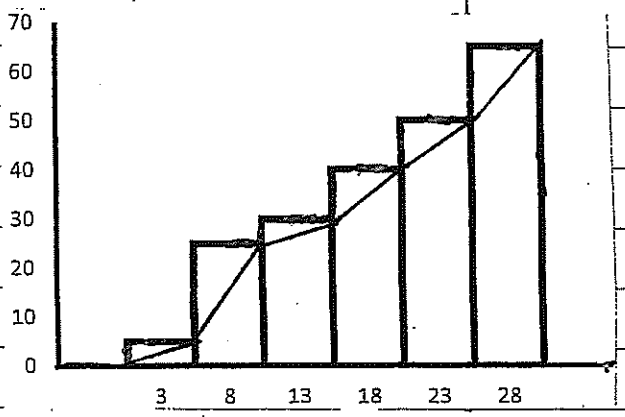
e. i) $P(\text{exactly one head}) = \frac{3}{8}$

ii) $P(\text{at least one head}) = 1 - \frac{1}{8}$

$= \frac{7}{8}$

f. $P(\text{Bob win}) = \frac{16}{51}$

Q5 a. i)



ii) Mode = 8

b. Mean = $467 \div 42$

$= 11.12$

c. $26 \times 4 = 104$ (current total)

$30 \times 5 = 150$ (new total)

Next test = 46/50.

d. i) Blue median = 163.5

Red median = 161

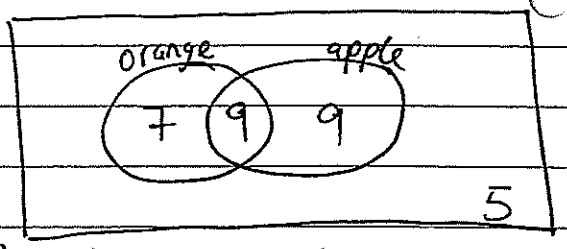
Diff = 2.5

ii) Blue range = 38

Red range = 32

Blue is larger.

e. i)



ii) Like apple not orange = 9