Number and Algebra Task 2 2014   (2$\frac{1}{2}$ Marks)

Name._____   Teacher:_____

Question		Marks

1 Which expression below does not simplify to $6x^2y$?   **1**

A. $3x \times 2xy$ B. $\dfrac{12x^2y^2}{2y}$

C. $4x^2y + 2x^2y$ D. $8x^2y - 2xy$

2 $\dfrac{u^4 \times u^8}{u^2 \times u^4} =$ **1**

A. u^2 B. u^3 C. u^4 D. u^6

3 Simplify $(2a)^0$ **1**

A. 0   B. 1   C. 2   D. $2a$

4 Marco is an artist and has created both paintings and sculptures in the ratio 3 : 7. He has created 18 paintings. How many sculptures has he completed?   **1**

A.   6   B.   12   C. 42   D. 60

5 Mount Panorama racing car circuit is about 6 km long. A car in a race averages a speed of 150 km/h. How long would it take to complete a race which is 75 laps of the circuit?   **1**

A.   1 ½ hours   B.   2 hours

C.   2 ½ hours   D.   3 hours

SHOW ALL WORKING

Question		Marks

6 Simplify   the following:

a) $4ab + 7ba$ **1**

b) $5m^2n - 6mn^2 - 3m^2n$ **2**

c) $-3x^2y \times 2xy$ **2**

d) $-\dfrac{12df}{3d}$ **2**

e) $\dfrac{4w^2z \times 5yz}{10wy}$ **2**

f) $\left(4m^2\right)^3$ **2**

7 Simplify the ratio $2\frac{1}{2}$ minutes : 45 seconds.   **2**

8   There are 400 fiction books and 360 non-fiction books in Mr Morgan's library.   2.
What is the ratio of fiction to non-fiction books in simplest form?

9   Express 60 km/h as metres per second correct to one decimal place.   2

10   Layla is a guitarist and she only ever breaks the top three strings when she plays.
The ratio with which she breaks the G, B and E strings is 2 : 3 : 5. Last month
she broke 40 strings. How many of these were B strings?   2

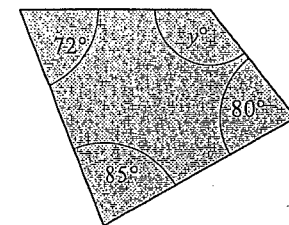## Geometry and Measurement Task 2 2014   (15 Marks)
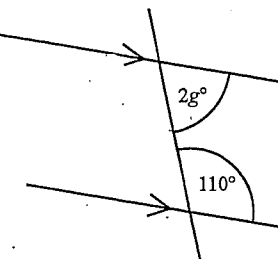
Name:_____   Teacher:_____

1   What is the value of y?   1

     A. $y = 85°$

     B. $y = 108°$

     C $y = 123°$

     D. $y = 237°$

2   What is the value of g in the diagram.   1

     A.   30°

     B.   35°

     C.   55°

     D.   70°

3   Which is true about an angle of 125°?   1
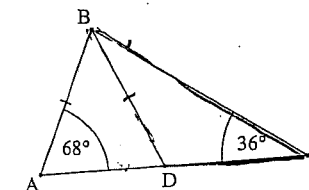
     A. Its complement is 55°.   B. It is an acute angle.

     C. Its supplement is 55°.   D. It is a straight angle.

4   What is the angle sum of a decagon?   1

     A. 1080°   B. 1000°   C. 1440°   D. 1800°

5   What is the size of $\angle CBD$?   1

     A.   32°   B.   44°

     C.   68°   D.   76°

6   What is the value of x in the diagram?   1

....

....

....

7   What is the value of y in the diagram?   1

....
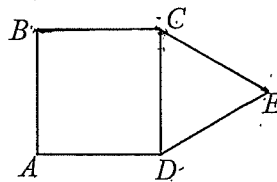
....

....

8 $ABCD$ is a square and CDE is an equilateral triangle.   1
What is the size of $\angle BCE$?

$$\angle BCE \;=\; \boxed{}$$

9 $EFGH$ is a parallelogram with its diagonal FH drawn.   2
IJ is perpendicular to GH.
What is the size of $\angle FJI$?

....
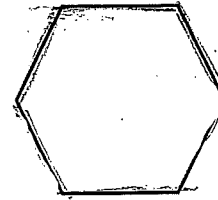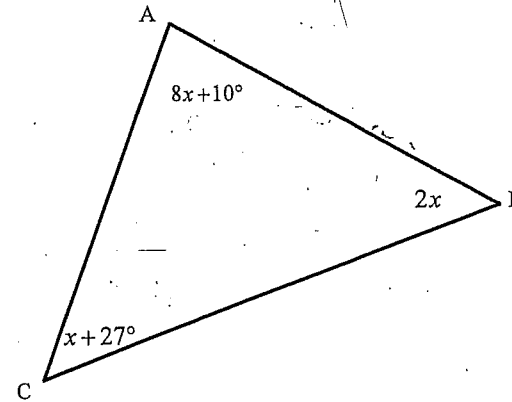
....

10   What is the size of each interior angle in this regular hexagon?   2

11   Find the size of all 3 angles in the triangle.   3

YEAR 9 HALF-YEARLY 2014   STUDENT:_____

NON-CALCULATOR SECTION   TEACHER:_____
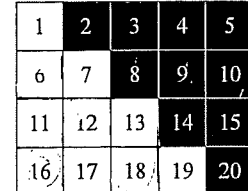(15 MARKS)

Write ANSWER ONLY in the Answer Column. Show working in the Question column.

#	Question	Answer
1	Simplify $3x^2y^3 \times 6xy^3$. Write the index of x. /1	$18x^{\square}y^6$
2	The diameter of a microscopic particle is 0.000 000 046 metres. Write the first part of the scientific notation to represent that number. /1	$\boxed{} \times 10^{-8}$
3	Write $2m^{-1}$ without using an index. /1	
4	Simplify the ratio 0.5 kg : 1500 g. /1	
5	What is the value of x in the diagram? /1	
6	Write an algebraic expression for : **"add twice y to x and divide the result by 3"** /1	
7	Simplify: $(-7)^2 + (-4)^0 =$ /1	
8	This Venn diagram shows the number of students in a class that study Music and Drama. How many students study either Music or Drama? /1	

Question 5 diagram: angle of $90°$, with $x°$ and $57°$ shown.

Question 8 Venn diagram: Music and Drama circles with 7, 4, 9 and 5.

#	Question	Answer
9	In a netball competition, each of the 5 teams must play each of the other 4 teams *once*. How many games must be played? /1	
10	Arrange the numbers below in ascending order. 0.3, $\frac{1}{4}$, 20%, 0.15 and $\frac{7}{20}$ /2	
11	A coin is dropped onto the board shown, which is divided into squares which are numbered 1 – 20. Half of the squares are black and half are white. What is the probability that the coin lands on a white square with an even number? /2	
12	Lycia calculated the mean, median, mode and range of the ages (to the nearest year) of her *five* cousins. What could have been her cousins' ages? /2	

Question 11 board:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Question 12 table:

Mean	5
Median	6
Mode	7
Range	5

End of Non-Calculator Section

Statistics and Probability Task 2 2014 (30 marks)

Name:_____ Teacher:_____

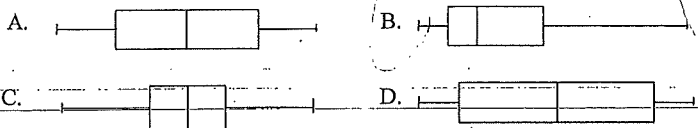| Question	Circle the Correct Multiple Choice Answer	Marks

1 A container holds 40 marbles numbered 1 to 40. **1**
A single marble is drawn out.
What is the probability that it is a number greater than 32?

A. $\dfrac{1}{40}$ B. $\dfrac{1}{10}$ C. $\dfrac{1}{8}$ D. $\dfrac{1}{5}$

2 Which box plot could represent a skewed set of data? **1**

A.   B.

C.   D.

3 Sky compiled a frequency distribution table of the number of calls per day she **1**
received from her friends on each day in April.

Number of Calls (x)	Frequency (f)	fx
6	3	18
7	10	70
8	11	88
9	4	36
10	2	20

$\Sigma f =$ $\Sigma fx =$

What was the mean number of calls per day (correct to one decimal place)?

A.   7.7   B.   8.0   C.   8.3   D.   8.5

Question 4 Marks

The coach of the Emattogah Cricket Club compiles the stem and leaf plot showing the ages of their players.

Ages of Emattogah Cricket Players

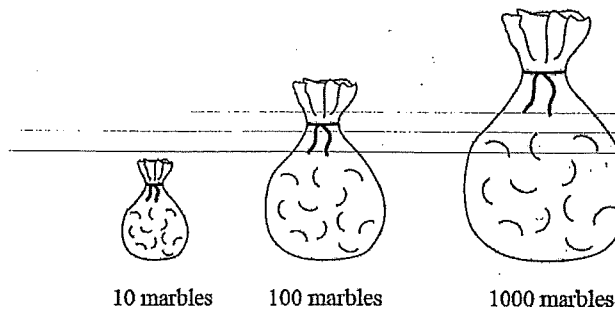| 1 | .4 5. 6 .6 .8 9 |
2	0 2. 4 .6 .7 9 .9 9
3	.1 3. 4. 5. 5 .7
4	.2 6.
5	.3

What is the median age of the players? **1**

A.   27   B.   28   C   29   D.   30

5 There is only one red marble in each of these bags. **1**

10 marbles   100 marbles   1000 marbles

Without looking in the bags, you are to pick a marble out of one of the bags. Which bag would give you the greatest chance of picking the red marble?

A.   The bag with 10 marbles

B.   The bag with 100 marbles

C.   The bag with 1000 marbles

D.   All bags would give the same chance.

6   Miranda has 4 songs on her phone, which we will abbreviate as M, N, O, and P. She randomly chooses two different songs to play on her way home.

    a) Draw a tree diagram to show the possible outcomes of the two songs and the order in which they are played.   2
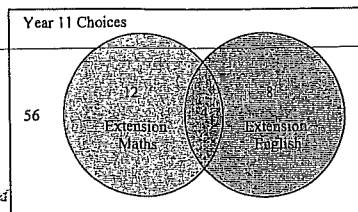
    b) What is the probability that the songs are M and O in either order?   2

    c) What is the probability that P is not included?   1

7   The Venn diagram below shows how many Year 11 students chose Extension subjects at Manly College.

Year 11 Choices

56

Extension Maths

Extension English

    a) A student is chosen at random. What is the probability that they chose Extension Maths?   1

    b) A student is chosen at random. What is the probability that they chose exactly one Extension subject?   1

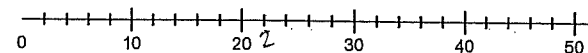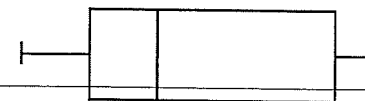8   The marks of 9 students on a test out of 100 are given below. Find the median.   1

$$45, 55, 57, 60, 65, 80, 88, 90, 92$$

9   The response times, in seconds, for 11 calls for taxis in the CBD are given below. What is the interquartile range of the times?   2

$$60, 65, 87, 90, 95, 100, 128, 150, 220, 250, 300$$

Questions 10 – 11 refer to the following.

The box plot summarises the percentage of the vote in the polls that a political party had each week over a year.

10   What was the range of the results?   1

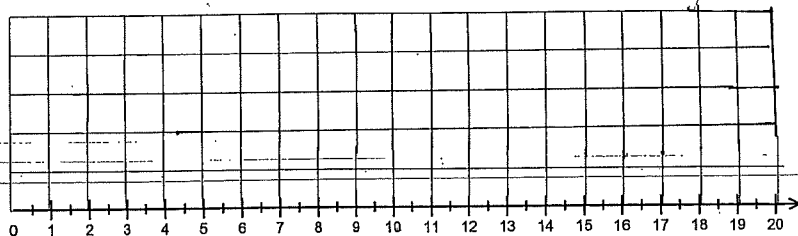11   What was the interquartile range of the results?   1

12 The five number summary of test results is given below.

2, 12, 16, 18, 19

a) Use the five number summary to draw a box plot. **3**

b) Describe the distribution of the data in question in terms of spread. **1**

13 Each of the six faces of a certain cube is painted either red or blue. When the cube is tossed, the probability of the cube landing with a red face up is $\frac{2}{3}$. **1**

How many faces are red?

From a standard pack of 52 playing cards, one card is selected at random.

What is the probability the card will be:

a) a black card (club or spade)? **1**

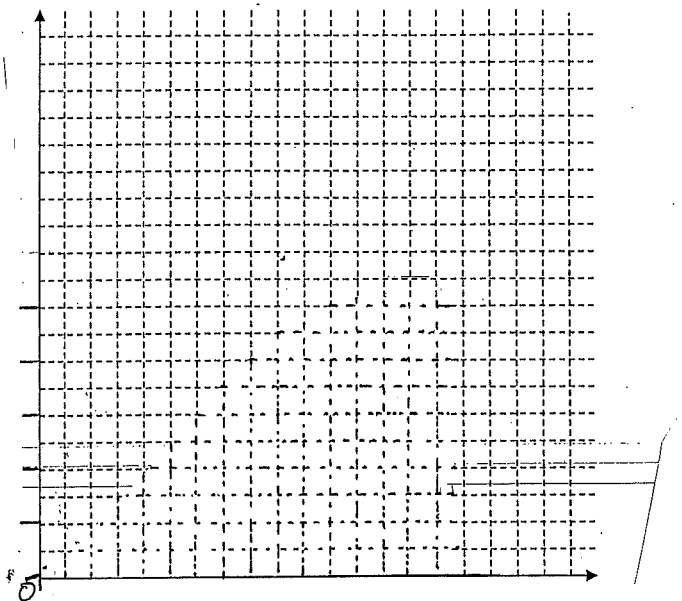b) a Queen? **1**

c) a black card or a Queen? **1**

15 a) Complete this frequency distribution table which shows the heights of the twenty-five students in 9M. **1**

Class centre (c.c)	Frequency (f)	c.f
152	1	
157	4	
162	5	
167	6	
172	4	
177	3	
182	2	
	$\sum f = 25$	

15   b) Draw a cumulative frequency histogram and polygon (ogive) for the   **4**
           data from the table.
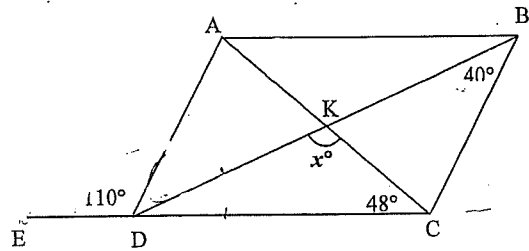
CHALLENGE SECTION (15 marks)

This Section contains the outcomes from stage 5.3 course, however all students are encouraged to attempt this section.

All necessary working must be shown and written in pen.

1)   Simplify fully: $\dfrac{x-3}{4}-\dfrac{x-4}{5}$ /2

2)   ABCD is a parallelogram (opposite sides are parallel and equal).   /3

Find the value of $x°$, **giving reason in every step.**

3)   A quadrilateral has angles of $3x-4$, $2x+10$, $5x+27$, $8x-33$. Find the *difference* between the largest & the smallest angle.   /3

4)   Simplify each of the following, leaving your answers in index form with *positive powers*.

(a) $\dfrac{7mn^3\times3m^2n}{2(mn)^2\times28m^4n^2}=$ $2\times m^n$ /2

(b) $\left(\dfrac{n^3}{27}\right)^{-\frac{2}{3}}=$ /2

5)   Expand and simplify the following expressions.

(a) $(n+2)(n-3)=$ /1

(b) $(2m-5)(2m+5)=$ /1

(c) $(x-9)^2=$ /1

The End of Section D

Number and Algebra Task 2 2014 21 (2⅓ Marks)

Name: _____   Teacher: _____

Question		Marks

1   Which expression below does not simplify to $6x^2y$?   **1**

   A. $3x \times 2xy$ B. $\dfrac{12x^2y^2}{2y}$

   C. $4x^2y + 2x^2y$ (D.) $8x^2y - 2xy$

2 $\dfrac{u^4 \times u^8}{u^2 \times u^4} = \dfrac{u^{12}}{u^6}$ **1**

   A. u^2 B. u^3 C. u^4 (D.) u^6

3   Simplify $(2a)^0$ **1**

   A. 0   (B.) 1   C. 2   D. 2a

4   Marco is an artist and has created both paintings and sculptures in the ratio 3 : 7. He has created 18 paintings. How many sculptures has he completed?   **1**
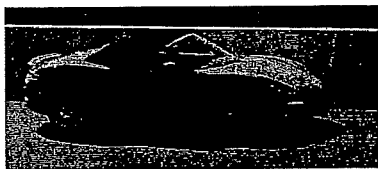
   A.   6   B.   12   (C.) 42   D.   60

5   Mount Panorama racing car circuit is about 6 km long. A car in a race averages a speed of 150 km/h. How long would it take to complete a race which is 75 laps of the circuit?   **1**

   A.   1 ½ hours   B.   2 hours

   C.   2 ½ hours   (D.) 3 hours

Question		Marks

6   Simplify the following:

   a) $4ab + 7ba$ **1**

$$= 11ab \checkmark$$

   b) $5m^2n - 6mn^2 - 3m^2n$ **2**

$$= 2m^2n - 6mn^2$$

   c) $-3x^2y \times 2xy$ **2**

$$-6x^3y^2 \checkmark\checkmark$$

   d) $-\dfrac{12df}{3d}$ **2**

$$-4f \checkmark\checkmark$$

   e) $\dfrac{4w^2z \times 5yz}{10wy}$ **2**

$$\dfrac{20w^2yz^2}{10wy} = \dfrac{20wyz^2}{10wy} = 2wz^2 \checkmark\checkmark$$

   (f) $(4m^2)^3$ **2**

$$64m^6$$

7   Simplify the ratio $2\frac{1}{2}$ minutes : 45 seconds.   **2**

$$150 : 45$$
$$= 10 : 3 \checkmark\checkmark$$

8   There are 400 fiction books and 360 non-fiction books in Mr Morgan's library.   2
What is the ratio of fiction to non-fiction books in simplest form?

$$400:360$$
$$= 10:9 \checkmark\checkmark$$

9   Express 60 km/h as metres per second correct to one decimal place.   2

$$\frac{60 \, km}{1h} = \frac{60\,000 \, m}{3600 \, s} \quad cm \cdot m \cdot km$$
$$= 16.7 \, m/s \checkmark\checkmark$$

10   Layla is a guitarist and she only ever breaks the top three strings when she plays.   2
The ratio with which she breaks the G, B and E strings is 2 : 3 : 5. Last month
she broke 40 strings. How many of these were B strings?

$$2+3+5 \qquad 4\times2=8$$
$$= 10 \qquad 4\times3=12$$
$$40 \div 10 = 4 \qquad 4\times5=20$$

$$8:12:20$$
$$B = 12 \text{ strings} \checkmark\checkmark$$

15

Geometry and Measurement Task 2 2014   (15 Marks)
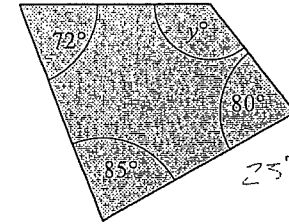
Name:_____   Teacher:_____

1   What is the value of y?   1

   A. $y = 85°$

   B. $y = 108°$

   C. $y = 123°$

   D. $y = 237°$

2   What is the value of g in the diagram   1

   A. $30°$

   B. $35°$

   C. $55°$

   D. $70°$
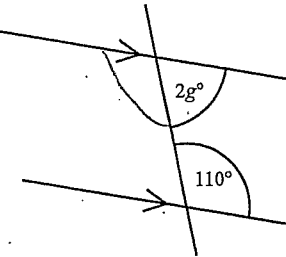
3   Which is true about an angle of $125°$?   1

   A. Its complement is $55°$.   B. It is an acute angle.

   C. Its supplement is $55°$.   D. It is a straight angle.
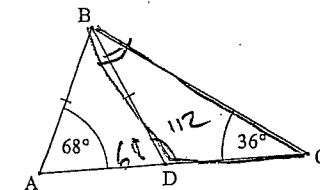
4   What is the angle sum of a decagon?   1

   A. $1080°$ B. $1000°$ C. $1440°$ D. $1800°$

5   What is the size of $\angle CBD$?   1

   A. $32°$ B. $44°$

   C. $68°$ D. $76°$

SHOW ALL WORKING

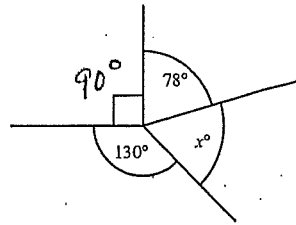**6**   What is the value of x in the diagram?   1
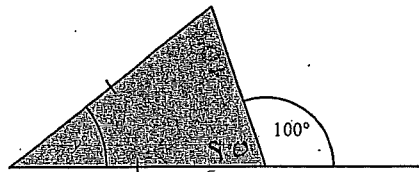
$$x = 360 - (130 + 90 + 78)$$
$$= 360 - 298$$
$$= 62$$
$$x = 62°$$
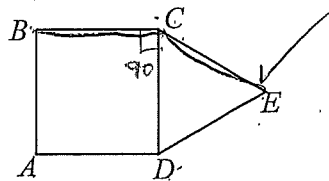
7   What is the value of y in the diagram?   1

$$y = 20°$$

100°

8 $ABCD$ is a square and CDE is an equilateral triangle.
What is the size of $\angle BCE$?   1
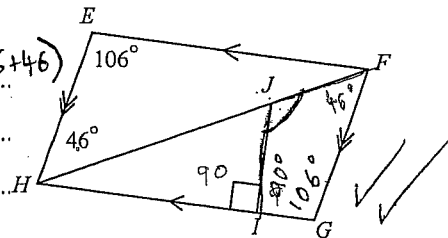
$$\angle BCE = \boxed{150°}$$
60

9 $EFGH$ is a parallelogram with its diagonal FH drawn.
IJ is perpendicular to GH.
What is the size of $\angle FJI$?   2

$$\angle FJI = 360 - (90 + 106 + 46)$$
$$= 360 - 242$$
$$\angle FJI = 118°$$

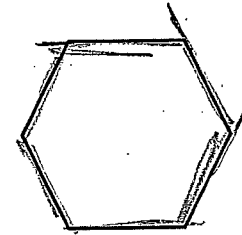**10**   What is the size of each interior angle in this regular hexagon?   2

$$180°(n-2)$$
$$180°(6-2)$$
$$= 720°$$
$$= 720 ÷ 6$$
$$\text{Answer} = 120°$$

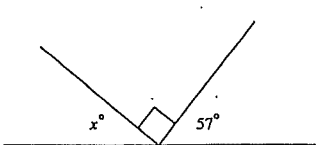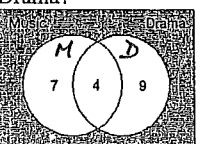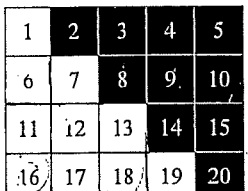**11**   Find the size of all 3 angles in the triangle.   3

A 114   C 40   B 26

82
106
98
22
35
$8x + 10°$
9
12
74
18
16
$2x$
$36°$
$x + 27°$
35
39
24
37
143

$$A = 114°$$
$$C = 40°$$
$$B = 26°$$

YEAR 9 HALF-YEARLY 2014   STUDENT: _MASTER COPY_

NON-CALCULATOR SECTION   TEACHER: \ (SOLUTIONS)
(15 MARKS)

Write ANSWER ONLY in the Answer Column. Show working in the Question column.

Question	Answer
1 Simplify $3x^2y^3 \times 6xy^3$. Write the index of x. /1	$18x^{\boxed{3}}y^6$
2 The diameter of a microscopic particle is 0.000 000 046 metres. Write the first part of the scientific notation to represent that number. /1	$\boxed{4.6} \times 10^{-8}$
3 Write $2m^{-1}$ without using an index. /1	$\dfrac{2}{m}$
4 Simplify the ratio 0.5 kg : 1500 g. /1	$1 : 3$
5 What is the value of x in the diagram? /1	$33°$
6 Write an algebraic expression for : "add twice y to x and divide the result by 3" /1	$\dfrac{2y+x}{3}$
7 Simplify: $(-7)^2 + (-4)^0 =$ /1	50
8 This Venn diagram shows the number of students in a class that study Music and Drama. How many students study either Music or Drama? /1	16

9	In a netball competition, each of the 5 teams must play each of the other 4 teams _once_. How many games must be played? /1	10 games
10	Arrange the numbers below in ascending order. 0.3, $\frac{1}{4}$, 20%, 0.15 and $\frac{7}{20}$ /2	0.15, 20% $\frac{1}{4}$, 0.3, $\frac{7}{20}$
11	A coin is dropped onto the board shown, which is divided into squares which are numbered 1 – 20. Half of the squares are black and half are white. What is the probability that the coin lands on a white square with an even number? /2	$\dfrac{1}{5}$
12	Lycia calculated the mean, median, mode and range of the ages (to the nearest year) of her _five_ cousins. What could have been her cousins' ages? /2	2, 3, 6, 7, 7

Table in Question 12:

Mean	5
Median	6
Mode	7
Range	5

End of Non-Calculator Section

Statistics and Probability Task 2 2014 (30 marks)

Name: _MASTER COPY_   Teacher: _____

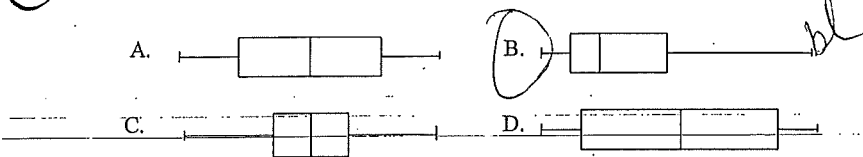| Question	Circle the Correct Multiple Choice Answer	Marks

1 A container holds 40 marbles numbered 1 to 40.
A single marble is drawn out.
What is the probability that it is a number greater than 32?   **1**

(handwritten: 33, 34, 35, 37, 40, 36, 38, 39)

   A. $\frac{1}{40}$ B. $\frac{1}{10}$ C. $\frac{1}{8}$ D. $\frac{1}{5}$ ✓

2 Which box plot could represent a skewed set of data?   **1**

A. ⊢▭▭⊣   B. ⊢▭▭⊣ *(circled)*

C. ⊢▭▭⊣   D. ⊢▭▭⊣

3 Sky compiled a frequency distribution table of the number of calls per day she received from her friends on each day in April.   **1**

Number of Calls (x)	Frequency (f)	fx
6	3	18
7	10	70
8	11	88
9	4	36
10	2	20
	$\Sigma f = 30$	$\Sigma fx =$

(handwritten: 232)

What was the mean number of calls per day (correct to one decimal place)?

   A. 7.7 ✓   B. 8.0   C. 8.3   D. 8.5

Question 4   Marks

The coach of the Emattogah Cricket Club compiles the stem and leaf plot showing the ages of their players.
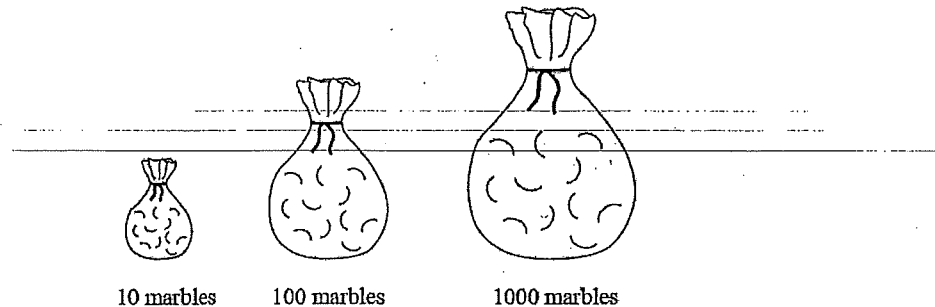
Ages of Emattogah Cricket Players

1	.4 5. 6 .6 .8 9
2	0 2, 4 .6 .7 9 .9 9
3	.1 3. 4 5 .5 .7
4	.2 6,
5	.3

What is the median age of the players?   **1**

   A. 27   B. 28   C. 29 *(circled)*   D. 30

5 There is only one red marble in each of these bags.   **1**

10 marbles   100 marbles   1000 marbles

Without looking in the bags, you are to pick a marble out of one of the bags. Which bag would give you the greatest chance of picking the red marble?
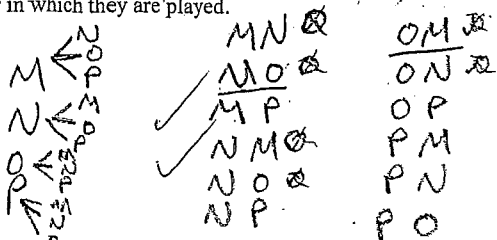
   A. The bag with 10 marbles *(circled)*

   B. The bag with 100 marbles

   C. The bag with 1000 marbles

   D. All bags would give the same chance.

6 Miranda has 4 songs on her phone, which we will abbreviate as M, N, O, and P. She randomly chooses two different songs to play on her way home.

a) Draw a tree diagram to show the possible outcomes of the two songs and the order in which they are played. **2**
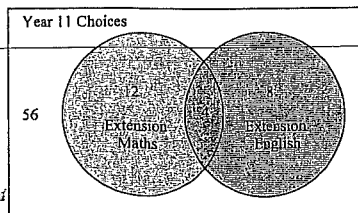
MN ✗   OM ✗
MO ✗   ON ✗
M P   O P
N M ✗   P M
N O ✗   P N
N P   P O

b) What is the probability that the songs are M and O in either order? **2**

$$\frac{2}{12} = \frac{1}{6} \checkmark\checkmark$$

c) What is the probability that P is not included? **1**

$$\frac{6}{12} = \frac{1}{2} \checkmark$$

7 The Venn diagram below shows how many Year 11 students chose Extension subjects at Manly College.

Year 11 Choices

56   Extension Maths   Extension English

a) A student is chosen at random. What is the probability that they chose Extension Maths? **1**

$$\frac{16}{80} = \frac{1}{5} \checkmark$$

b) A student is chosen at random. What is the probability that they chose exactly one Extension subject? **1**

$$\frac{24}{80} = \frac{3}{10} \times$$

$$\frac{20}{80} = \frac{1}{4} \checkmark$$

8 The marks of 9 students on a test out of 100 are given below. Find the median. **1**

45, 55, 57, 60, 65, 80, 88, 90, 92

$$= 65 \checkmark$$

9 The response times, in seconds, for 11 calls for taxis in the CBD are given below. What is the interquartile range of the times? **2**

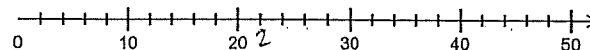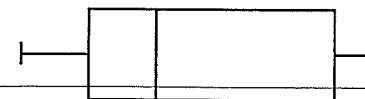60, 65, 87, 90, 95, 100, 128, 150, 220, 250, 300

$$Q1 = 87$$
$$Q2 = 100$$
$$Q3 = 220 \checkmark$$
$$IQ \; Range = 133$$

$$220 - 87$$
Interquartile range = 207 ✗

Questions 10 – 11 refer to the following.

The box plot summarises the percentage of the vote in the polls that a political party had each week over a year.

10 What was the range of the results? **1**

$$Q1 = 22$$
$$Q2 = 28$$
$$Q3 = 44$$
$$Range = 22$$

$$44 - 22$$
$$32$$

11 What was the interquartile range of the results? **1**
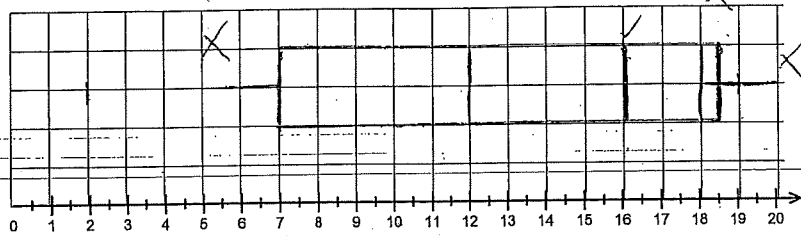
✓ ✗ $\cancel{38}$ ✗

12   The five number summary of test results is given below.

2, 12, (16), 18, 19

18.5

a)   Use the five number summary to draw a box plot.   3

b)   Describe the distribution of the data in question in terms of   1
spread.

Negatively skewed ✓

13   Each of the six faces of a certain cube is painted either red or blue. When the   1
cube is tossed, the probability of the cube landing with a red face up js $\frac{2}{3} \cdot \frac{x2}{x2} \frac{4}{6}$

How many faces are red?

4 faces

14   From a standard pack of 52 playing cards, one card is selected at random.

What is the probability the card will be:

a)   a black card (club or spade)?   1

$26/52 = 1/2$ ✓

b)   a Queen?   1

$4/52 = 1/13$ ✓

c)   a black card or a Queen?   1

$28/52 = 7/13$ ✓

15   a)   Complete this frequency distribution table which shows the heights   1
of the twenty-five students in 9M.

Class centre (c.c)	Frequency (f)	c.f
152	1	1
157	4	5
162	5	10
167	6	16
172	4	20
177	3	23
182	2	25
	$\sum f = 25$	

4 ✓

b) Draw a cumulative frequency histogram and polygon (ogive) for the data from the table. **4**

Class Centre VS
Cumulative
frequency

Title

X

$\checkmark$
$\checkmark$
$\checkmark$

Cumulative Frequency (c.f)

Cumulative Frequency (c.f)

25
20
15
10
5

0   152 157 162 167 172 177 182
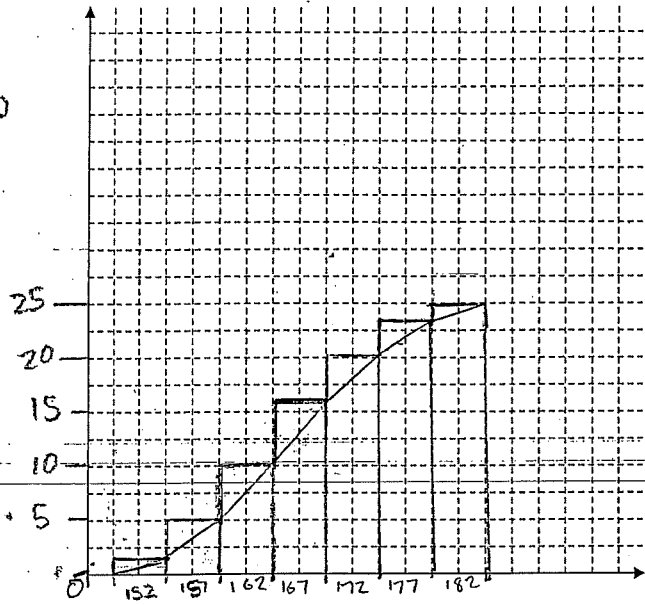
Class Centre (C.C)

}

Title = Heights of the twenty-five
students in 9m

This Section contains the outcomes from stage 5.3 course, however all students are encouraged to attempt this section.

All necessary working must be shown and written in pen.

1) Simplify fully: $\dfrac{x-3}{4} - \dfrac{x-4}{5}$ $= \dfrac{5(x-3) - 4(x-4)}{20}$ /2

$$= \dfrac{5x - 15 - 4x + 16}{20}$$

$$= \dfrac{x+1}{20}$$

2) ABCD is a parallelogram (opposite sides are parallel and equal).   /3
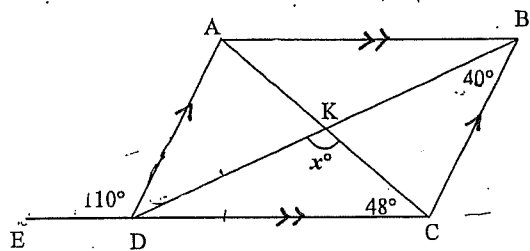
Find the value of $x°$, giving reason in every step.

$\angle ADB = 40°$ (Alt. $\angle$s AD$\parallel$BC)

$\therefore \angle BDC = 70° - 40°$ (Supplementary angles)

$= 30°$

$\therefore x + 30 + 48 = 180$ ($\angle$ sum of $\triangle$KDC)

$\therefore x° = 102°$

3) A quadrilateral has angles of $3x-4$, $2x+10$, $5x+27$, $8x-33$.
Find the *difference* between the largest & the smallest angle.   /3

$3x - 4 + 2x + 10 + 5x + 27 + 8x - 33 = 360$

$18x = 360$

$\therefore x = 20$

Largest $= 5(20) + 27 = 127$

Smallest $= 2(20) + 10 = 50$

Difference $= 77$

4) Simplify each of the following, leaving your answers in index form with *positive powers*.

(a) $\dfrac{7mn^3 \times 3m^2 n}{2(mn)^2 \times 28m^4 n^2} =$ /2

$\dfrac{7mn^3 \times 3m^2 n}{2m^2 n^2 \times 28 m^4 n^2}$

$= \dfrac{3}{8} m^{-3} n^0 = \dfrac{3}{8m^3}$

(b) $\left(\dfrac{n^3}{27}\right)^{-\frac{2}{3}} = \left(\dfrac{27}{n^3}\right)^{\frac{2}{3}}$ /2

$= \dfrac{9}{n^2}$

5) Expand and simplify the following expressions.

(a) $(n+2)(n-3) = $ $n^2 - 3n + 2n - 6 = n^2 - n - 6$ /1

(b) $(2m-5)(2m+5) = $ $4m^2 + 10m - 10m - 25 = 4m^2 - 25$ /1

(c) $(x-9)^2 = $ $x^2 - 18x + 81$ /1

The End of Section D