Name: _____ Teacher: _____

SYDNEY TECHNICAL HIGH SCHOOL

Year 8 COMMON TEST

MATHEMATICS

MAY – 2014

Time allowed: 70 Minutes

Total Marks: 75 Marks

Part A: Q1 – 15 Multiple choice (15 Marks)

Allow approximately 15 mins

Calculators are NOT allowed.

Part B: Q16-20 (60 Marks)

Allow approximately 55 Mins

Calculators ARE allowed

General Instruction:

- There is a multiple choice answer sheet stapled to the back of the exam. Tear it off and shade in your responses.
- All answers to Q 16-20 must be written in the space provided with complete and organised setting out and working.
- Marks will not be given if required working is not shown.
- Marks are indicated for each question but may be changed.
- Use blue or black pen only.

M/C	Percentages	Pythagoras/Graphs	Algebra	Geometry	Statistics	Total
/15	/12	/12	/12	/12	/12	/75

Part A Q1 – 25 (answers on answer sheet provided) CALCULATORS ARE NOT PERMITTED

1. $5^3 \times 5^4 =$

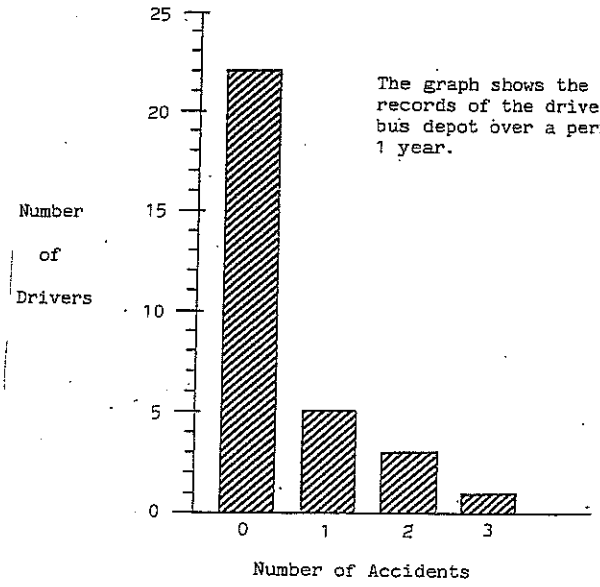
   A. 5^7 B. 5^{12} C. 25^7 D. 25^{12}

2. $\frac{6a^2}{2ab} =$

   A. $3ab$ B. $\frac{3a}{b}$ C. $6b$ D. $\frac{6}{b}$

3. The cost, $\$C$, of n books at $\$d$ each is given by

   A. $C = n + d$ B. $C = \frac{n}{d}$ C. $C = \frac{d}{n}$ D. $C = nd$

4. 

   What fraction of drivers had fewer than 2 accidents?

   A. $\frac{1}{31}$ B. $\frac{3}{31}$ C. $\frac{27}{31}$ D. $\frac{30}{31}$

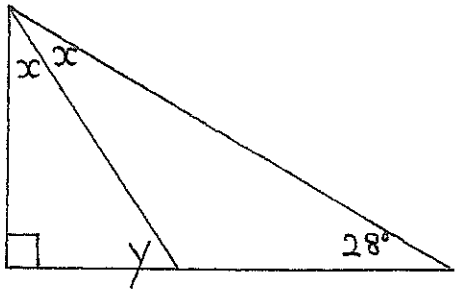
5.	Peter weighs 86kg. After one year his weight has increased by 12%. What is his new weight to the nearest kilogram? A. 10kg B. 93kg C. 96kg D. 98kg
6.	The mode of the scores 4, 4, 6, 7, 14 is A. 4 B. 6 C. 7 D. 10
7.	A set of 5 scores has a mean of 7. If another score, 7 is included, the mean A. increases B. decreases C. remains unaltered D. cannot be calculated from this information

8. If a rhombus is cut along an axis of symmetry, the resulting shapes are

A. Parallelograms B. Scalene Triangles

C. Isosceles Triangles D. Rhombuses

9.



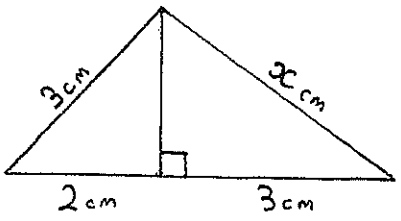
$y =$

A. 31 B. 56 C. 59 D. 62

10. $\frac{(a^4)^4}{a^2} =$

A. a^4 B. a^6 C. a^8 D. a^{14}

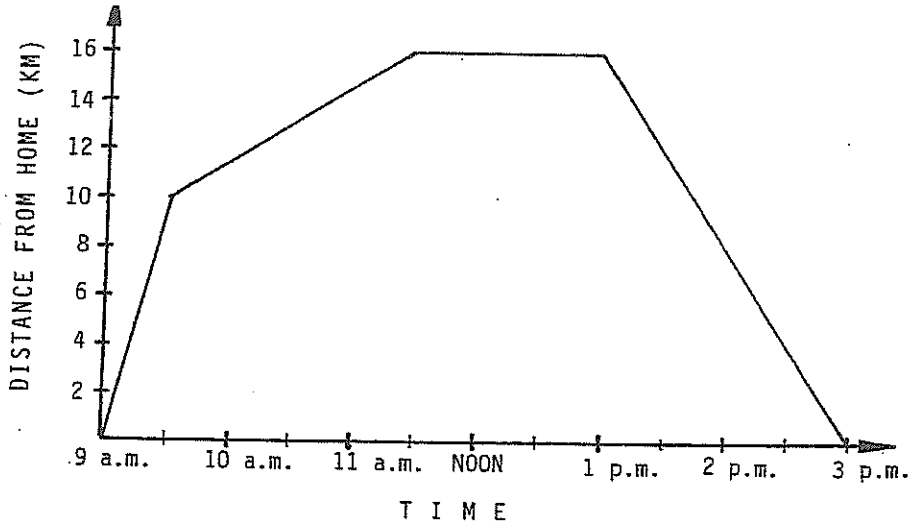
11.



$x =$

A. 4 B. $\sqrt{14}$ C. $\sqrt{22}$ D. $\sqrt{34}$

12.



The travel graph shows the distance of a cyclist from home.
The cyclist was travelling most quickly between

A. 9:00am and 9:30am

B. 9:30am and 11:30am

C. 11:30am and 1:00pm

D. 1:00pm and 3:00pm

13. $\frac{13}{4x} - \frac{2}{x} =$

A. $\frac{12}{x}$

B. $\frac{11}{2x}$

C. $\frac{11}{3x}$

D. $\frac{5}{4x}$

14. The value of $2x - 3y + 5$ *when* $x = -3$ *and* $y = 2$ is

A. -17

B. -7

C. 5

D. 17

15. At a shop John pays cash for a TV set and receives a 20% discount. Next day he sells the same TV for $600 making a profit of 20% on the price he paid. What was the original price for the TV?

A. $576

B. $600

C. $625

D. $720

Part B – (Show all working in space provided) **CALCULATORS ARE PERMITTED**

Question 16 – Percentages (12 marks-marks are indicated in brackets at end of each question)

A. Write $62\frac{1}{2}\%$ as a simplified fraction (1)	D. Convert $\frac{5}{12}$ into a percentage. (1)
B. Find 75% of 3 minutes. (Give your answer in minutes and seconds) (1)	E. In 1972, the Harbour Bridge Toll for motorbikes increased from 5c to 95c. Find the percentage increase. (2)
C. On a long journey a car used 85% of its full tank and $10\frac{1}{2}$ litres remained. Find the capacity of the full tank. (2)	F. Find the simple interest earned when \$2700 is invested for 30 months at $4\frac{1}{2}\%$ p.a. (2)

G. A house is sold on commission.
The commission is calculated as follows.

2% on the first $300,000 plus 3% on the amount in excess of $300,000

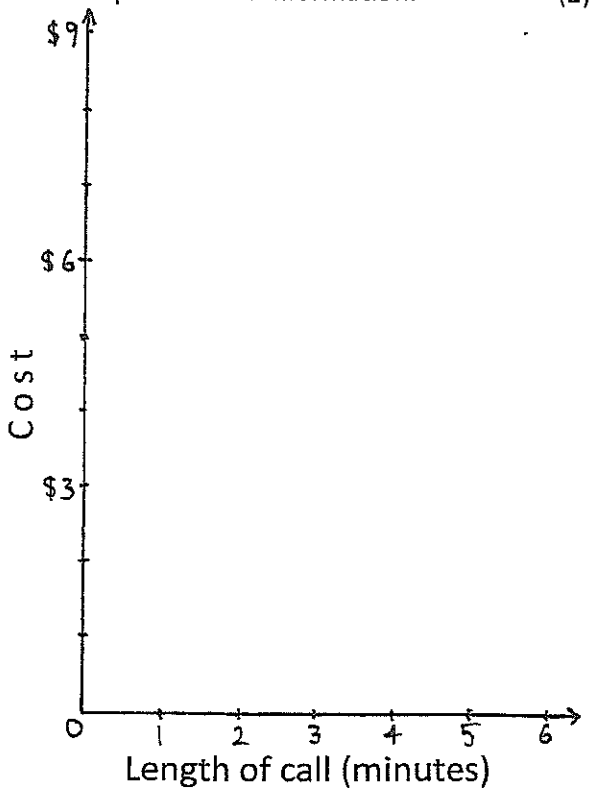
i. Find the commission earned on a house selling for $400,000. (1)

ii. John and Margaret were charged $27,000 commission on the sale of their home. How much did their house sell for? (2)

Question 17 – Pythagoras and Graphs (12 marks)

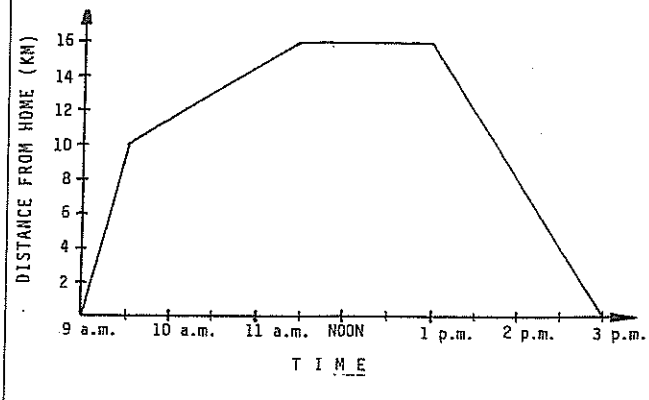
A. A telephone call to the south Pacific costs $4.50 for 3 minutes or less. Each additional minute (or part thereof) costs a further $1.50.

i. On the axes below draw a step graph to represent this information. (2)



ii. Use the above graph to find the cost of a $5\frac{1}{2}$ minute call. (1)

B.



i. From the graph above, find the total distance travelled. (1)

ii. Find the average speed of the whole trip including the lunch break. (1)

C. Kilolitres of water used by a family in a year.

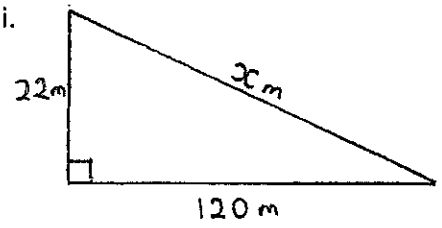
Purpose	Amount used (kilolitres)
Showers	540
Washing clothes	216
Toilet	162
Garden	72
Washing dishes	54
Cooking and drinking	36
Total	1080

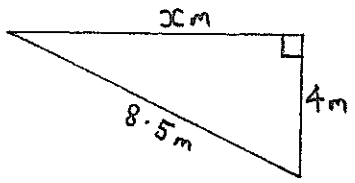
i. If this information is to be represented on a sector graph, calculate the angle at the centre of the sector representing 'Garden'. (1)

ii. What percentage of water is used to flush toilets? (1)

D. Find the missing sides in: (2)

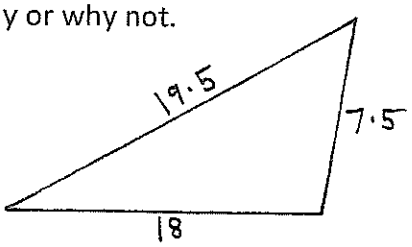
i.



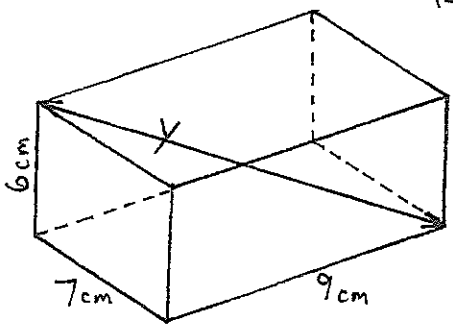
ii. 

(1)

E. Is the triangle right angled? Show why or why not. (1)



F. The figure is a rectangular prism. Find the value of y, correct to 2 decimal places. (2)



Question 18 – Algebra (12 marks)

A. Simplify each of the following: (5)

i. $-12x - 6 + 9x - 4x + 2$

ii. $5ab \times -3a$

iii. $12x \div 18y$

iv. $3p^4 \times 6p^2 \div 9p$

v. $4(x^2)^0$

B. If $f(x) = 2x^2 - 3x$, evaluate $f(-2)$ (1)

C. Factorise fully

i. $18x - 24$ (1)

ii. $3(x+1) + x\,(x+1)$ (1)

D. Expand and simplify (2)

$$-3\,(2x-1) + 2\,(x-4)$$

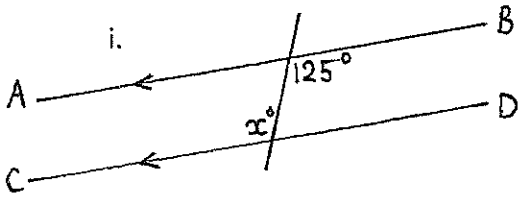
E. Write as a single fraction (2)

I. $\frac{5x}{4} \div \frac{7x^2}{8}$

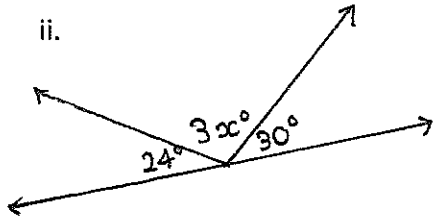
Question 19 – Geometry (12 marks)

A. Find the missing pronumerals and give a reason for your answer

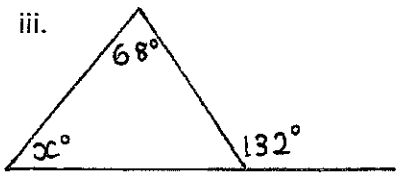
i. (2)



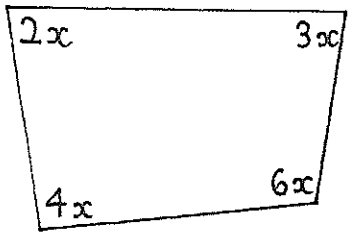
ii. (2)



iii. (2)

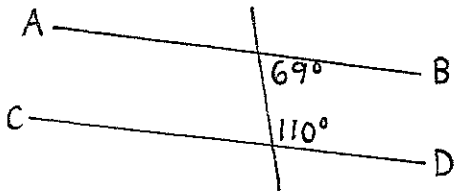


iv. (2)

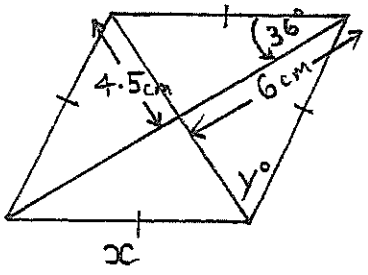


B. In the diagram below, is AB//CD?

Give a reason. (2)



C. In the rhombus below, find x and y (no reasons required) (2)



Question 20 – Statistics (12 marks)

A. Write down the range and median of this set of numbers:
$\{0,6,9,11,19,20\}$ (2)

B. The test marks of a maths class of year 9 students are listed on the ordered back to back stem – and – leaf plot below:

Boys		Girls
3	2	
	3	
8 6 6	4	0 9
9 6 5 5 3	5	3 3 4 5 5
4 4	6	3 8 9
	7	4 6 6 6
5 0	8	

i. Are there more boys or girls in this class and by how much? (1)

ii. What was the highest score and was it scored by a boy or girl? (1)

iii. What was the median score for boys? (1)

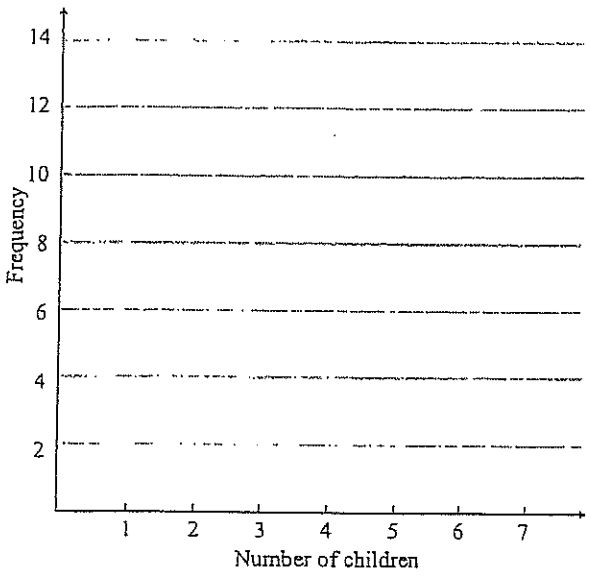
C. A group of students were surveyed on the number of children in their families. The results are shown in the frequency table below.

Score (x)	Frequency (f)	fx
1	5	
2	10	
3	14	
4	7	
5	4	
6	3	
Totals		

i. How many students were surveyed? (1)

ii. Draw a frequency histogram and polygon for this data on the axes provided. (2+2)

ii.



iii. Complete the fx column in the table and use it to find the mean number of children per family (correct to one d.p) (2)

END OF TEST

Name: _____

Teacher: _____

SECTION A: MULTIPLE CHOICE

Instructions:

- Circle the letter that best answers the question
- One mark each

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

Teacher: _____

SECTION A: MULTIPLE CHOICE

Instructions:

- Circle the letter that best answers the question
- One mark each

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

Part B – (Show all working in space provided) CALCULATORS ARE PERMITTED

Question 16 – Percentages (12 marks-marks are indicated in brackets at end of each question)

A. Write $62\frac{1}{2}\%$ as a simplified fraction (1)

$\frac{5}{8}$

D. Convert $\frac{5}{12}$ into a percentage. (1)

Accept

$41\frac{2}{3}\%$

41.6%

41.7%

B. Find 75% of 3 minutes. (Give your answer in minutes and seconds) (1)

2 min 15 sec

E. In 1972, the Harbour Bridge Toll for motorbikes increased from 5c to 95c. Find the percentage increase. (2)

$\frac{90}{5} \times \frac{100}{1} = 1800\%$

C. On a long journey a car used 85% of its full tank and $10\frac{1}{2}$ litres remained. Find the capacity of the full tank. (2)

$\frac{10\frac{1}{2}}{3} \times 20 =$

70L

F. Find the simple interest earned when \$2700 is invested for 30 months at $4\frac{1}{2}\%$ p.a. (2)

$2700 \times 2\frac{1}{2} \times \frac{4.5}{100}$

$= \$303.75$

G. A house is sold on commission.
The commission is calculated as follows.

2% on the first $300,000 plus 3% on the amount in excess of $300,000

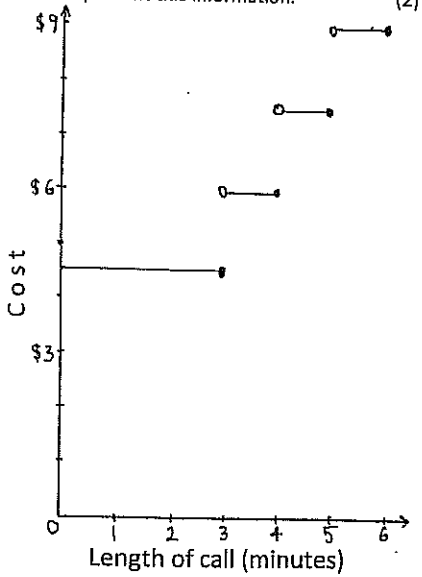
i. Find the commission earned on a house selling for $400,000. (1)

ii. John and Margaret were charged $27,000 commission on the sale of their home. How much did their house sell for? (2)

Question 17 – Pythagoras and Graphs (12 marks)

A. A telephone call to the south Pacific costs $4.50 for 3 minutes or less. Each additional minute (or part thereof) costs a further $1.50.

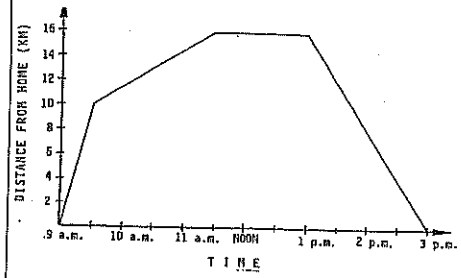
i. On the axes below draw a step graph to represent this information. (2)



ii. Use the above graph to find the cost of a $5\frac{1}{2}$ minute call. (1)

$9.

B.



i. From the graph above, find the total distance travelled. (1)

32 Km

ii. Find the average speed of the whole trip including the lunch break. (1)

$32 \div 6 = 5\frac{1}{3}$ km/h
(5·3 km/h OK).

C. Kilolitres of water used by a family in a year.

Purpose	Amount used (kilolitres)
Showers	540
Washing clothes	216
Toilet	162
Garden	72
Washing dishes	54
Cooking and drinking	36
Total	1080

i. If this information is to be represented on a sector graph, calculate the angle at the centre of the sector representing 'Garden'. (1)

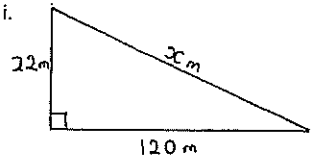
$\frac{72}{1080} \times \frac{360}{1} = 24°$

ii. What percentage of water is used to flush toilets? (1)

$\frac{162}{1080} \times \frac{100}{1} = 15\%$

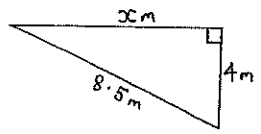
D. Find the missing sides in: (2)

i.



$x^2 = 22^2 + 120^2$

$x = 122$ (accept if they forget m)

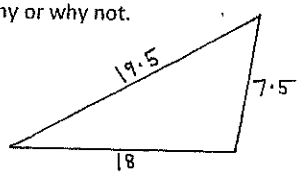
ii. 

(1)

$x^2 = 8.5^2 - 4^2$

$x = 7.5$ (accept if they forget m).

E. Is the triangle right angled? Show why or why not. (1)



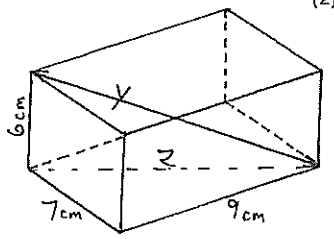
$19.5^2 = 18^2 + 7.5^2$

$380.25 = 324 + 56.25$

$= 380.25$ ✓

∴ Right Angled

F. The figure is a rectangular prism. Find the value of y, correct to 2 decimal places. (2)



$z^2 = 7^2 + 9^2 = 130$

$y^2 = 6^2 + z^2$

$= 36 + 130$

$y = 12.88$ cm

Question 18 – Algebra (12 marks)

A. Simplify each of the following: (5)

i. $-12x - 6 + 9x - 4x + 2$

$-7x - 4$

ii. $5ab \times -3a$

$-15a^2b$

iii. $12x \div 18y$

$\frac{12x}{18y} = \frac{2x}{3y}$

iv. $3p^4 \times 6p^2 \div 9p$

$2p^5$

v. $4(x^2)^0$

4

B. If $f(x) = 2x^2 - 3x$, evaluate $f(-2)$ (1)

14

C. Factorise fully

i. $18x - 24$ (1)

$6(3x - 4)$

ii. $3(x+1) + x(x+1)$ (1)

$(x+1)(3+x)$

D. Expand and simplify (2)

$-3(2x - 1) + 2(x - 4)$

$-4x - 5$

E. Write as a single fraction (2)

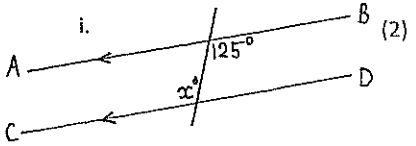
I. $\frac{5x}{4} \div \frac{7x^2}{8}$

$\frac{5x^1}{4_1} \times \frac{8^2}{7x^1}$

$\frac{10}{7x}$

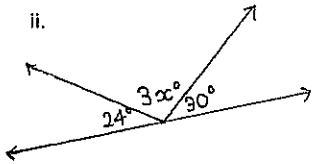
Question 19 – Geometry (12 marks)

A. Find the missing pronumerals and give a reason for your answer

i. 

(2)

$x = 125°$ (Alternate angles AB // CD)

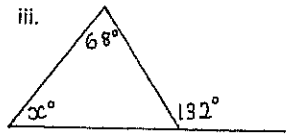
ii. 

(2)

$24 + 3x + 30 = 180$ (Straight Angle)

$3x = 126$

$x = 42°$

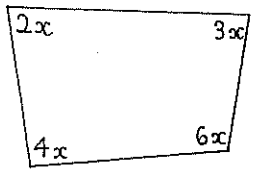
iii. 

(2)

$x + 68 = 132$ (Exterior angle of a triangle equals sum of two interior opposite angle)

$x = 64°$

iv. (2)



$2x+3x+4x+6x=360$

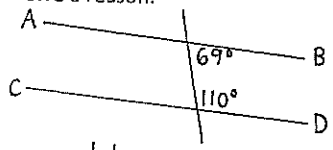
(Angle sum of quadrilateral)

$15x=360$

$x=24°$

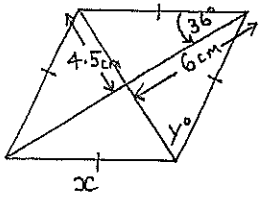
B. In the diagram below, is AB//CD?

Give a reason. (2)



No, the cointerior angles are not supplementary

C. In the rhombus below, find x and y (no reasons required) (2)



$x^2=4.5^2+6^2$

$x=7.5$

$y=54°$

Question 20 – Statistics (12 marks)

A. Write down the range and median of this set of numbers:
{0,6,9,11,19,20} (2)

Range = 20

Median = 10

B. The test marks of a maths class of year 9 students are listed on the ordered back to back stem – and – leaf plot below:

Boys		Girls
3	2	
	3	
.8 6 6	4	0 9
9 6 5 5 3	5	3 3 4 5 5
4 4	6	3 8 9
	7	4 6 6 6
5 0	8	

13 boys 14 girls

i. Are there more boys or girls in this class and by how much? (1)

More girls by one.

ii. What was the highest score and was it scored by a boy or girl? (1)

85 boy

iii. What was the median score for boys? (1)

55

C. A group of students were surveyed on the number of children in their families. The results are shown in the frequency table below.

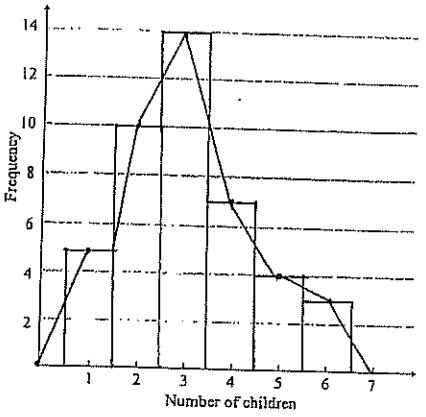
Score (x)	Frequency (f)	fx
1	5	5
2	10	20
3	14	42
4	7	28
5	4	20
6	3	18
Totals	43	133

i. How many students were surveyed? (1)

43

ii. Draw a frequency histogram and polygon for this data on the axes provided. (2+2)

ii.



iii. Complete the fx column in the table and use it to find the mean number of children per family (correct to one d.p) (2)

$\bar{x}=\frac{\Sigma fx}{\Sigma f}$

$=\frac{133}{43}$

$=3.1$

END OF TEST