

Mathematics Entrance Exam

OLDHAM HULME GRAMMAR SCHOOL

Exemplar solution by students

Section A The following questions should be done without writing any working out. Each correct answer is worth 1 mark.

1. Write down the value of the 6 in the number 405, 060. sixty.....
2. Write down the answer to 5×16 . 80.....
3. Write down the answer to $136 + 264$. 400.....
4. How many degrees are there in a right angle? 90°.....
5. Write $\frac{6}{20}$ as a percentage. 30%.....
6. Write the answer to $2\frac{1}{2} \div \frac{1}{4}$. 10.....
7. Write down the next number in the sequence 1, 2, 6, 24, 120.....
8. Write down the answer to $272 \div 8$. 34.....
9. Write $\frac{3}{5}$ as a decimal. 0.6.....
10. Change 2.3 Kilograms into grams. 2300g.....
11. The temperature, -6°C rises by 13°C , write down the new temperature. 7.....°c
12. Write down the length of a square with an area of 121cm^211cm.....
13. What is the value of $42 \div 6 - 4$? 3.....
14. Is 387 divisible by 3? Write down 'yes' or 'no'. yes.....
15. Write $\frac{23}{4}$ as a mixed number? 5³/₄.....

(Total 15 marks)

Section B For these questions show your working in the spaces provided.

1. A football team make a list of the number of goals scored in a season.

0	1	3	1	3	2	0	2	1
2	2	3	0	1	3	3	1	3
3	4	2	1	4	0	1	2	3

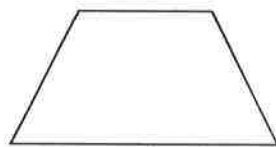
Complete the tally chart.

Goals scored	Tally	Frequency
0		4
1		7
2		6
3		8
4		2
	Total	27

(Total 3 marks)

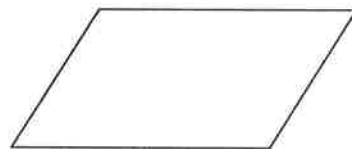
2. (a) Write down the mathematical name of each of these quadrilaterals.

(i)



(i) trapezium.....

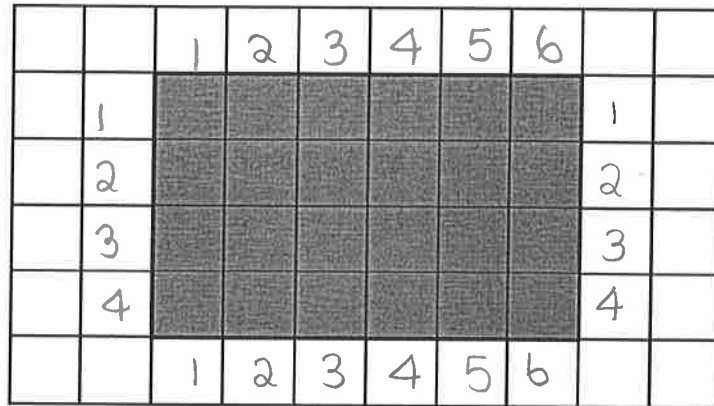
(ii)



(ii) parallelogram.....

(Total 2 marks)

3. (a) The diagram shows a grey rectangle drawn on a centimetre grid.



Work out the perimeter of the grey rectangle.

$4 + 4 + 6 + 6 = 20$

...20... cm

(1)

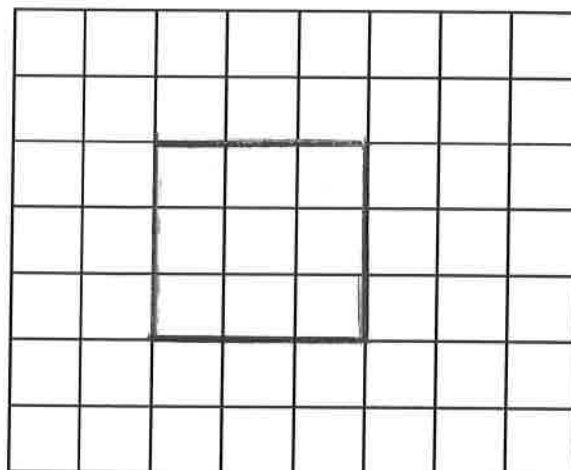
- (b) The perimeter of a **square** is 12 cm.

Draw the **square** on the grid below.

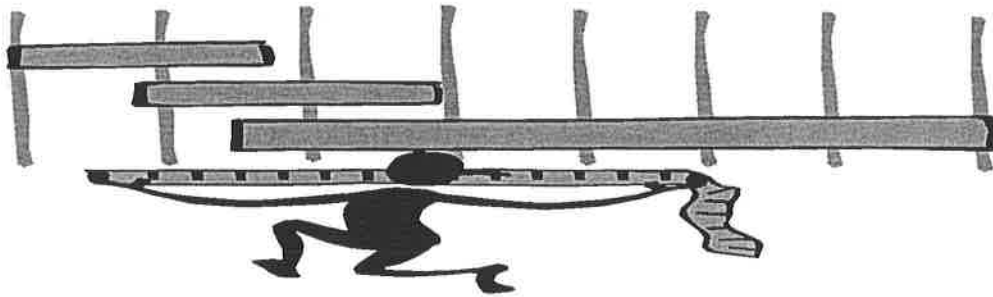
$12 \div 4 = 3 \text{ cm}$

check:

$3 + 3 + 3 + 3 = 12 \text{ cm}$



(2)
(Total 3 marks)



4. Write down how many:

(a) days in 3 weeks?

$$7 + 7 + 7 = 21$$

.....21.....

(b) metres in 450 cm?

$$450 \div 100 = 4.5$$

.....4.5.....

(c) minutes in $1\frac{1}{4}$ hours? $60 + 15 =$
 1 hour = 60 mins $\frac{1}{4}$ hr = 15 mins

.....75.....

(d) seconds in $2\frac{1}{2}$ minutes?

$$2 \text{ mins} = 120 \text{ seconds} \quad 120 + 30 =$$

$$\frac{1}{2} \text{ min} = 30 \text{ seconds}$$

.....150.....

(e) metres in $5\frac{1}{2}$ km? $5000 + 500$
 $5 \text{ km} = 5000 \text{ m} \quad \frac{1}{2} \text{ km} = 500 \text{ m}$

.....5500.....

(f) months in $1\frac{1}{6}$ years?

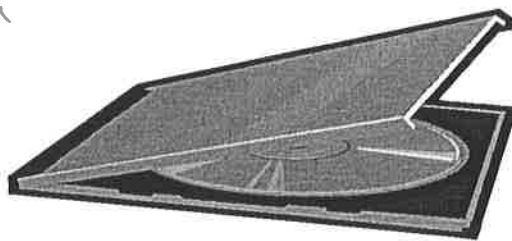
$$12 \text{ month} = 1 \text{ year} \quad 12 + 2 = 14$$

$$\frac{1}{6} \text{ year} = 2 \text{ month}$$

$$12 \div 6 = 2 \quad \nearrow$$

.....14.....

(Total 6 marks)



5. Hamza is packing CD-ROMs into boxes of six. He has 79 CD-ROMs.

How many boxes can he fill?

$$6 \times 12 = 72$$

$$6 \times 13 = 78 \text{ (closest to 79)}$$

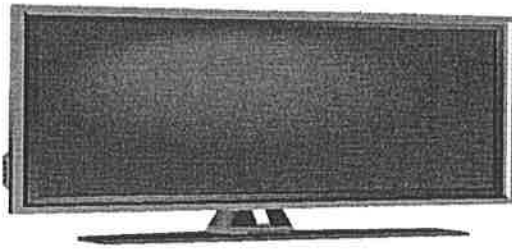
How many more CD-ROMs will he need to fill another box?

$$78 + 6 = 84 - 79 = 5$$

.....13.....

.....5.....

(Total 2 marks)



6. Sarah is watching her favourite TV programme. It lasts for two hours and forty minutes. If it starts at 11.55 am. At what time will the programme finish?

$$\begin{array}{r}
 11.55 \qquad \qquad \qquad 14.35 \\
 \hline
 \text{2hrs 40mins}
 \end{array}$$

$$11.55 + 2\text{hrs} = 13.55 + 40\text{mins} = 14.35 \quad (\text{Total 1 mark})$$

7. (a) Two numbers added together make 18. The same numbers multiplied together make 45.

trail and error

$$\begin{array}{l}
 3 + 15 = 18 \\
 3 \times 15 = 45 \quad (\checkmark) \\
 12 + 6 = 18 \quad (\text{X}) \\
 12 \times 6 = 72 \quad (\text{X})
 \end{array}$$

What are the two numbers?

..... 3 and 15

- (b) Anita thinks of a number. She multiplies it by 8 and then takes away 3.

Her answer is 45. What was the number she thought of? 6

(Total 2 marks)

8. Sameera has just done three tests.

She got: 32 out of 50 for French, 19 out of 25 for Chemistry and 18 out of 20 for English.

- (a) Which test did she do best in?

$$F = \frac{32}{50} = \frac{64}{100}$$

$$C = \frac{19}{25} = \frac{76}{100}$$

$$E = \frac{18}{20} = \frac{90}{100}$$

..... English

- (b) What percentage did she get in this subject?

..... 90%

(Total 2 marks)

9. Write down the answers to:

(a) $20 \times 40 =$ 800
 $2 \times 4 = 8$
 $8 \times 100 = 800$

(b) $11 \times 200 =$ 2200
 $11 \times 2 = 22$
 $22 \times 100 = 2200$

(c) $380 \div 20 =$ 19
 $38 \div 2 = 19$

(d) $1350 \div 50 =$ 27
 $135 \div 5 = 27$

(Total 4 marks)



10. Amie buys

a book for £5.99
 a newspaper for £1.80
 3 pens for 27p each.

$$\begin{array}{r} \pounds 5.99 \\ + \pounds 1.80 \\ \pounds 0.81 \quad (3 \times 27p) \\ \hline \pounds 8.60 \end{array}$$

She only has a £10 note.

How much change should she receive?
 You **must** show your working.

$$\begin{array}{r} \pounds 10.00 \\ - \pounds 8.60 \\ \hline \pounds 1.40 \end{array}$$

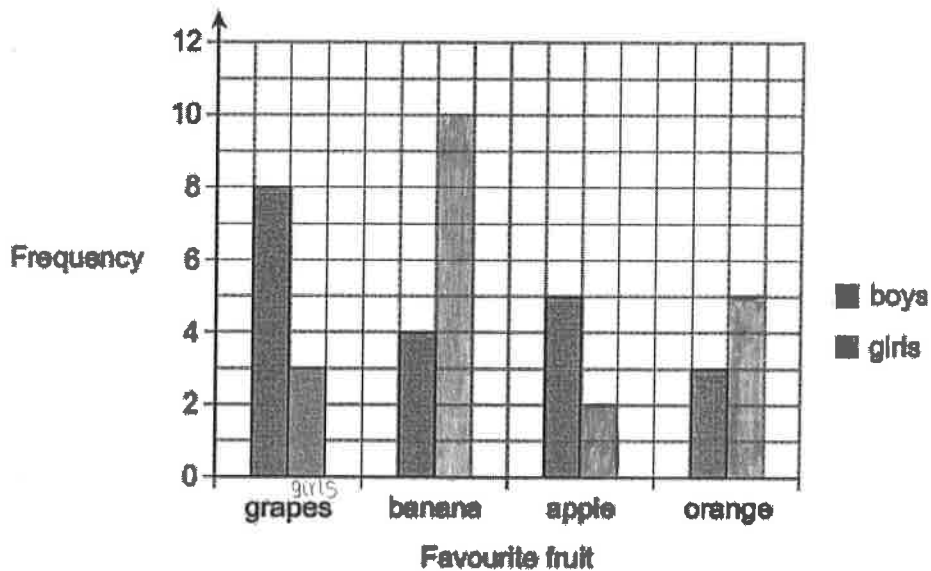
Change = £ 1.40

(Total 4 marks)

11. Callum asks some boys and girls to choose their favourite fruit.

He is drawing a dual bar chart of the results.

Callum has only drawn the first bar of the results for the girls.



- (a) How many more boys than girls choose grapes?

$$8 - 3 = 5$$

(1)

- (b) How many boys does Callum ask altogether?

$$8 + 4 + 5 + 3 = 20$$

(2)

- (c) Callum asks the same number of boys and girls.
Two girls choose apple.
Twice as many girls choose banana as choose orange.

Complete the bar chart.

$$3 + 2 = 5$$

$$20 - 5 = 15 \text{ girls}$$

10 chose banana

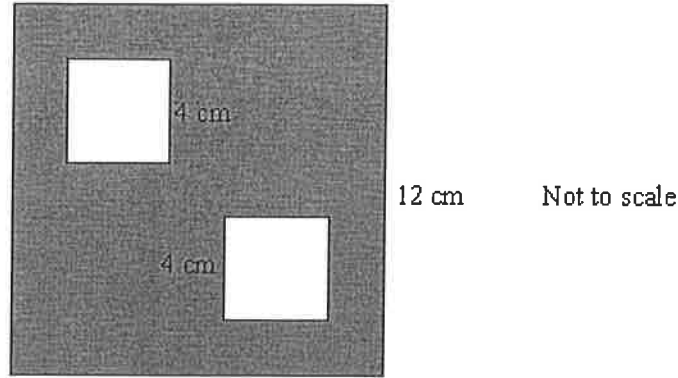
5 chose orange

$$15 - 10 = 5$$

$$5 \times 2 = 10$$

(3)
(Total 6 marks)

12. Two squares of side 4 cm are removed from a square tile of side 12 cm as shown.



Work out the shaded area of the tile.

$$12 \times 12 = 144$$

$$4 \times 4 = 16$$

$$16 \times 2 = 32$$

$$144 - 32 = 112$$

Shaded area = 112 cm^2

(3)
(Total 3 marks)

13. Here is a table for a two-stage number machine. It divides by 2 then subtracts 1. Complete the missing numbers in the table.

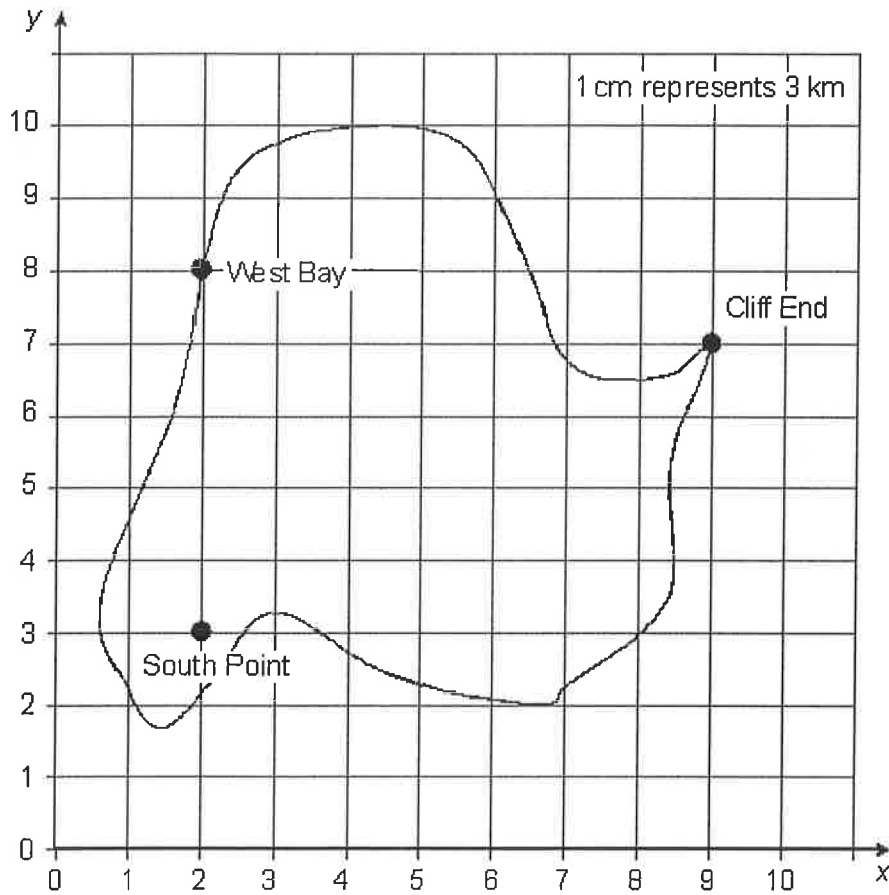
÷ 2 - 1	
Input	Output
6	2
7	2.5
10	4
11	4.5
17	7.5

$$7.5 + 1 \times 2$$

(3)
(Total 3 marks)

14. A map is drawn on a centimetre grid.

1 cm represents 3 km.



(a) Write down the coordinates of South Point.

(..... 2 , 3)

(1)

(b) Write down the coordinates of West Bay.

(..... 2 , 8)

(1)

(c) Work out the actual distance between South Point and West Bay.

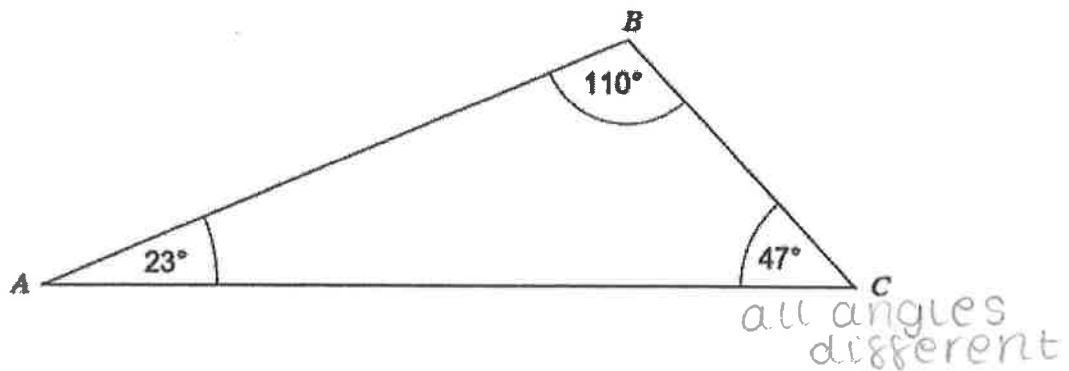
$$5 \times 3 = 15$$

..... 15 km

(2)

(Total 4 marks)

15. The diagram shows a triangle ABC .



(a) What type of triangle is ABC ? ..scalene.....

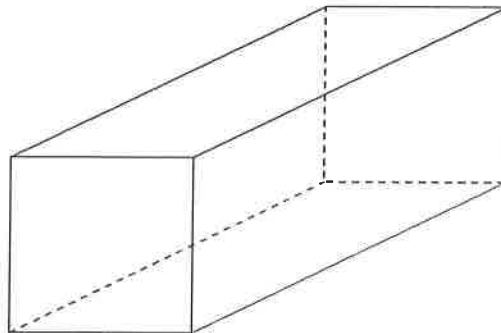
(d) Write down the correct word to describe the type of angle at B .

over 180°

..obtuse.....

(Total 2 marks)

- 16.



Here is a diagram of a cuboid.

Write down the number of

(i) faces

.....6.....

(ii) edges

.....12.....

(iii) vertices

.....8.....

(Total 3 marks)

17. In the diagrams below you have to fill in the letter which shows how to change the first number into the second number.

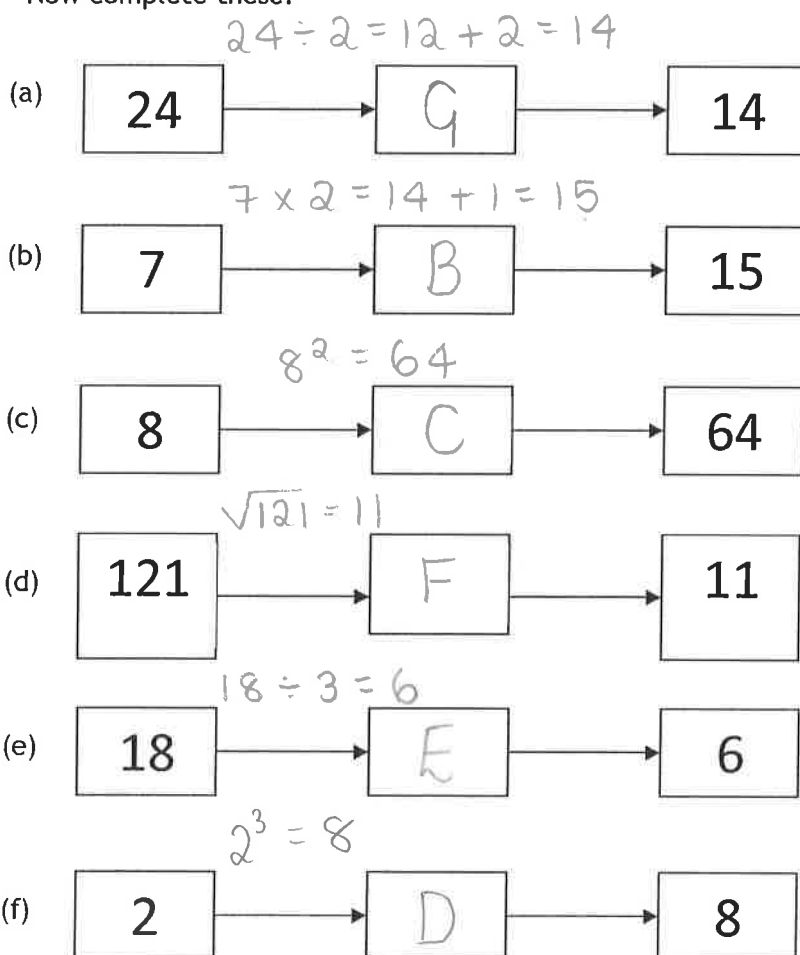
The rules are:

- A "double the number"
- B "double the number and add one"
- C "square the number"
- D "cube the number"
- E "divide the number by three"
- F "find the square root of the number"
- G "halve the number and add two"

Here is an example.



Because if you double 11 you get 22.
Now complete these.



(Total 6 marks)



18. Trevor buys five packets of crisps.
The change from £3.00 is 75 pence.

How much is one packet of crisps?

$$\begin{array}{r} \pounds 3.00 \\ - \pounds 0.75 \\ \hline \end{array}$$

$$\pounds 2.25 = 225p$$

$$\begin{array}{r} 045 \\ 5 \overline{) 225} \\ \underline{20} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

.....45 pence

(Total 2 marks)

19. Mrs Moore parked her car in a car park at 9.00 am. She drove out of the car park at 4.00 pm.

16.00pm

Car Parking Charges

£1.80 per hour

- (a) How much did she pay, in total, for parking her car from 9.00 am to 4.00 pm?

$$\begin{array}{l} 16.00 - 9.00 = 7 \text{ hrs} \\ \pounds 1.80 \times 7 = 12.60 \end{array}$$

£12.60.....

(2)

- (b) The following day she pays £7.20. For how many hours did she park?

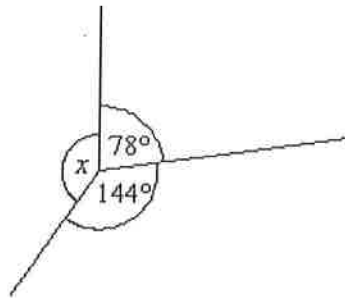
$$\begin{array}{l} \pounds 7.20 \div \pounds 1.80 = 4 \\ 720p \div 180p = 72 \div 18 = 4 \end{array}$$

.....4 hours

(3)

(Total 5 marks)

20. (a)



angles
around = 360°
a point

Not drawn accurately

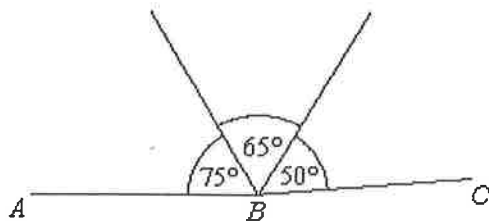
Work out the value of x .

$$144 + 78 = 222^\circ$$
$$360 - 222 = 138^\circ$$

$x = \dots\dots\dots 138 \dots\dots\dots$ degrees

(2)

(b)



Not drawn accurately

Jasmine says that if this diagram was drawn accurately then ABC would be a straight line.

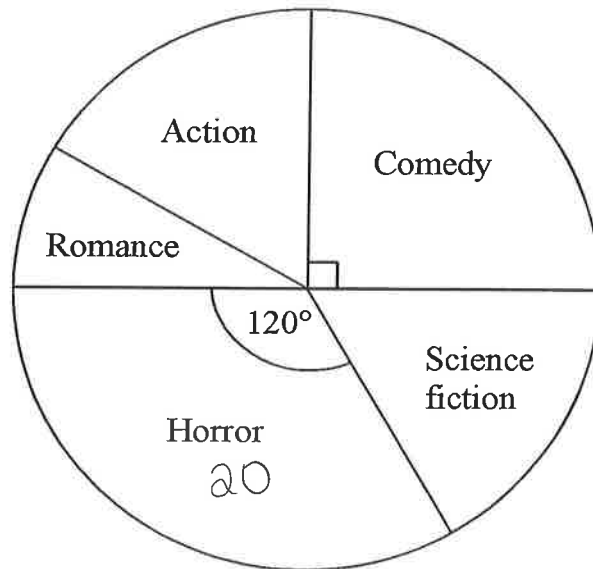
Is she right?

You **must** explain your answer. **NO**

because angles on a straight line have to add up to 180° and $75 + 50 + 65 = 190^\circ$

(2)
(Total 4 marks)

21. Colin carried out a survey.
He asked some students in Year 10 which type of film they liked best.
He used the results to draw this pie chart.



Not drawn accurately

- (a) What fraction of the students said "Comedy"?

$$\frac{1}{4}$$

(1)

20 students said "Horror".

- (b) Work out the total number of students Colin asked.

$$\begin{array}{r} \times 3 \downarrow \\ 120^\circ \quad 20 \text{ students} \\ \hline 360^\circ \quad 60 \quad \dots\dots\dots 60 \end{array}$$

(2)

(Total 3 marks)

22. Work out $\frac{2}{3} + \frac{1}{5}$

find common denominator

$$\frac{2}{3} = \frac{10}{15}$$

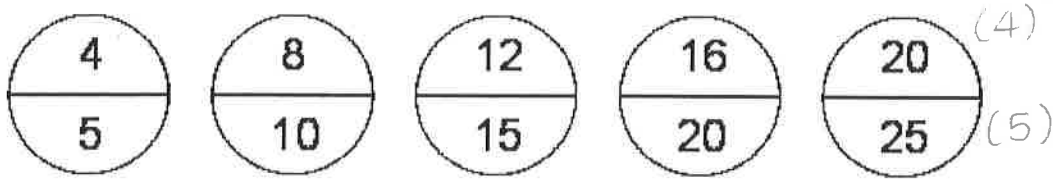
$$\frac{1}{5} \begin{array}{l} \times 5 \\ \times 3 \\ \hline = \frac{3}{15} \end{array}$$

$$\frac{10}{15} + \frac{3}{15}$$

$$\frac{13}{15}$$

(Total 2 marks)

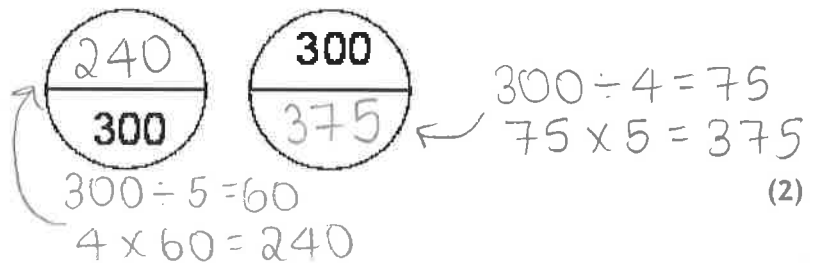
23. Here are some circles each containing two numbers.



The numbers are in a pattern.
 The numbers in the top of each circle are multiples of four.
 The numbers in the bottom of each circle are multiples of five.

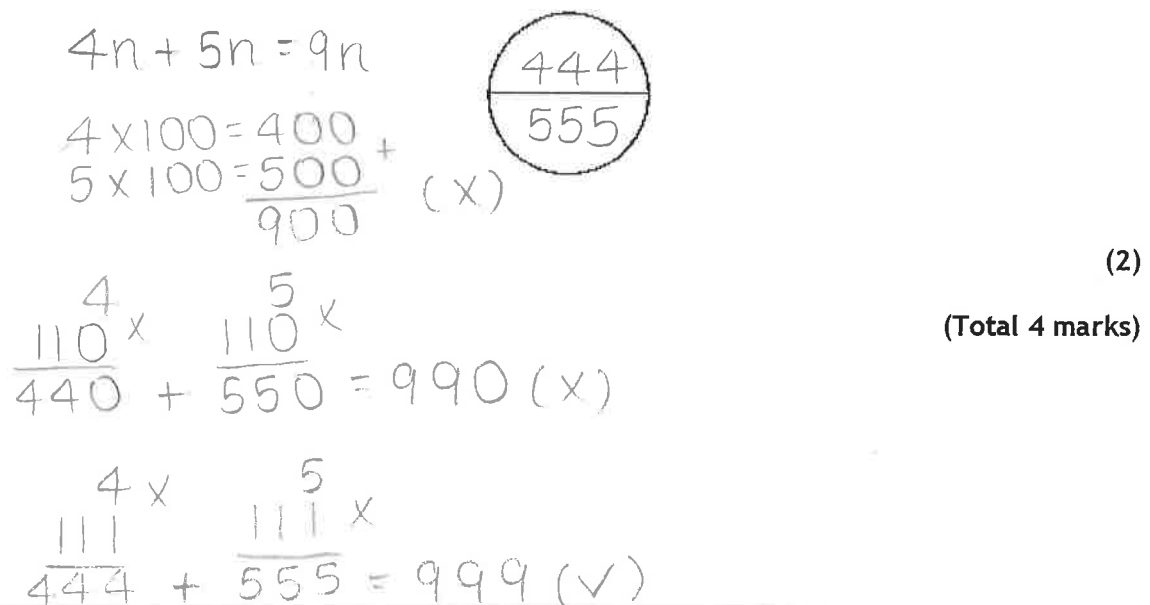
(a) Here are two more circles in the pattern.

Write in the missing numbers.



(b) Here is another circle in the pattern.

Write the two numbers in the circle so that their total is closest to 1000.



24. Romana picks a number.



My number has 2 digits
and is a factor of 36.

- (a) One number that she could pick is 36.
Write down the other **two** numbers that Romana could pick.

$$1 \times 36 = 36 \quad 3 \times 12 = 36$$

$$2 \times 18 = 36 \quad 4 \times 9 = 36$$

..... 12 18 36

(2)

- (b) Romana gives some more clues about the number.



If I add the digits in my number,
I get a square number.

If I multiply the digits in my number,
I get a cube number.

What number does Romana pick?
You **must** show your working.

18 or 12

cube
numbers

$$1$$

$$\textcircled{8}$$

$$27$$

$$1 + 8 = 9$$

$$1 + 2 = 3$$

$$1 \times 8 = 8$$

$$1 \times 2 = 2$$

square
numbers

$$1$$

$$4$$

$$\textcircled{9}$$

$$16$$

18

.....

(2)
(Total 4 marks)

For each of the following questions circle the correct answer.

25. Peter has three times as many sisters as brothers. His sister Louise has twice as many sisters as brothers. How many children are there in the family?

$$p = \text{sisters} : \text{brothers} \\ 3 : 1$$

A 15

B 13

C 11

D 9

E 5

$$L = \text{sisters} : \text{brothers} \\ 2 : 1$$



26. The Grand Old Duke of York had 10,000 men. He lost 10% of them on the way to the top of the hill, and he lost 15% of the rest as he marched them back down the hill. What percentage of the 10,000 men were still there when they reached the bottom of the hill?

A 76½%

B 75%

C 73½%

D 66⅔%

E 25%

27. How many hexagons are there in the diagram?



A 4

B 6

C 8

D 10

E 12

28. In our school netball league a team gains a certain whole number of points if it wins a game, a lower whole number of points if it draws a game and no points if it loses a game. After 10 games my team has won 7 games, drawn 3 and gained 44 points. My sister's team has won 5 games, drawn 2 and lost 3. How many points has her team gained?

A 28

B 29

C 30

D 31

E 32

$$44 \text{ points} = 7 \text{ won} + 3 \text{ drawn (10 games)}$$

$$0 \text{ points} = \text{lost} = 5 \text{ won} + 2 \text{ drawn} + 3 \text{ lost}$$

$$5 \text{ points} = \text{win}$$

$$3 \text{ points} = \text{draw}$$

$$7 \times 5 + 3 \times 3 = 44$$

$$5 \times 5 + 2 \times 3 + 0 = 31$$

29. Two numbers in the 4 x 4 grid can be swapped to create a Magic Square (in which all rows, all columns and both main diagonals add to the same total).

What is the sum of these two numbers?

$$13 + 15 = 28$$

34 34 34 34 34

9	6	3	16	34
4	13	10	5	34
14	1	8	11	34
7	12	15	2	34

A 12

B 15

C 22

D 26

34
E 28

END OF EXAMINATION

Total marks for sections A and B = 100

Check all your answers if you have time.