

Name: _____

Examination Number: _____

Room Number: _____

WITHINGTON GIRLS' SCHOOL

ENTRANCE EXAMINATION 2013

MATHEMATICS

Paper 2

TIME: 40 MINUTES

- Some questions in this paper involve new ideas, but there are examples to guide you and help you understand these new ideas.
- Look at the examples carefully and try to answer all the questions.
- If you cannot answer a question, leave it and go on to the next one.
- Use any time you have left to check your answers and go back to any questions you have left out.

CALCULATORS MUST NOT BE USED

PAPER 2 TOTAL		
Marker's Initials		
Checker's Initials		

Do not write in this margin

1. Each half of a hockey match lasted 35 minutes and the half-time interval was 20 minutes. The match started at 10.45 am. What time did it finish?

1

Answer: _____pm

1

2. Andrew is three times as old as Louise. The sum of their ages is 84. How old is Louise?

1

Answer: _____

1

3. What is $\frac{3}{1-\frac{1}{2}}$?

1

Answer: _____

4. My train was due to leave Manchester Piccadilly at 14:25 and arrive in London Euston at 16:55. However the train left 4 minutes late. The journey was 8 minutes shorter than planned. At what time did I arrive at London Euston?

1

Answer: _____

5. This examination paper weighs 25g. If 250 girls sit the paper today, what will be the total weight of all their answer sheets? Give your answer in kilograms.

1

Answer: _____kg

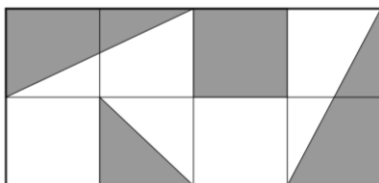
1

6. Find the smallest possible whole number which when divided by 2 leaves a remainder of 1 and when divided by 13 also leaves a remainder of 1.

1

Answer: _____

7. What fraction of the shape is shaded?



1

Answer: _____

1



8. Vani wants to buy $3\frac{1}{2}$ kg of steak costing £7.50 a kilogram. She only has a £20 note. How much more money does she need to buy the steak?

1
1
1

Answer: £ _____

9. These are two bills from Sally's Café:



Find the cost of a single tea and a single coffee.

1

1
1

1 tea costs : £ _____

1 coffee costs : £ _____

10. (a) In the following addition sum, *a*, *b*, *c* and *d* are single digits. Find them.

$$\begin{array}{r}
 1 \quad c \quad 4 \quad 7 \\
 + \quad 8 \quad 8 \quad b \quad a \\
 \hline
 1 \quad d \quad 2 \quad 1 \quad 9 \\
 \hline
 \end{array}$$

1
1
1
1

a = _____ *b* = _____ *c* = _____ *d* = _____

(b) In the following multiplication sum *f*, *g*, *h* and *k* are single digits. Find them.

$$\begin{array}{r}
 k \quad h \quad g \quad 4 \\
 \times \quad \quad \quad \quad 3 \\
 \hline
 2 \quad 1 \quad 4 \quad 6 \quad f \\
 \hline
 \end{array}$$

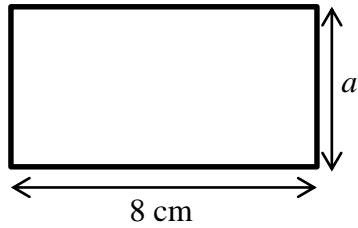
1
1
1
1

f = _____ *g* = _____ *h* = _____ *k* = _____



13. In this question the diagrams are not drawn to scale.

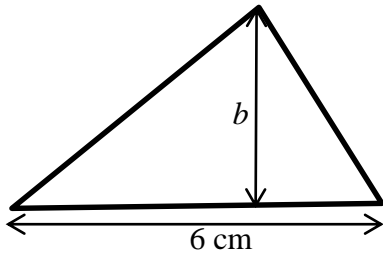
- (a) The area of the rectangle is 24 cm^2 . Find a



$a = \underline{\hspace{2cm}} \text{ cm}$

1

- (b) The area of the triangle is 15 cm^2 . Find b

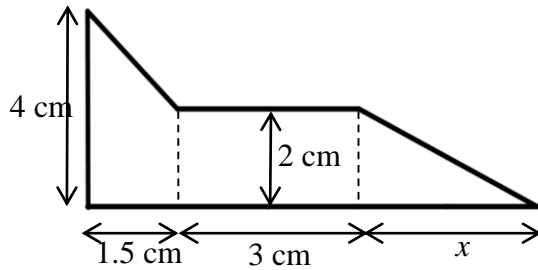


$b = \underline{\hspace{2cm}} \text{ cm}$

1

1

- (c) The area of the shape below is 13 cm^2 . Find x



$x = \underline{\hspace{2cm}} \text{ cm}$

1

1

1

14. \otimes means divide the first number by 3 then add the second number

For example $12 \otimes 5 = 12 \div 3 + 5 = 4 + 5 = 9$

Find the values of \blacksquare , \star and \blacklozenge .

(a) $18 \otimes 10 = \blacksquare$

$\blacksquare = \underline{\hspace{2cm}}$

1

1

(b) $15 \otimes \star = 12$

$\star = \underline{\hspace{2cm}}$

1

1

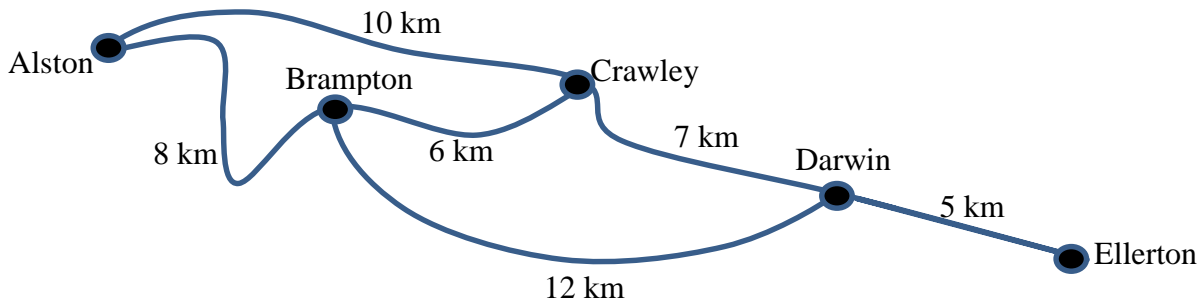
(c) $\blacklozenge \otimes 7 = 15$

$\blacklozenge = \underline{\hspace{2cm}}$

1

1

15. The diagram shows the distances in kilometres between 5 towns:



(a) The table below shows the shortest distance in kilometres between any two towns. Complete the table:

Alston	x				
Brampton	8	x			
Crawley	10	6	x		
Darwin				x	
Ellerton	22			5	x
	Alston	Brampton	Crawley	Darwin	Ellerton

Speed is a measure of how fast you are moving.

If Emma travels 60km in 3 hours, this means she travels 20km in 1 hour, so her speed is 20km/h (km/h means kilometres per hour).

(b) Lizzie cycles from Alston to Ellerton in 2 hours. What is her speed in km/h?

_____ km/h

(c) Lucy cycles from Brampton to Crawley in 30 minutes. What is her speed in km/h?

_____ km/h

(d) Richard drives from Alston to Crawley at a speed of 40km/h. How long does the journey take him?

_____ mins

(e) Ayesha drove at 30km/h for 10 minutes. Between which two towns did she drive?

_____ and _____

1
1
1

1

1

1

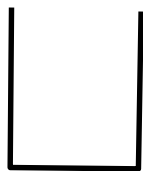
1

1

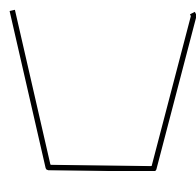
1

1

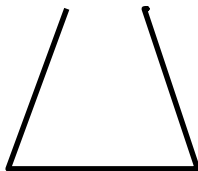
16. Water is poured at the same rate into each of the containers A, B, C and D



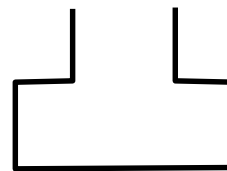
A



B



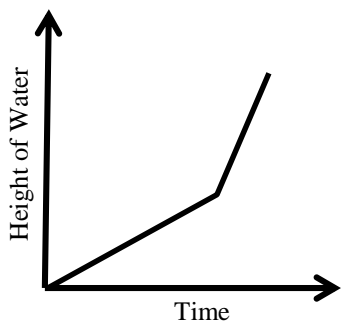
C



D

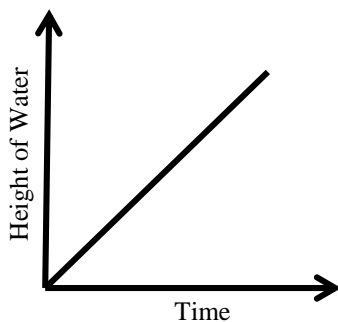
(a) The graphs X, Y and Z show how the water level rises. Decide which graph fits each container. One of the containers is not needed.

Graph X



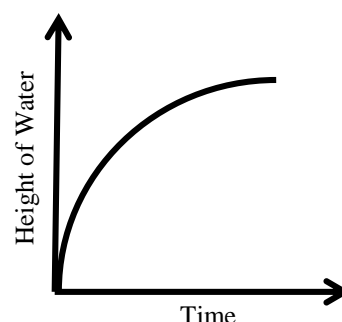
Container = _____

Graph Y



Container = _____

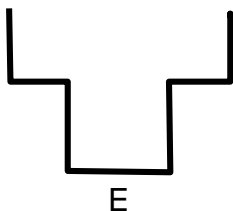
Graph Z



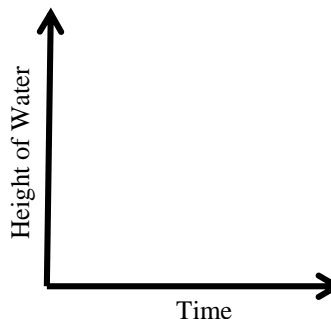
Container = _____

1
1
1

(b) On the axes draw a graph for container E.



E



1
1

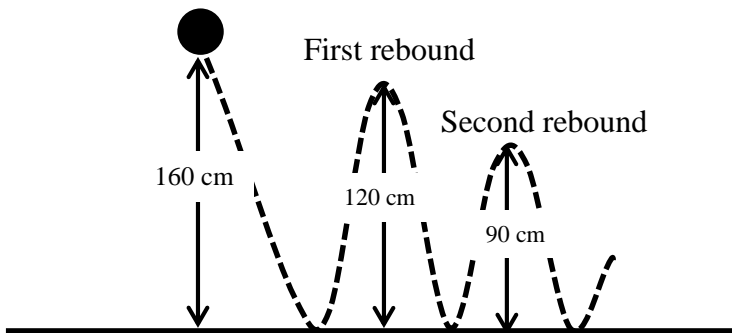
17. The total cost of a necklace, bracelet and ring is £350. The necklace costs twice as much as the bracelet. The ring is £10 cheaper than the bracelet. What is the cost of the bracelet?

Cost of bracelet = £ _____

1
1
1

18. A ball is dropped onto a hard surface. Each time it bounces, it rebounds to exactly three quarters of the height from which it fell.

The diagram shows the path of the ball when it is dropped from 160 cm.



$$\text{First rebound} = \frac{3}{4} \times 160 = 120 \text{ cm}$$

$$\text{Second rebound} = \frac{3}{4} \times 120 = 90 \text{ cm}$$

(a) Symron dropped her ball from 280cm. What would be the height of the first rebound?

Answer: _____ cm

(b) When Izabella dropped her ball, the first rebound was 150 cm. From what height was the ball dropped?

Answer: _____ cm

(c) When Heather dropped her ball, the second rebound was 27 cm. From what height was the ball dropped?

Answer: _____ cm

(d) If the ball was dropped from x cm, write down a formula for the height of the second rebound.

Answer: _____ cm

1

1

1

1

1

1

19. We normally write numbers in ***base ten***.

In *base ten*, the column headings are units, tens, hundreds and thousands.

Numbers are written using the digits 0, 1, 2....., 9.

In this question we are going to write numbers in ***base three***.

In *base three*, the column headings are units, threes, nines and twenty-sevens.

Numbers are written using the digits 0, 1 and 2.

Here are some examples of how to change numbers from *base three* to *base ten*.

$$\begin{aligned}
 2122_{three} &= \textcircled{2} \times 27 + \textcircled{1} \times 9 + \textcircled{2} \times 3 + \textcircled{2} \times 1 \\
 &= 54 + 9 + 6 + 2 \\
 &= 71_{ten}
 \end{aligned}$$

$$\begin{aligned}
 1011_{three} &= \textcircled{1} \times 27 + \textcircled{0} \times 9 + \textcircled{1} \times 3 + \textcircled{1} \times 1 \\
 &= 27 + 0 + 3 + 1 \\
 &= 31_{ten}
 \end{aligned}$$

(a) Convert the number 2201_{three} into *base ten*.

_____ ten

1

1

(b) Convert the number 1111_{three} into *base ten*.

_____ ten

1

1

Here is an example of how to change a number from *base ten* into *base three*:

$$\begin{aligned}
 38_{ten} &= 1 \times 27 + 1 \times 9 + 0 \times 3 + 2 \times 1 \\
 &= 1102_{three}
 \end{aligned}$$

(c) Convert the number 50_{ten} into *base three*.

_____ three

1

1