

City of London School



Mathematics

Entrance Examination for entry in September 2008

Group 2

Monday 14th January 2008

Name:

Candidate number:

- Write your name and candidate number in the box above
- **Calculators are not allowed**
- **Time: One hour**
- **You will need a pencil and a ruler**
- Write your final answers on the dotted lines
- Show your working out clearly in the spaces provided
- Do not use other writing paper

1. Look at these number cards.

| | | | |
|--------------|-------------|------------|----------|
| A 730 000 | B 73 000 | C 7 300 | D 730 |
| E 7.3 | F 0.73 | G 0.073 | |

Write the letter of the card that is

- ten times as big as 73
- one thousand times as big as 73
- one hundredth of 73

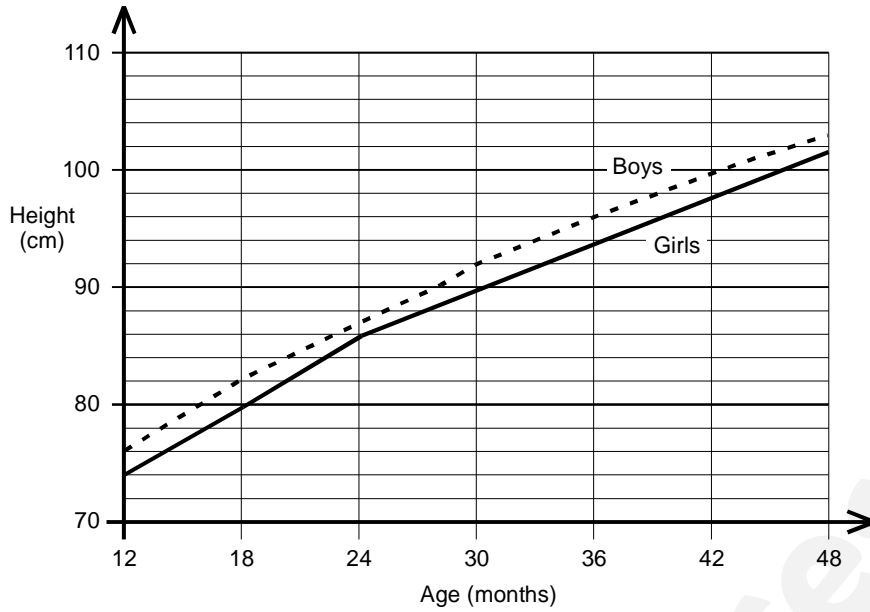
Write **one** number at the end of each equation to make it correct.

Example

$$26 + 34 = 16 + 44$$

- (a) $38 + 17 = 28 + \dots$
- (b) $38 - 17 = 28 - \dots$
- (c) $40 \times 10 = 4 \times \dots$
- (d) $7000 \div 100 = 700 \div \dots$

2. The graph shows the average heights of young children.



- (a) What is the average height of **girls** aged **30** months?
.....
- (b) What is the average height of **boys** aged **36** months?
.....
- (c) Jane is average height for her age. Her height is **80cm**. Use the graph to find Jane's age.
.....
- (d) This formula tells you how tall a boy is likely to be when he grows up.

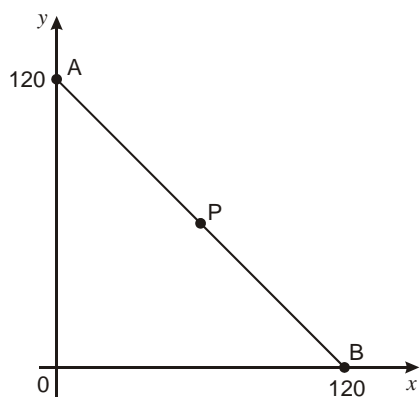
Add the mother's and father's heights. Divide by 2. Add 7cm to the result. The boy is likely to be this height, **plus or minus 10 cm**.

Marc's mother is **168cm** tall. His father is **194cm** tall.

What is the **greatest** height Marc is likely to be when he grows up?
Show your working.

..... cm

3. (a) P is the **midpoint** of line AB.

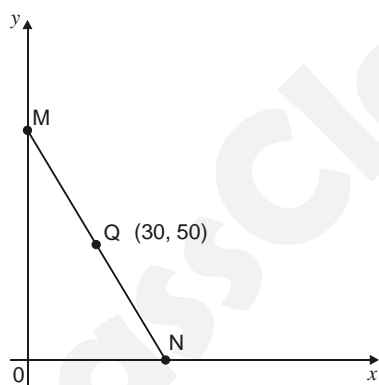


What are the coordinates of point P?

P is (..... ,))

(b) Q is the **midpoint** of line MN.

The coordinates of Q are (30, 50)



What are the c-ordinates of points M and N?

M is (..... ,))

N is (..... ,))

4. Andrew went on a cycling holiday.

The table shows how far he cycled each day.

| Monday | Tuesday | Wednesday | Thursday |
|---------|---------|-----------|----------|
| 32.3 km | 38.7 km | 43.5 km | 45.1 km |

He claimed; 'On average, I cycled over 40 km a day'.

Show that Andrew is wrong.

5. Which two numbers have a **mean** of 10 and a **range** of 8?

The numbers are and

6. A ruler costs k pence, and a pen costs m pence.

Match each statement with the correct expression for the amount in pence.
The first one is done for you.

| Statement | Expression |
|---|------------|
| The total cost of 5 rulers | $5k$ |
| The total cost of 5 rulers and 5 pens | $5m$ |
| How much more 5 pens cost than 5 rulers | $5 - 5m$ |
| The change from £5, in pence, when you buy 5 pens | $500 - 5m$ |
| | $5k + m$ |
| | $5(k + m)$ |
| | $5m - 5k$ |
| | $5k - 5m$ |

7. (a) A football club is planning a trip.

The club hires **234** coaches. Each coach holds **52** passengers.

How many passengers is that altogether?

Show your working.

..... passengers

(b) The club wants to put one first aid kit into each of the 234 coaches.

These first aid kits are sold in **boxes of 18**

How many boxes does the club need?

..... boxes

8. You can buy a new calculator for **£1.25**



In 1979 the same type of calculator cost **22 times** as much as it costs now.

How much did the same type of calculator cost in 1979?

Show your working.

£.....

9. Here are some number cards:



You can use each card once to make the number 1735, like this:



(a) What is the **biggest** number you can make with the four cards?

(b) Explain why you **cannot** make an **even** number with the four cards.

.....

.....

.....

(c)

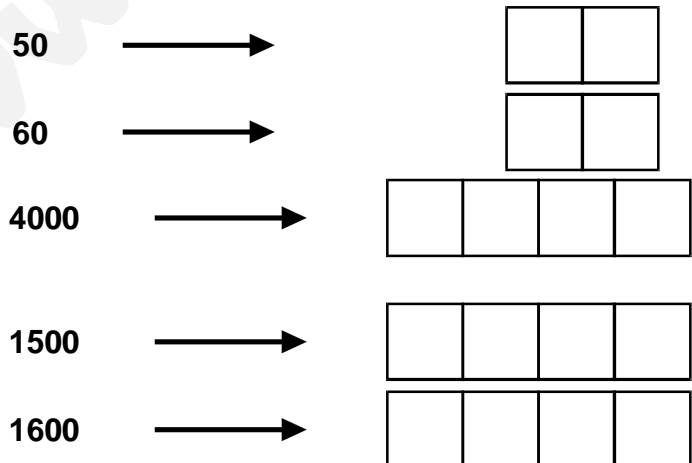


Use some of the four number cards to make numbers that are **as close as possible** to the numbers written below.

Examples

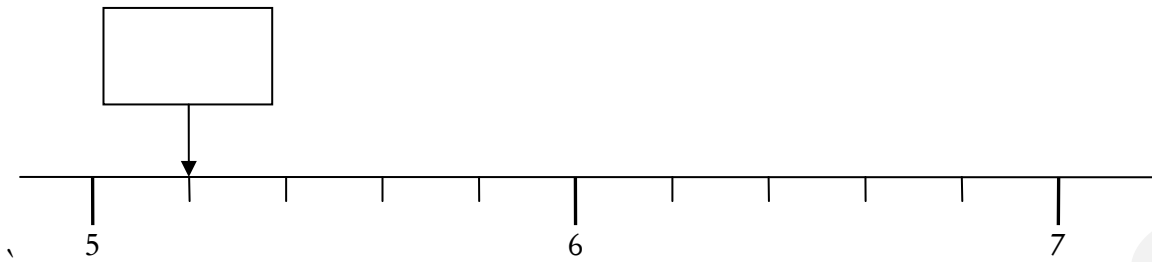


You must **not** use the same card more than once in each answer.



10. (a) The diagram shows part of a number line.

What number is the arrow pointing to? Write your answer in the box.

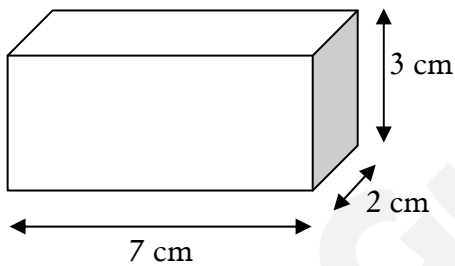


(b) Now draw an arrow on the number line above to show the number that is **1.2 less than 7**

(c) Work out the answer to $6.7 - 0.8$

.....

11. a) Find the **surface area** of a cuboid which measures 2 cm by 3 cm by 7 cm. Include the units in your answer.

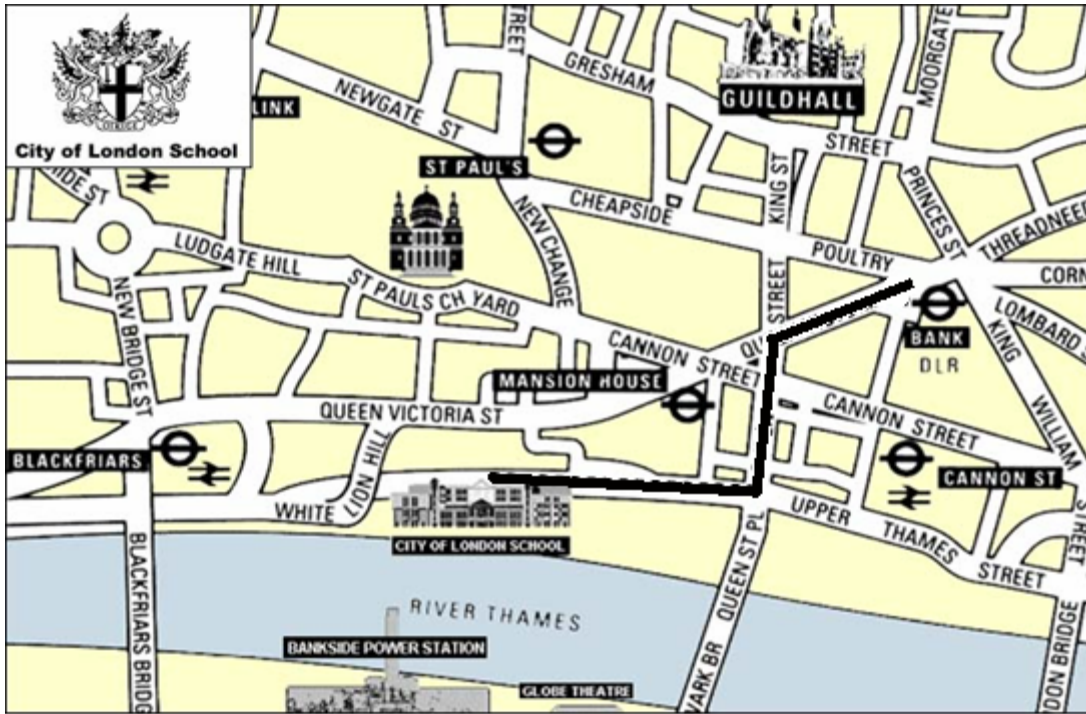


.....

b) Find the volume of the cuboid.

.....

12. Below is a map of the area surrounding City of London School drawn to a scale of
 1 cm : 125 metres.



a) Estimate how far it is, in metres, from City of London School to Bank Station by following the path shown. Give your answer to the nearest 10 metres.

.....

b) If the walking distance from City of London School to Guildhall is 1500 metres, and I walk at 5km/h, find how long it takes, in minutes, to walk from Guildhall to the school.

.....

13. Reflect the word MATHEMATICS in the given line.

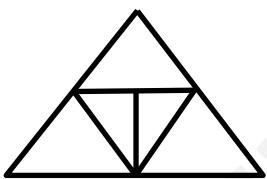
M A T H E M A T I C S

14. Look at the three by three table.

Fill in the missing numbers so that
each row adds up to 3,
each column adds up to 3 and
each diagonal adds up to 3

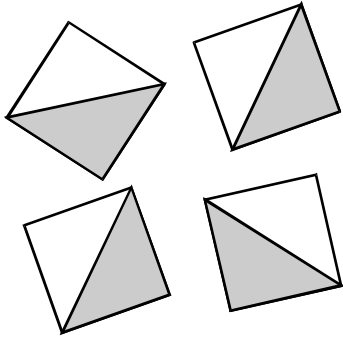
| | | |
|---|-------|-------|
| 2 | | |
| 3 | 1 | |
| 2 | | 4 |

15. How many triangles are there in this diagram?

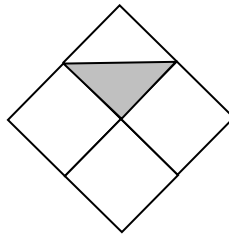


.....

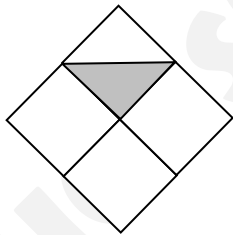
16. I have four identical square tiles.



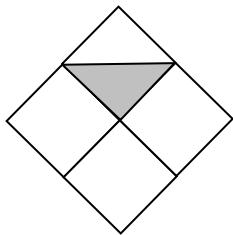
- (a) Shade in the diagram below to show how the four tiles can fit together to make a pattern with **4 lines of symmetry**.



- (b) Now shade in the next diagram to show how the four tiles can fit together to make a pattern with **no lines of symmetry**.



- (c) Show how the four tiles can fit together to make a pattern with **rotation symmetry of order 2**



17. I travel 1 mile at 60 m.p.h. and then 1 mile at 30 m.p.h. What is my average speed in miles per hour?

.....

18. Find the sum of the prime numbers between 50 and 60.

.....

19. What percentage of the integers 1 – 100 inclusive are not a multiple of 10?

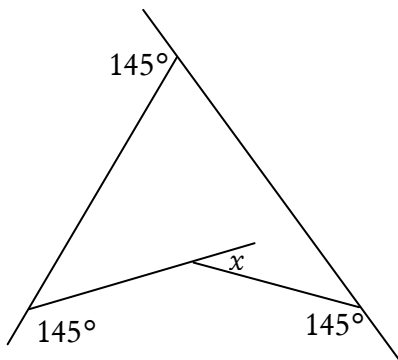
.....

20. Even though the method of cancelling shown below is incorrect, the student has got the correct answer by chance. Can you find a similar fraction which will cancel down to give $\frac{2}{5}$?

$$\frac{\cancel{19}}{\cancel{95}} = \frac{1}{5}$$

.....

21. What is the size of the angle labelled x in the diagram? The diagram is not drawn to scale.



$x = \dots\dots\dots$

22. If you add up the digits of 14 you get 5 i.e. $1 + 4 = 5$. **How many** 2-digit numbers are there altogether (including 14) which add up to a *multiple* of 5?

.....
23. Find the sum of the smallest multiple of 11 greater than 100 and the largest multiple of 11 less than 300.

.....
24. \approx means approximately equal to. Given that 1 kilogram (kg) \approx 2.2 pounds (lb), convert 154 lb to kg.

.....

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25.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233

from the sequence of numbers above:

(a) Which numbers are square numbers?

(b) Which number is the cube of 2?

(c) Which number is the cube root of 125?

(d) How many prime numbers are there in the list?

(e) The sequence of numbers above is called the Fibonacci sequence. 89 is the 11th Fibonacci number. Find the first 6 decimal places of $\frac{1}{89}$ by finding $1 \div 89$.

.....

26. A palindromic number is the same whether read from left to right or right to left. For example 41514 is a palindromic number.

Find as many whole numbers as you can which are:

- i) greater than 1 and less than 500
- and ii) palindromic
- and iii) either a square number or a cube number.

Do your working below the answer line.

Answers:

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END OF EXAM