11+ Sample Paper
Mathematics

Bancroft's

Bancroft's
11+ Entrance Examinations
Guidance Notes for Parents

Mathematics

Candidates will sit one paper, which lasts 75 minutes. A ruler, pencil and protractor will be needed, but not a calculator.

The paper consists of about thirty-five to forty questions in increasing order of difficulty. Questions will cover numeracy, problem solving and shape and space, and should be broadly accessible to children who are working towards level 5 at Key Stage Two. Some of the later questions may include elements from level 6. And contain more difficult, non-standard problems. We try to make these problems original yet accessible to mathematically talented children. Children should complete as much of the paper as they can.

Preparation:

Children who are likely to cope comfortably with mathematics at Bancroft's should only need an experience of solving problems under timed conditions.

We find that excessive coaching for the paper can be counter-productive in the longer term. The questions are designed to test how the candidate copes with unfamiliar problems, and it is not intended that children should be taught any particular methods in preparation for this.

1. Fill in the missing numbers in the boxes.

$91 + \square = 215$

$0.25 \div \frac{1}{4} = \square$

$25 - \square + 17 = 38$

$\square \times 24 = 12$

$72 \div 9 = \square \div 3$

$(20 + 10) \times (20 \times 0) = \square$

(6 marks)

2. Add together 734 and 5629

. . . . . **(2 marks)**

3. Subtract 2019 from 9102

. . . . . **(2 marks)**

4. Multiply 168 by 91

. . . . . **(2 marks)**

5. Divide 3934 by 7

. . . . . **(2 marks)**

6. a. A bus holds 12 people.

How many buses are needed to transport 175 students to the athletics stadium?

. . . . . **(2 marks)**

b. Mark goes to school from Monday to Friday, but he has trouble getting out of bed and arrives late if there is an 's' in the name of the day.

During the 12 weeks of term, how many days did he arrive late?

. . . . . **(2 marks)**

c. Cormac leaves the house with £120 in his wallet after his birthday.

He spends 25% of it on a game for his Xbox, and 10% of the rest on a DVD. How much money does he have left?

. . . . . **(2 marks)**

7. On consecutive days you eat $\frac{1}{3}$ and $\frac{1}{6}$ of a lasagne.

What fraction of lasagne have you eaten?

. . . . . **(2 marks)**

8. a. The sum of two consecutive whole numbers is 91.

What is the larger of these two numbers?

. . . . . **(2 marks)**

b. I thought of a number, doubled it and then subtracted 14.

I then divided the result by 3 and got a final answer of 8.

What was the original number?

. . . . . **(3 marks)**

9. The mouse below been rotated and then reflected.

Which of the following would show how the polecat would look if it had been rotated and then reflected in the same way?

A  B  C  D  E 

. . . . . **(2 marks)**

10. How many lines of symmetry (mirror lines) does the shape below have?

. . . . . **(2 marks)**

11. A train left London at 11:30 and arrived in Glasgow at 15:50
The train only made 3 stops, each lasting 5 minutes.
For how many minutes was the train moving on this journey?

. . . . . **(2 marks)**

12. The table below shows the results of a survey in which 60 boys were asked what colour of dress girls should wear.

	Blue	Pink	Black
Total	15	24	21

What percentage of *boys* thought *girls* should wear pink?

. . . . . **(2 marks)**

13. A farmer has 364 ewes and each ewe has either one or two new born lambs. If there are 468 lambs in total, how many of the ewes have twin lambs?

. . . . . **(2 marks)**

14. Arjun gets his hair cut every 2 weeks.
Yahya gets his hair cut every 10 days.

They both got their hair cut on the same day. How long until this happens again?

. . . . . **(2 marks)**

15. **a.** Here are the first six terms of a number sequence.

11, 14, 17, 20, 23, 26

Which of the following numbers will also be in this sequence?

30 40 50 60

. . . . . **(2 marks)**

b. The rule to get the next term in a sequence is:

"add the previous two terms together"

The fourth term is 7 and the fifth term is 11.

What are the first two terms of the sequence?

. . . . . **(3 marks)**

16. To make eight 200ml glasses of squash, Yasmin needs 320ml of cordial; the rest is water.

a. How much **water** does she need to make **eight** glasses of squash?

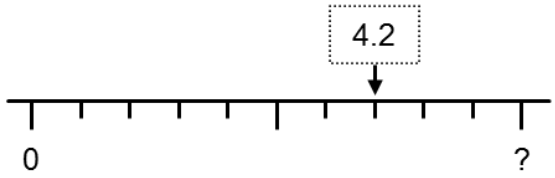
. . . . . ml **(2 marks)**

b. How much **cordial** does she need to make **three** glasses of squash?

. . . . . ml **(2 marks)**

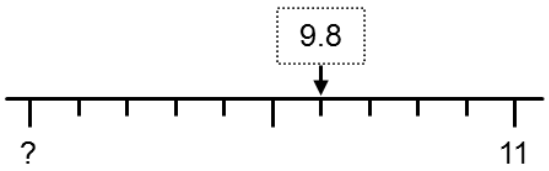
17. What are the missing values on each of these scales?

a.



. . . . . **(2 marks)**

b.



. . . . . **(2 marks)**

18. **a.** Write the following numbers in ascending order:

0.2019 0.219 0.291 0.2109

. . . . . **(2 marks)**

b. Write the following numbers in ascending order:

$\frac{5}{6}$, 0.5, $\frac{5}{12}$, 75%, $\frac{1}{3}$

. . . . . **(3 marks)**

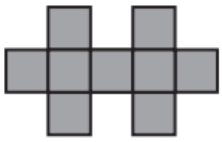
19. Eleanor receives £20 pocket money each week.
This week, she spent £4.88 on sweets at the shop.
She then put a third of what was left in her piggy bank.

How much money does she still have to spend?

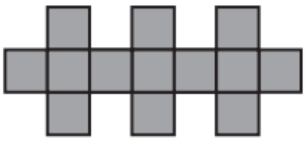
. . . . . **(3 marks)**

20. Here are some patterns made from squares.

Pattern number 1



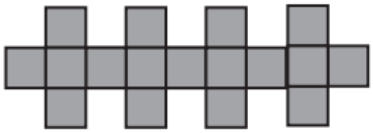
Pattern number 2



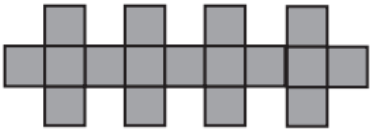
Pattern number 3

a. The diagram below shows pattern number 4 and part of pattern 5.

Complete the diagram for pattern 5.



Pattern number 4



Pattern number 5

b. Complete the table.

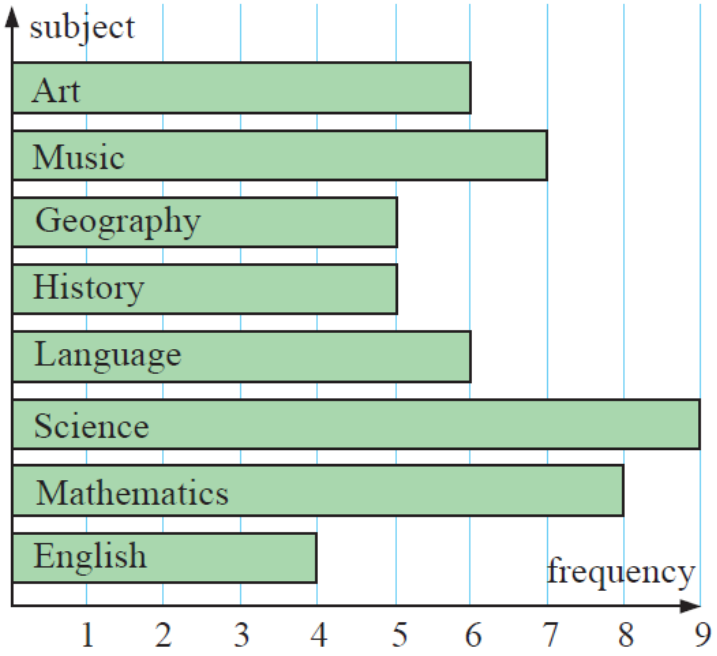
Pattern number	1	2	3		
Number of squares	5	9	13		

c. Find the number of squares used for pattern number 9

. . . . . **(4 marks)**

21. A group of students were asked to name their favourite subject at school.

The results of the survey are shown on the graph on the right.



a. What was the most popular subject?

. . . . . **(1 mark)**

b. Four students prefer which subject?

. . . . . **(1 mark)**

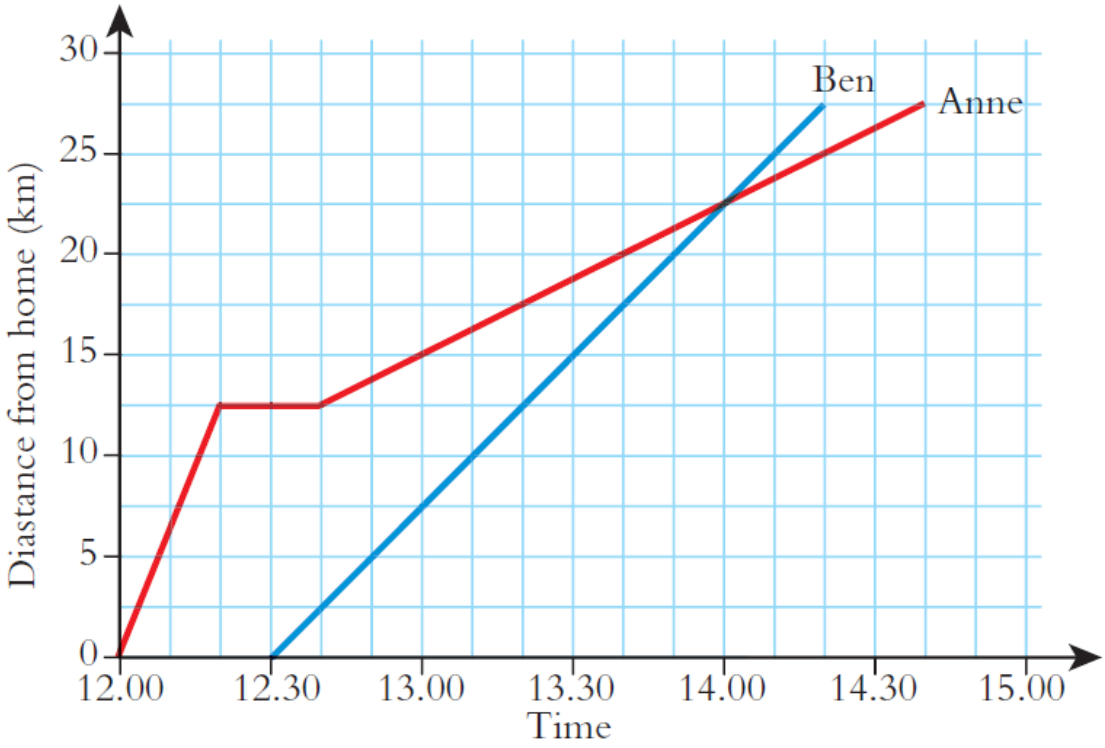
c. How many **more** students prefer Mathematics to History?

. . . . . **(1 mark)**

d. How many students took part in the survey?

. . . . . **(2 marks)**

22. The graph below shows how Ben and Anne travelled to their Grandmother's house one weekend.



a. How much later did Ben start his journey?

.....mins **(1 mark)**

b. How far were they both from their Grandmother's house when Ben passed Anne?

.....km **(1 mark)**

c. How long did Anne stop for?

.....mins **(1 mark)**

d. How far from Ben and Anne's house is their Grandmother's house?

.....km **(2 marks)**

23. A bag of marble contains the following:

4 red marbles
3 blue marbles
8 yellow marbles
1 green marble

Without looking Omar takes a marble from the bag.

a. Answer true or false for each statement below

i. Omar is more likely to get a blue marble than a red marble

. . . . . **(1 mark)**

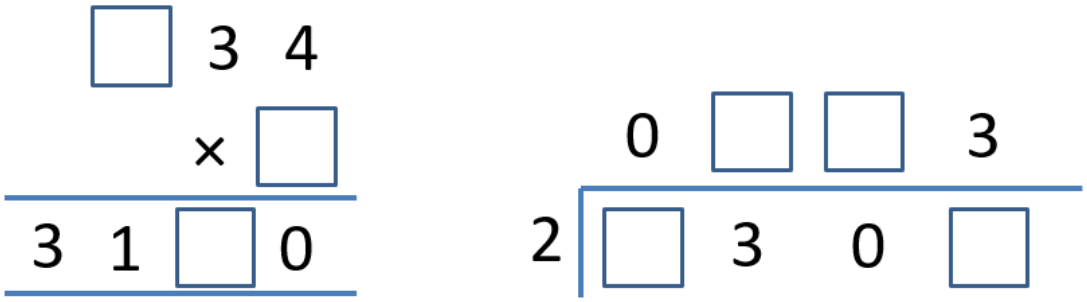
ii. Omar is just as likely to get a yellow marble,, or a non-yellow marble.

. . . . . **(1 mark)**

b. This time, he wants to draw two marbles of the same colour. If he removes them one by one without looking, how many marbles will he need to take out to guarantee drawing two marbles of the same colour?

. . . . . **(2 marks)**

24. Fill in the gaps in the calculations below (none of the gaps are zero):



. . . . . **(4 marks)**

25. When Patience asked her Grandfather how old he was, he answered,

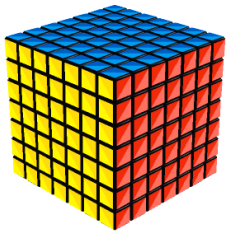
"I am 34 now and will be 33 on my birthday."

She looked confused so he added, "After being 50 for a year I started counting backwards on each birthday."

How old will he actually be on his birthday?

. . . . . **(3 marks)**

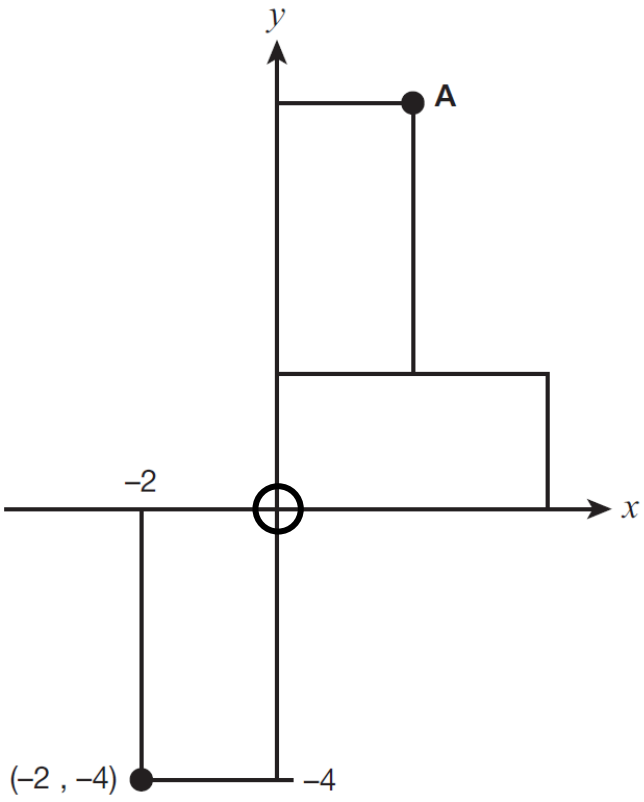
26. A 7x7x7 cube is painted, and then cut into 1x1x1 cubes.



How many of these cubes are painted on exactly two sides?

. . . . . **(3 marks)**

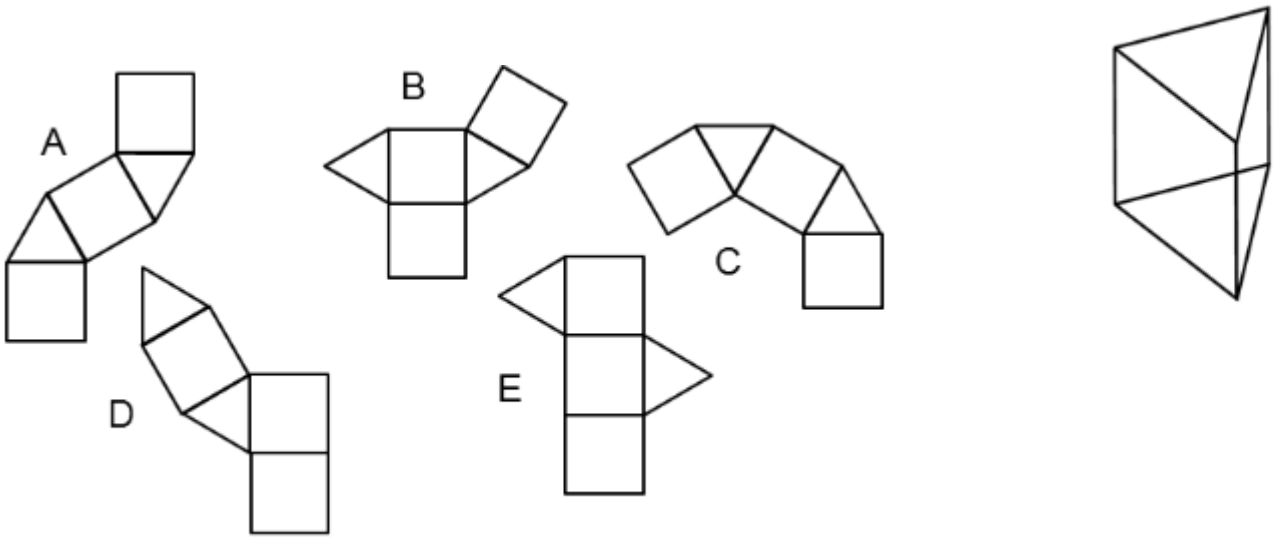
27. Three identical rectangles are drawn.



What are the co-ordinates of A?

(,) (2 marks)

28. Which net cannot be folded to make a triangular prism?



. . . . . **(2 marks)**

29. Adrian's garden measures 10 m by 6 m.

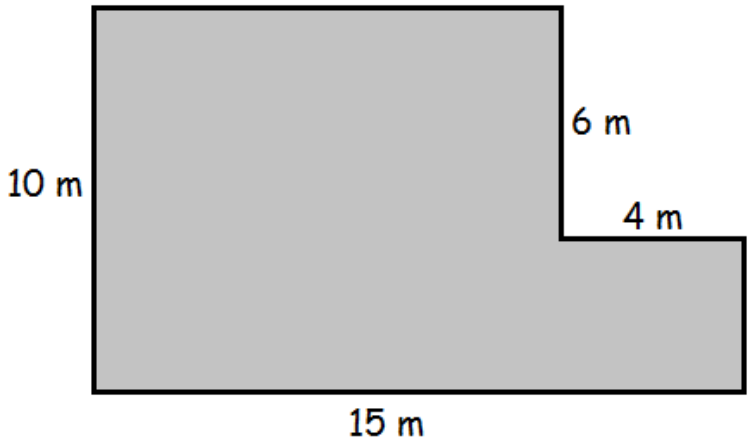
Paving stones measure 0.5 m by 0.5 m.

How many paving stones does he need to pave his garden?

. . . . . **(3 marks)**

30.

a. Calculate the area of the shape below:



. . . . . **m^2 (3 marks)**

b. Calculate the perimeter of the shape,

. . . . . **m (2 marks)**

31. The notation 4! is used as an abbreviation for the multiplication:

$4 \times 3 \times 2 \times 1$ so that $4! = 24$.

Similarly, $9! = 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 362880$

Work out the value of:

a. 5!

. . . . . **(2 marks)**

b. 8!

. . . . . **(2 marks)**

c. $\frac{50!}{48!}$

. . . . . **(2 marks)**

32. As everyone knows, a normal cat has 18 claws, 5 on each front leg and 4 on each back leg.

At Harry's Care Home for Distressed Cats there are 4 three-legged cats, each one with a different leg missing.

How many claws do they have all together?

. . . . . **(3 marks)**

33. A newspaper has four pages missing. One of them is page 21.

If the back page is 28, what are the numbers of the other three missing pages?

. . . . . **(3 marks)**

34. **a.** If there are 5 Mondays, 5 Tuesdays and 5 Wednesdays in January, on what day of the week will February 1st fall?

. . . . . **(2 marks)**

b. If August 5th falls on a Tuesday, on which day of the week will New Year's Day fall next year?

. . . . . **(2 marks)**

35.

a. The coordinates of the 4 vertices of a quadrilateral are:

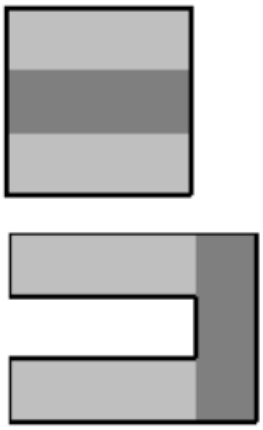
(a–3 , b) (a , b) (a–3 , b+2) (a , b+2)

What shape is this?

. . . . . **(2 marks)**

b. A square of side length 3 cm is divided into three rectangles of equal size.

The middle rectangle is removed and replaced on the side of the original square to form an octagon as shown.



How many times bigger is the perimeter of the octagon than the perimeter of the original square?

. . . . . **(4 marks)**

36. In the four digit number 12☺2, ☺ can take the value of any digit from 0 to 9 inclusive.

a. How many solutions for ☺ are there to the calculation 12☺2 ÷ 3, so that the answer is a whole number?

. . . . . **(2 marks)**

b. How many solutions for ☺ are there to the calculation 12☺2 ÷ 4, so that the answer is a whole number?

. . . . . **(2 marks)**

In the four digit number 4☺32, ☺ can take the value of any digit from 0 to 9 inclusive.

c. How many solutions for ☺ are there to the calculation 4☺32 ÷ 12, so that the answer is a whole number?

. . . . . **(2 marks)**

37.

a. The number 56665 is a palindrome, it reads the same forwards and backwards. The next palindrome will be 56765.

If we say that 56665 is the first of these palindromes, what will the 8th palindrome be?

. . . . . **(3 marks)**

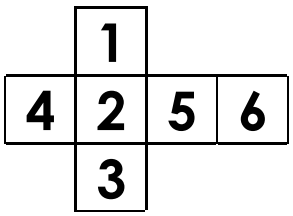
b. Given that none of the letters A, B or C is zero, work out what number each of the letters stands for in the calculation below:

$$\begin{array}{r} AAA \\ BB \\ +\ A \\ \hline CAB \end{array}$$

A = ... **(1 mark)**
B = ... **(1 mark)**
C = ... **(1 mark)**

38.

a. If the figure shown is folded to form a cube, then three faces meet at every vertex (corner).

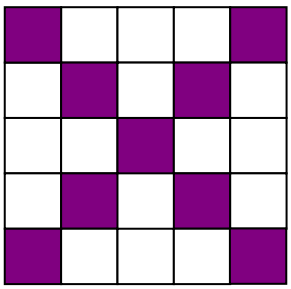


The numbers on the three faces meeting at any vertex can be multiplied together.

What is the largest such product for the vertices of this cube?

. . . . . **(3 marks)**

b. A square floor is tiled with square tiles and there are 77 tiles on the diagonals.

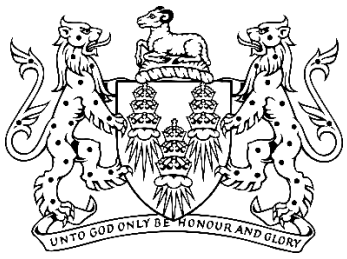


The diagram shows part of the floor.

How many tiles are in the room?

. . . . . **(3 marks)**

STOP! Now go back and check your work!



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