BANCROFT'S SCHOOL
Woodford Green, Essex, IG8 0RF
Telephone: 020 8506 6761
Email: admissions@bancrofts.org

MATHEMATICS

SAMPLE PAPER

11+

ENTRANCE EXAMINATION

BANCROFT'S SCHOOL
11+ ENTRANCE EXAMINATIONS
GUIDANCE NOTES FOR PARENTS

MATHEMATICS

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

Section A:

Consists of about thirty 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.

Section D:

Contains more difficult, non-standard problems. We try to make these problems original yet accessible to mathematically talented children. Children should not attempt these questions until they have completed as much as they can in Section A. A high score in this section is not expected, but we will use the Section D score as additional evidence when we are identifying Scholarship candidates or as supplementary evidence for borderline candidates.

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. Section D 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.

MATHEMATICS SAMPLE PAPER



11+ MATHEMATICS

Instructions

1. Answer as many questions as you can. If you get stuck, go on to the next question.

YOU ARE NOT EXPECTED TO BE ABLE TO ANSWER ALL OF THEM.

2. **SHOW ALL WORKING** – you may get marks for working even if you don't give the right answer. Use the space beside each question.

3. Write each answer in the space provided. The number in brackets is the number of marks for each question.

4. No calculators are allowed.

SECTION A

DO AS MUCH OF THIS SECTION AS YOU CAN.

IF YOU GET STUCK, GO ON TO THE NEXT QUESTION.

1. Fill in the missing numbers in the boxes.

$55 + \square = 82$

$\square - 23 = 45$

$60 \div \square = 12$

$32 \times \square = 640$

$0.75 \div \frac{3}{4} = \square$

(8 marks)

2. Add together 308, 86 and 4444.

.....(2 marks)

3. Subtract three hundred and three

from six thousand and sixty.

.....(2 marks)

4. Multiply 345 by 67.

.....(2 marks)

5. Divide 3112 by 8.

.....(2 marks)

6. a) Angus and his six friends have collected 756 football stickers, which they all share out equally.

How many stickers do they each get?

.....(2 marks)

b) Today is Emma's 29th birthday.

How many months old is she?



.....(2 marks)

c) Amar works for 45 weeks each year.

His total cost of travelling to and from work is £630 each year. How much is that per week?



£.....(2 marks)

7. a) Look at these four decimals:

0.86	0.9	0.17	0.73

i) Write down the largest amount.

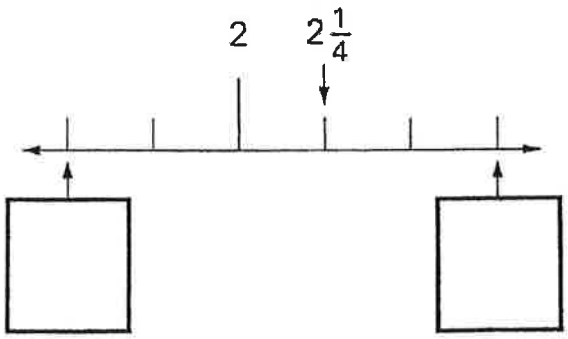
.....(1 mark)

ii) Find the difference between the largest and smallest amounts.

.....(2 marks)

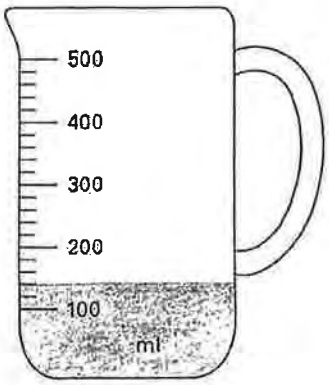
b) Here is part of a number line.

Write the two missing numbers in the boxes.



(2 marks)

8.



The jug contains some orange squash.

How much water must be added to make 500 millilitres of drink?

.....ml (2 marks)

---

9. At Redville Primary School, 16 of the teachers travel to work by car, 6 travel by bus and the other 3 walk.

Car	Bus	Walk
16	6	3



What *percentage* of the teachers travel by car?

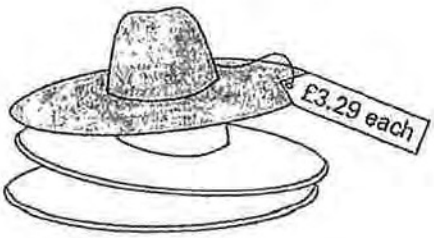
.....% (2 marks)

---

10. a) Clarissa buys the sunglasses and a sun hat.

How much change, *in pounds*, does she get from a £10 note?





£.....(2 marks)

b) Jo and Aisha bought identical jeans from a market stall.

Jo got 10 % discount off the full price.

Aisha got 15% discount off the full price.

Jo paid £1.20 more than Aisha.

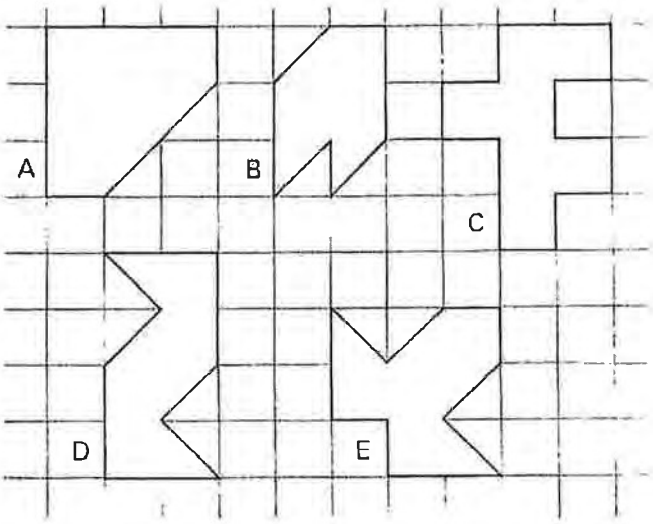
What was the full price of the jeans?



£.....(2 marks)

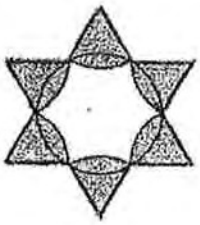
11. a) Here are five shapes on a square grid.

Write the letters of the two shapes which have a line of symmetry.



..... and ..... (2 marks)

b)



How many lines of symmetry

does the shape on the left have?

.....(1 mark)

c) If you looked in a mirror at an accurate clock at 1:30pm,

which one of the following (A, B, C, D or E) would you see?



A B C D E

.....(2 marks)

12.a) A film starts at 6:45pm and lasts for 2 hours 35 minutes.

At what time will it finish?

.....(1 mark)

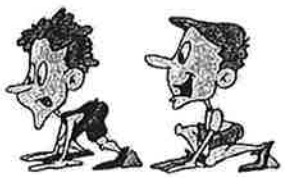
b) A coach left London Victoria 5 minutes late, at 13:45, and arrived in Banbury 14 minutes early, at 17:05. How long should the journey have taken if the coach had left and arrived on time?

.....hours .....minutes (2 marks)

c) Chris runs round a track at a speed of 6 km/hour.

Dave runs round the same track at a speed of 9 km/hour.

When Chris has run 18 laps, how many laps has Dave run?



.....laps (2 marks)

13. a) How many sixths are there in $3\frac{1}{3}$?

.....sixths (1 mark)

b) What is the value of $2 + \frac{1}{2} + 3 + \frac{1}{3} + 6 + \frac{1}{6}$?

.....(2 marks)

---

14. a) Two numbers have a difference of 3 and a sum of 27.

What are the two numbers?

.....and..... (2 marks)

b) Start with the number 20, then multiply by 4, then add 16, then divide by 12, then find three-quarters of your answer.

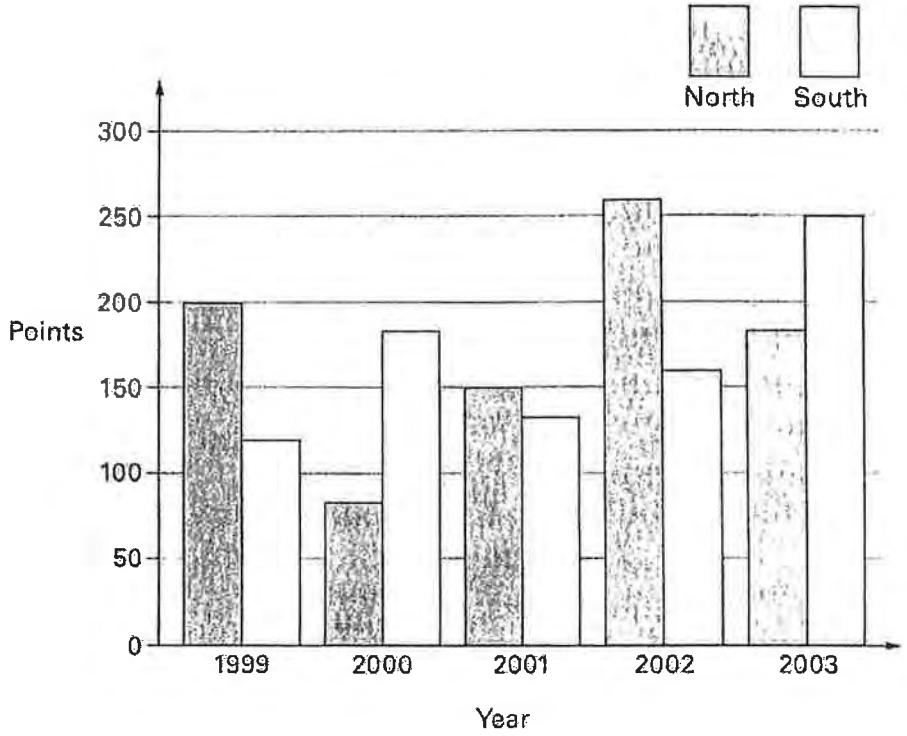
What number do you get?

.....(2 marks)

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15. Each year a school has a quiz between two teams, North and South.

The diagram shows the results.



i) In which year did North beat South by 100 points?

.....(1 mark)

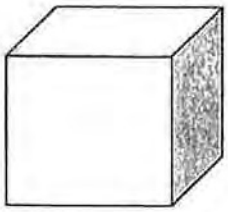
ii) In which year did South beat North by the greatest amount?

.....(1 mark)

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16. The total length of the edges of a cube is 240 cm.

What is the length of one edge?

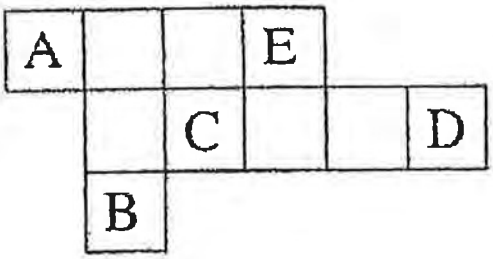


.....cm (2 marks)

---

17. The diagram shows a shape made from ten square tiles.

Which labelled tile (A, B, C, D or E) could be removed without changing the perimeter of the shape?



..... (2 marks)

---

18. Here is some information about three different squares:

The *area* of Vikram's square is 64 cm^2.
The *length of a side* of Kim's square is 64 cm.
The *perimeter* of Ali's square is 64 cm.



i) Who has the largest square?

.....(1 mark)

ii) Who has the smallest square?

.....(1 mark)

---

19. In a magic square, the totals for each row, column and diagonal are the same.

i) Fill in the missing numbers in this magic square.

3		
8		4
7		

(2 marks)

ii) Find the value of ☺ in this magic square.

(You do *not* need to complete the whole magic square.)

14		7	2
☺		12	
	5	9	16
15			3

☺ = ...(2 marks)

20. a) Lollipops cost 12p each, or a pack of 3 costs 30p.





I have £2 to spend.

What is the maximum number of lollipops I can buy?

.....lollipops (2 marks)

b)



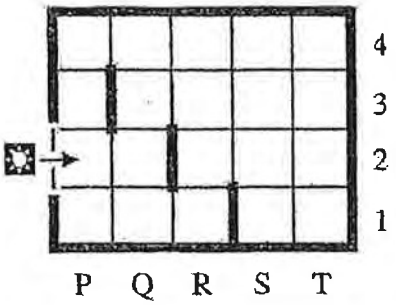
Every 100g of brown bread contains 6g of fibre.

A small loaf of bread weighs 400g and has 10 equal slices.

How much fibre is there in one slice?

.....g (3 marks)

21. The robot in the diagram has been programmed to move in a straight line and, if it meets a wall (shown by a thick line), to turn to its right by 90° and then to continue straight on.



If it cannot go straight or turn right, it will stop.

What will happen to the robot? (Write A, B, C, D or E as your answer.)

A. It will stop at square P2.

B. It will stop at square P1

C. It will stop at square T1.

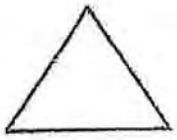
D. It will stop at square S1.

E. It will never stop.

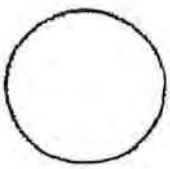
.....(3 marks)

22. Kate is looking at a 3-D mathematical object.

When she looks at it from the front, this is what she sees:



When she looks down at it from above, this is what she sees:



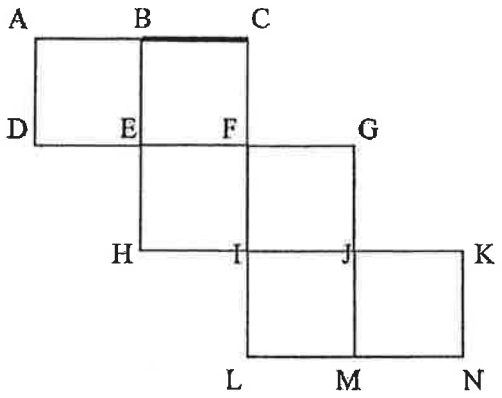
What is the mathematical name for Kate's 3-D object?

.....(1 mark)

TURN OVER!

23. i) The diagram shows a net of a cube.

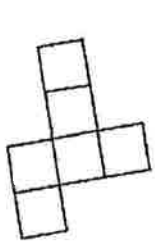
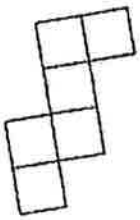
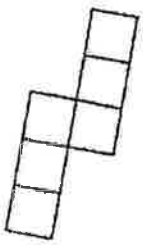
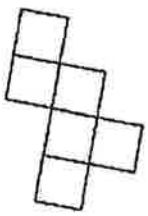
Which edge meets the edge BC when the net is folded to form the cube?



.....(2 marks)

ii) Which of the following are possible nets for a cube?

(Write 'yes' or 'no' in each of the spaces provided.)

....

(3 marks)

24. a) Calculate $(9999 - 999 + 99 - 9) \div 9$.

.....(2 marks)

b) What is the value of 20% of $(60)^2$?

.....(2 marks)

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25. a) What is the smallest positive number that can be divided exactly by 2, 3, 4, 6 and 8 without a remainder?

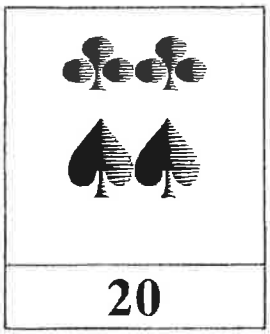
.....(2 marks)

b) What is the largest 4-digit number that can be formed by using four different digits that add up to 18?

.....(2 marks)

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26. a) On the cards below, each club ♣ has the same value and each spade ♠ has the same value (but a different value to each club). The number on each card is the total value of the symbols on that card. Find the value of one club ♣ .





♣ = ...(3 marks)

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27. Claire is two years older than her brother and five years younger than her sister. The total of their ages is 87 years.

How old is Claire?

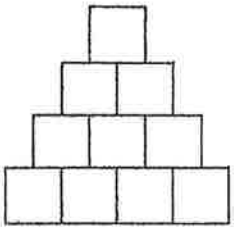
.....years (3 marks)

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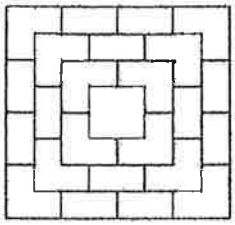
28. Here are the side view and top view of a *solid* pyramid.

The pyramid was made by using cubes as building blocks.

How many blocks did it take to make the pyramid?



SIDE VIEW



TOP VIEW

.....blocks (3 marks)

---

29. James cycles home from school every day in a particular week and tries to beat the school bus. Think about the following possible events:

X. James beats the bus on Monday.

Y. James beats the bus on Monday, but not on any other day.

Z. James beats the bus on Monday but not on Tuesday.

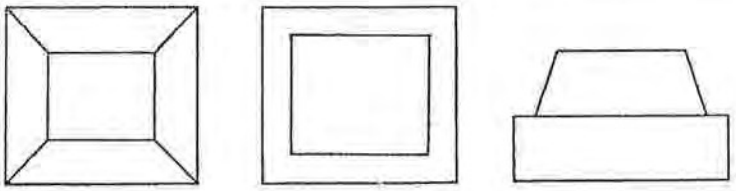
i) Which event (X, Y or Z) is the *most* likely to happen?

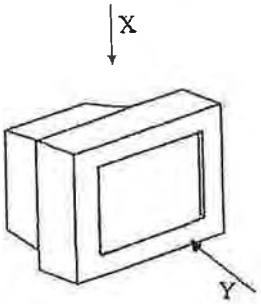
.....(1 mark)

ii) Which event (X, Y or Z) is the *least* likely to happen?

.....(1 mark)

30.a)





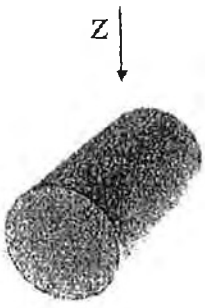
i) Which view (A, B or C) can I get by looking down at the 3-D object from above, in the direction of arrow X?

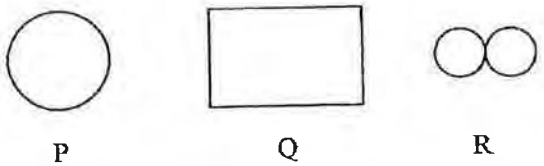
..... (1 mark)

ii) Which view (A, B or C) can I get by looking at the object from the front, in the direction of arrow Y?

..... (1 mark)

b) Which view (P, Q or R) can I get by looking down at the cylinder from above, in the direction of arrow Z?





.....(1 mark)

YOU HAVE NOW FINISHED SECTION A.

NOTE: THERE ARE **NO** SECTIONS B OR C.

THE NEXT SECTION IS SECTION D.

SECTION D

DO NOT START THIS SECTION UNTIL YOU HAVE DONE AS MUCH AS YOU CAN IN SECTION A.

YOU ARE NOT EXPECTED TO BE ABLE TO DO ALL OF THESE QUESTIONS.

IF YOU CANNOT ANSWER A PARTICULAR QUESTION TRY THE NEXT ONE.

DO AS MANY QUESTIONS AS YOU CAN.

ANY MARKS YOU SCORE IN THIS SECTION WILL BE ADDED TO YOUR TOTAL.

1. Look at this pattern:

$$3^2 = 1^2 + 8$$
$$4^2 = 2^2 + 12$$
$$5^2 = 3^2 + 16$$
$$6^2 = 4^2 + 20$$

(a) Write down the next line of the pattern:

..... = ... + ... (1 mark)

(b) *Use the pattern* to complete this line:

20^2 = ... + ... (2 marks)

(c) *Use the pattern* and the fact that $249^2 = 62001$

to find the value of 251^2.

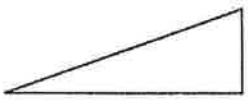
.....(3 marks)

2. a) How many square numbers are there from 1 to 10 000 inclusive?

.....(2 marks)

b) The area of a right angled triangle is 32 cm^2.

The lengths, in cm, of the two shorter sides are both different square numbers bigger than 1.



What are the lengths of the two shorter sides?

.....cm, ...cm (3 marks)

3. a) *Use* the fact that $17 \times 18 \times 19 = 5814$

to work out the value of $34 \times 36 \times 38$.

..... (2 marks)

b) Seven *consecutive* whole numbers add up to 7357.

What is the largest of the seven numbers?

.....(3 marks)

c) When three *consecutive* whole numbers are multiplied together, the answer is 990. What are the three numbers?

....., ..., ...(2 marks)

4. On Planet Cash, money is measured in Tinkles and Clinks.
   Here is an addition sum (which is known to be correct).

	Clinks	Tinkles
	2	5
	2	4
+	1	3
	1	3
	8	3

i) How many Tinkles make one Clink?

.....Tinkles (2 marks)

ii) Work out the answer to this subtraction.

	Clinks	Tinkles
	4	3
−	2	5
	....	....

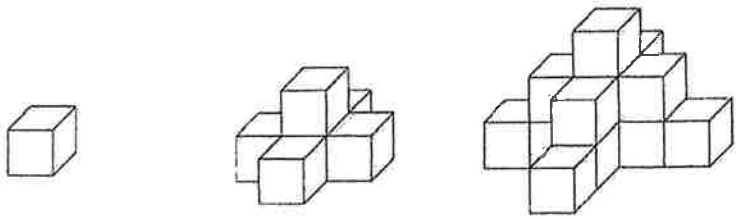
(2 marks)

iii) Work out the answer to this division.

	Clinks	Tinkles
4 ⌊	7	2
	....	....

(2 marks)

5. A sequence of *solid* 'towers' is built from cubes, as shown below:



1 2 3

i) Complete the table:

Tower number	1	2	3	4
Number of cubes used to make tower	1	6	.....	.....

(2 marks)

ii) How many cubes will there be in the 7^{th} tower?

.....(3 marks)

iii) How many *more* cubes will there be in the 11^{th} tower than in the 10^{th} tower?

.....(3 marks)

6. Here is some information about Sports Day:

• There were 4 teams: Red, Blue, Green, Yellow	• There were 6 races: Parents race, Sack race, Egg-And-Spoon, Three-Legged race, Obstacle race, Nose Pushing race
• Blue won the Obstacle race, just beating Yellow, but Blue came last in the Egg-And-Spoon, which was won by Green	• In the Parents, Sack and Three-Legged races, Blue came second and Green came last
• Everyone won at least one race	• There was exactly the same result in the Sack race as there was in the Three-Legged race
• Red came first on two occasions, with Blue second each time	• First and third in the Nose race and Parents race were the same, but were the opposite way round in the Three-Legged race
• Yellow came third three times and first twice	• Red did not win the Nose race
• Green came last three times, but Yellow never came last	• The winner of each race got 6 points, second got 4 points, third 3 points, fourth 2 points

i) Use the information to complete the following table to show each result:

	Red	Blue	Green	Yellow
Parents				
Sack			4th	
Egg-And-Spoon				
Three-Legged				
Obstacle				2nd
Nose Pushing				

(4 marks)

ii) How many points did each team score?

Red....., Blue....., Green....., Yellow.....

(3 marks)

iii) Which team won Sports Day?

.....(1 mark)

STOP! Now go back and CHECK your work.