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

MATHEMATICS

SAMPLE PAPER

13+

ENTRANCE EXAMINATION

BANCROFT'S SCHOOL

13+ ENTRANCE EXAMINATION

MATHEMATICS

SPECIMEN PAPER

1 hour 15 minutes

SURNAME	
FIRST NAME(S)	
DATE OF BIRTH	
PRESENT SCHOOL	

INSTRUCTIONS

1. Answer as many of the 26 questions as you can. If you get stuck, go on to the next question.
2. SHOW ALL WORKING - you may get marks for working even if you do not 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 allowed**.
5. Ruler, compasses and protractor are required.

For Examiner's use only.

MARK out of 110	

MARK percentage	

1. Calculate:

i) $3 + 0 \times 5 + 9$

..... (1 mark)

ii) $32.7 \div 1000$

..... (1 mark)

iii) $32.7 \div 8$

..... (1 mark)

iv) $(3^2 + 4^2) \div \sqrt{25}$

..... (1 mark)

v) $(0.12)^2$

..... (2 marks)

vi) $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$ of 500

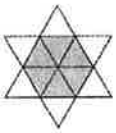
..... (2 marks)

vii) 80% of 80 km

.....km (2 marks)

---

2. a) The star is formed from 12 identical equilateral triangles.
The perimeter of the star is 36cm.
What is the perimeter of the shaded hexagon?



.....cm (2 marks)

b) What *percentage* of the diagram below is shaded?

.....% (2 marks)

3. a) Which 2-digit number is one more than a square number and one less than a cube number?

..... (2 marks)

b) Which two prime numbers have a sum of 21?

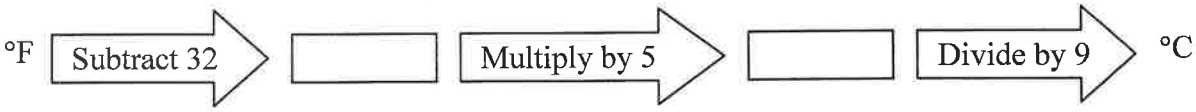
..... and ..... (1 mark)

---

4. a) A sequence of numbers starts at 11 and its term-to-term rule is 'double the last number, then subtract 3'. The number 4099 is in the sequence. Calculate the number that comes immediately *before* 4099 in the sequence.

..... (2 marks)

b) The diagram shows how to change a temperature from °F to °C.



The highest temperature ever recorded in a human is 115.7 °F
Change this temperature into °C.

.....°C (2 marks)

---

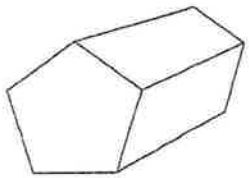
5. a) A container when half-full holds 3.6 litres.
How much *more* fluid is required to make it two-thirds full?

.....litres (3 marks)

b) One-third of the people at a party are women, one-quarter are girls, one-sixth are men, and there are six boys. How many people are there at the party?

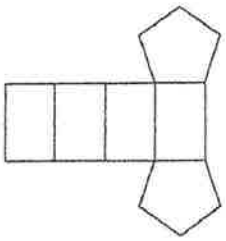
.....(3 marks)

6. a) Here is a pentagonal prism.

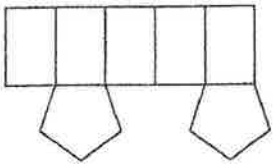


Which one of the five shapes (A, B, C, D or E) is a net for a pentagonal prism?

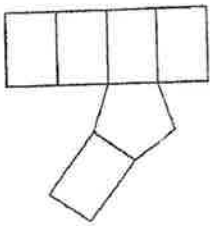
A.



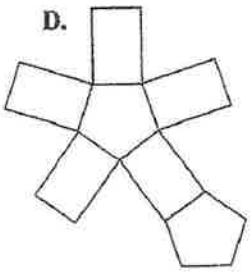
B.



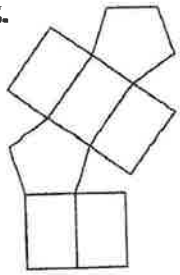
C.



D.



E.



..... (1 mark)

b) For a *triangular* prism, write down the number of: i) faces ..... (1 mark)

ii) edges ..... (1 mark)

iii) vertices ..... (1 mark)

---

7. a) The value of π, correct to 7 decimal places, is 3.1415927

Round the value of π to: i) four decimal places

..... (1 mark)

ii) the nearest hundredth

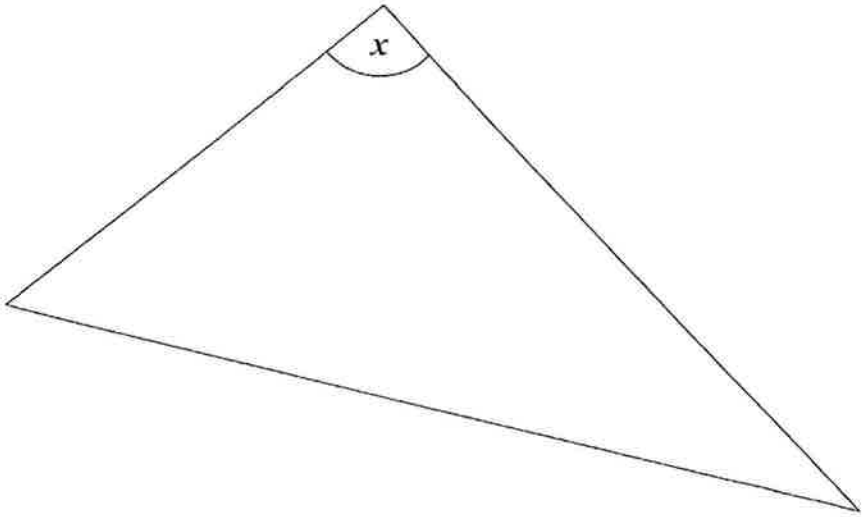
..... (1 mark)

b) A glass holds 225ml. An adult needs about 1.8 litres of water each day to stay healthy. How many glasses is that?

..... (2 marks)

---

8. a) Measure angle x and write down its size.



x = ...° (1 mark)

b) Construct ΔABC in which AB = 6.5cm, $\hat{ABC} = 38°$ and $\hat{CAB} = 110°$.

Measure and write down the length of BC.

BC = ...cm (3 marks)

---

9. a) Simplify as much as possible: $3e + 2f - 4 + e - f$

..... (1 mark)

b) When $n = 1.1$, find the value of : i) $100n - 1$

..... (1 mark)

ii) $2(n + 1)$

..... (1 mark)

10. Given that $84 = 2 \times 2 \times 3 \times 7$ and $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$,

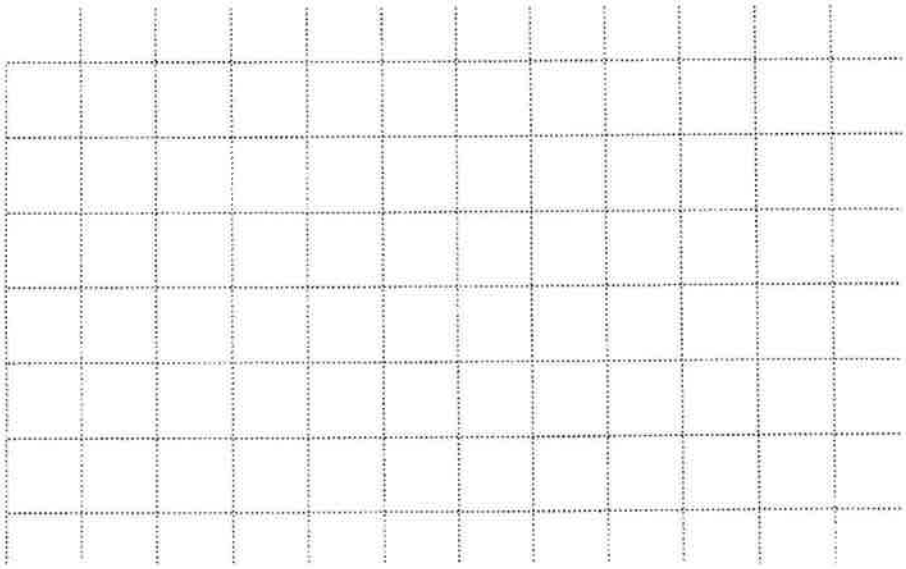
find the highest common factor (H.C.F.) of 84 and 216.

..... (2 marks)

---

11. On the grid below, the length of a side of each small square is one unit.

Draw and label a right angled triangle (R) and an obtuse angled triangle (T), each triangle having an area of 6 units^2.



(2 marks)

---

12. a) Solve the equation $7p = 9$, giving your answer as a mixed fraction.

$p =$ ..... (1 mark)

b) Showing your working clearly, solve the equation $\frac{1}{2}t - 17 = 21$.

$t =$ ..... (2 marks)

13. Fill in the missing numbers:

i) $6.66 \times$ ..... $= 3.33$

(1 mark)

ii) ..... $\div 0.03 = 1.4$

(1 mark)

iii) ¾ of 80 = ½ of .....

(1 mark)

iv) 40 km is approximately ..... miles

(1 mark)

v) $3\ m^2$ = ...mm^2

(1 mark)

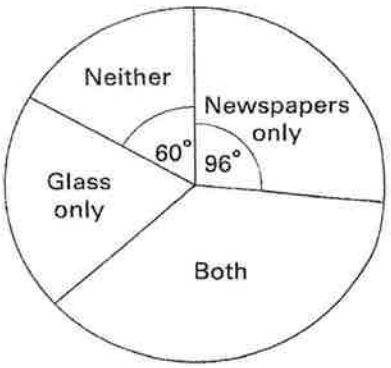
---

14. i) A teacher asked her pupils if they recycled newspaper and glass.

The pie chart shows the results.

5 pupils answered 'Neither'.

How many pupils answered 'Newspapers only'?



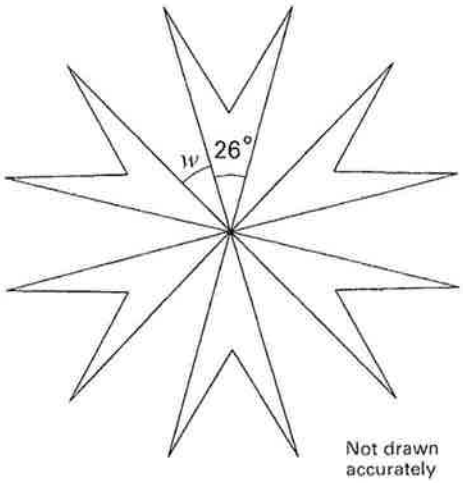
..... (2 marks)

ii) The teacher asked a different class. There were 24 pupils in the class. 9 pupils answered 'Newspapers only'. On a pie chart, what size would the angle for 'Newspapers only' be?

.....° (2 marks)

15. This pattern has rotational symmetry of order 6.

Calculate the size of angle w.



……..° (3 marks)

16. Aftab is y years old. Boris is 3 years older than Aftab. Colin is twice as old as Aftab.

i) Write down (in terms of y and as simply as possible) an expression for:

Boris' age ……..…..

Colin's age …….. (1 mark)

ii) Given that the sum of their three ages is 71 years, *form an equation*.

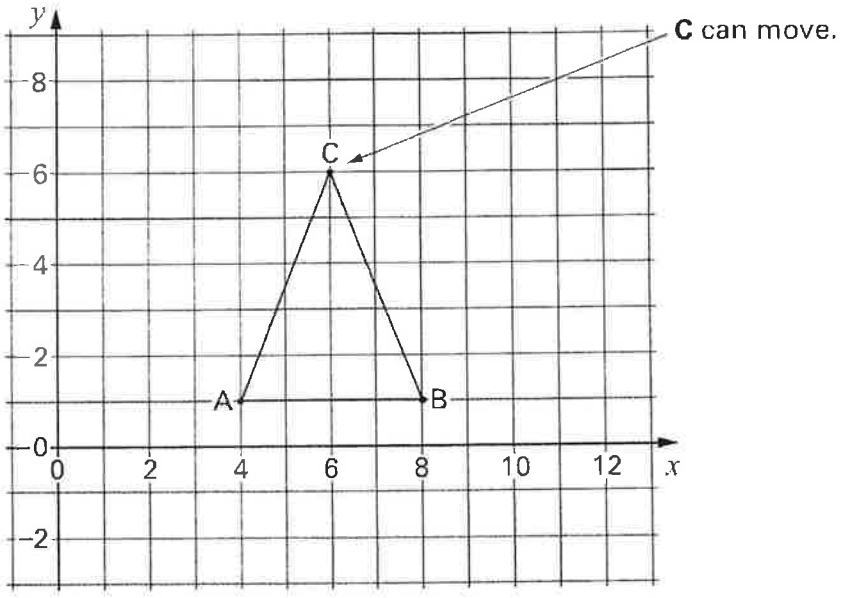
…….…… (1 mark)

iii) *Solve your equation* to find Aftab's age.

……years (2 marks)

17. On this square grid, A and B must *not* move, but C can move.

When C is at (6,6), ΔABC is isosceles.



i) *Calculate* the area of ΔABC when C is at (6,6).

.....units^2 (2 marks)

ii) C now moves so that ΔABC is isosceles *and* right-angled.

Write down the coordinates of the six possible new positions for C.

(..... , ...) , (..... , ...) , (..... , ...)

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

18. i) On my necklace, the ratio of red beads to blue beads is 2 : 3 and the ratio of red beads to yellow beads is 4 : 3. What is the ratio (in simplest form) of blue beads to yellow beads?

..... (2 marks)

ii) Hannah's necklace has black, silver and white beads in the ratio B : S : W = 5 : 1 : 3. There are 45 beads on Hannah's necklace. How many white beads are there?

..... (3 marks)

19. Simplify as much as possible:

i) $\frac{a}{3} + \frac{a}{3} + \frac{a}{3}$ ..... (1 mark)

ii) $3a^3 - 3a + a - 3$ ..... (1 mark)

iii) $\frac{a \times a \times a}{a}$ ..... (1 mark)

---

20. Find the value of each expression, given that $x = 3$, $y = -2$, $z = -1$.

i) $x^2 + y^2$

..... (1 mark)

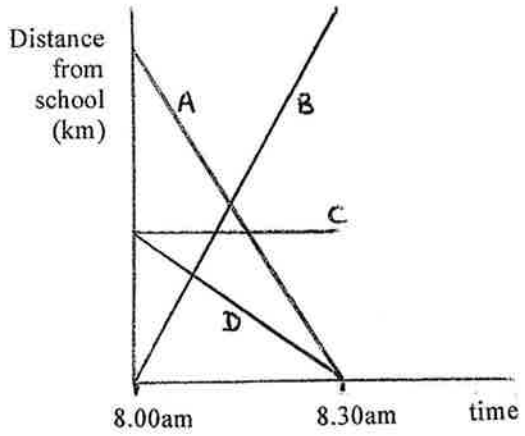
ii) $2y - 3z$

..... (2 marks)

iii) $\frac{x - y}{z}$ ..... (2 marks)

iv) $x(y + z)$ ..... (2 marks)

21.



Jude and Micky are twins who usually walk to school together but today Micky is off school ill.
Sophie travels to school by car. Hetal went on a school trip to France today.
A, B, C and D are today's travel graphs for the four classmates.
State the letter of the graph which best fits each description.

Jude ..... Micky ..... Sophie ..... Hetal ..... (2 marks)

22. A triangle has an area of $10cm^2$ and a base of 5cm. What is its height?

.....cm (2 marks)

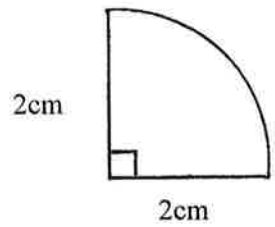
23. Five pings and five flips are worth the same as two flips and eleven pings.

How many pings is one flip worth?

..... (3 marks)

24. Taking the value of π as 3.1, calculate:

i) the area of the shape,



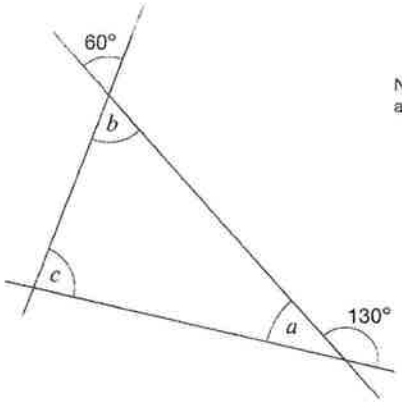
Area = ... (2 marks)

ii) the perimeter of the shape.

Perimeter = ... (2 marks)

TURN OVER!

25. Calculate the size of each angle marked with a letter.

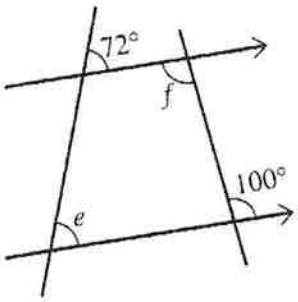


Not drawn accurately

a = ...° (1 mark)

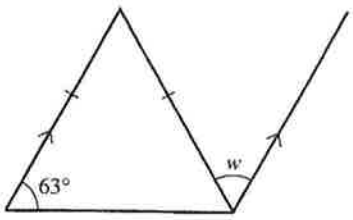
b = ...° (1 mark)

c = ...° (1 mark)



e = ...° (1 mark)

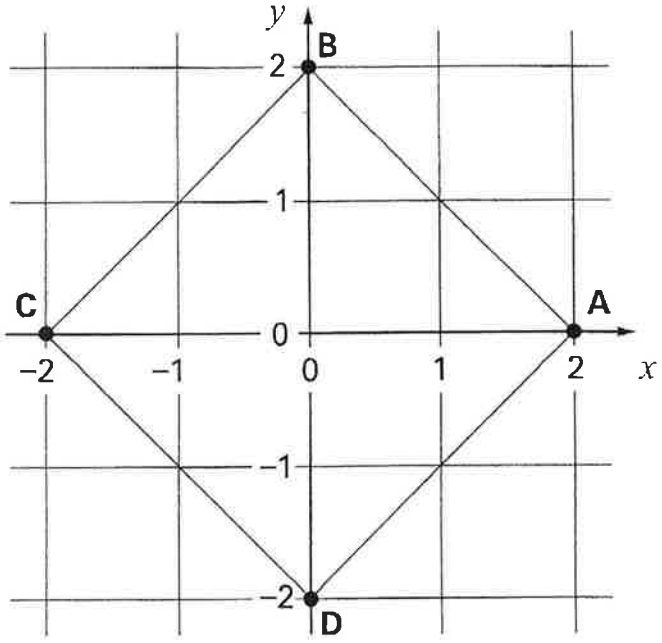
f = ...° (1 mark)



w = ...° (1 mark)

26.

ABCD is a square, drawn on a square grid.



i) Write down the *equation* of the line that passes through A and B.

..... (2 marks)

ii) Name *two* points (A, B, C or D) which are on the line whose equation is $y = x + 2$.

..... and ..... (1 mark)

iii) If ABCD is rotated 90° clockwise around the origin, onto which point does D move?

..... (1 mark)

iv) If instead ABCD is rotated 90° clockwise around point A, onto which point does D move?

..... (1 mark)

v) If instead ABCD is reflected in the mirror line whose equation is $y = x$, onto which point does D move? (Draw and label the line $y = x$.)

..... (2 marks)

vi) Write down the coordinates of the point where the lines $x = 4$ and $y = 3x + 1$ would cross. (You do *not* need to draw the lines.)

..... (1 mark)

END OF EXAMINATION.

Now go back and check your work.