SURNAME ..... FIRST NAME .....
(Block capitals, please)
JUNIOR SCHOOL ..... SENIOR SCHOOL .....

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

PAPER 2: Non-Calculator Paper

Practice Paper 2006–2007

Please read this information before the examination starts.

- This examination is 60 minutes long.
- **All** questions should be attempted.
- A row of dots ..... denotes a space for your answer.
- A completely correct answer may receive **no** marks unless you show all your working.
- Answers given as fractions should be reduced to their lowest terms.

1. Calculate

(i) the sum of 23.5 and 12.72

Answer: ..... (1)

(ii) the difference between 23.5 and 12.72

Answer: ..... (2)

(iii) 73.5×0.03

Answer: ..... (2)

(iv) $73.5 \div 0.03$

Answer: ..... (2)

2. (a) (i) Write 52% as a fraction in its lowest terms.

Answer: ..... (2)

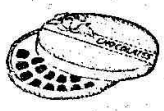
(ii) Of the 125 passengers on an aeroplane, 52% are men.
How many men are on the aeroplane?

Answer: ..... (2)

(b) Write $\frac{3}{8}$ as a decimal.

Answer: ..... (1)

3. (i) $\frac{3}{5}$ of the chocolates in a box contain nuts.
If 15 chocolates contain nuts, how many chocolates are there in the box?



Answer: ..... (2)

(ii) A recipe for 24 biscuits requires 360 grams of flour.
How many kilograms of flour will I need for 90 biscuits?

Answer: ..... kg (2)

4. By rewriting each number in this calculation correct to one significant figure, estimate the value of:

$$\frac{37.28 \times 31.11}{5.95}$$

Answer: ..... (2)

5. (a) Work out the following:

(i) 123×16

Answer: ..... (2)

(ii) $15 - 6 \div 3 - 1$

Answer: ..... (2)

(b) Calculate the value of $\sqrt[3]{64} \times 5^2$

Answer: ..... (2)

6. If $a = 4$ $b = -3$ $c = 5$ find the value of

(i) $2a + b$

Answer: ..... (1)

(ii) $a^2 - 4bc$

Answer: ..... (2)

(iii) $\frac{a+c+1}{b+1}$

Answer: ..... (2)

7. (a) Write down the next term in each of the following sequences.

(i) 1, 8, 27, 64, ...

Answer: ..... (1)

(i) 5, ⁻4, 1, ⁻3, ⁻2, ⁻5, ...

Answer: ..... (2)

(b) The nth term of a sequence, t_n, is defined by the formula $t_n = n^2 + n$

(i) What is the 5th term, t_5, of this sequence?

Answer: t_5 = ... (1)

(ii) What is the value of n when $t_n = 110$?

Answer: n = ... (2)

8. Edward, Fabian, Guy and Harriet go to the shops to buy some marbles.
Edward buys 20 marbles and Fabian buys 5 more than Edward.

(i) Write the ratio of the number of marbles bought by Edward and by Fabian in its lowest terms.

Answer: ..... : ..... (1)

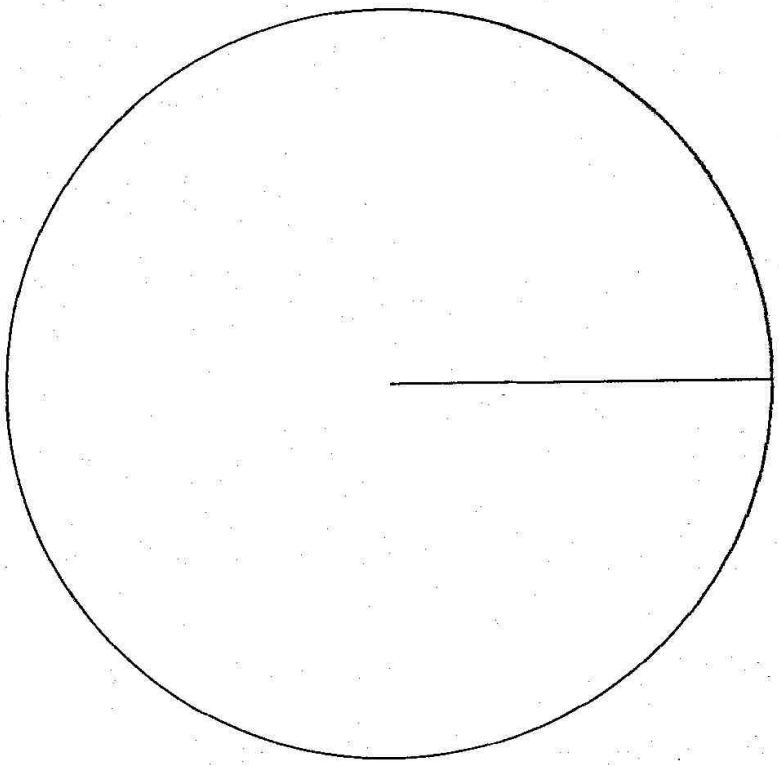
Guy buys twice as many marbles as Edward, and Harriet buys 10 more marbles than Fabian.

(ii) Complete this table, showing the number of marbles bought by each child, and the total number of marbles.

name	number of marbles bought
Edward	20
Fabian	
Guy	
Harriet	
total	

(2)

(iii) Represent this information on a fully-labelled pie chart, showing all the angles.



(3)

9. (i) The heights of five children are:

130 cm 1.25 m $1\frac{1}{2}$ m 1.2 m 1 m 35 cm

(a) Convert these heights to centimetres, and write them in order, starting with the smallest.

Answer: ..... cm, ... cm, ... cm, ... cm, ... cm (2)

(b) What is the range of these heights?

Answer: ..... cm (1)

(c) What is the median height?

Answer: ..... cm (1)

(d) What is the mean height?

Answer: ..... cm (2)

(ii) Another child joins the group and the mean height changes to 1.36 m. What is the height, in metres, of the child who joins the group?

Answer: ..... m (2)

10. Joe has two fair 4-sided dice.

One has the numbers 1, 2, 3 and 4 on its faces.

The other has the numbers 5, 6, 7 and 8 on its faces.

Joe throws the two dice and finds the product of their scores.

(i) Complete the table below, showing all the possible products. (2)

2nd die

1st die	x	5	6	7	8
	1			7	
	2		12		
	3			21	
	4	20			

(ii) Which product is the most likely to occur?

Answer: ..... (1)

(ii) What is the probability that the product will be

(a) even

Answer: ..... (1)

(b) a square number?

Answer: ..... (1)

(iv) What is the probability that the product will not be a prime number?

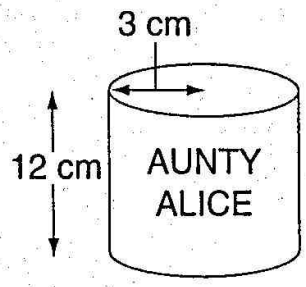
Answer: ..... (2)

11. **For this question, use $\pi = 3$**

Aunty Alice's Artichoke Soup is sold in cylindrical tins. Each tin has a base radius of 3 cm and a height of 12 cm.

(i) Work out the volume of soup in a full tin.

not to scale

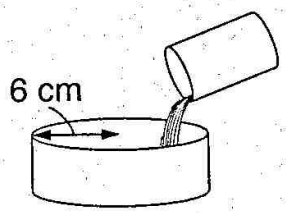


Answer: ..... cm^3 (2)

Bert, who loves Aunty Alice's Artichoke Soup, has two full tins for dinner. He pours both tins of soup into a cylindrical bowl of radius 6 cm.

(ii) What is the depth of soup in the bowl?

not to scale

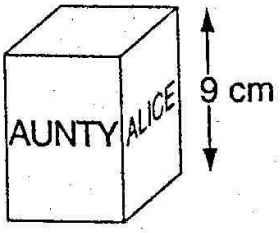


Answer: ..... cm (3)

Chris does not like cylinders and prefers cuboids. He decides that a full tin should be packaged into a square-based carton of height 9 cm.

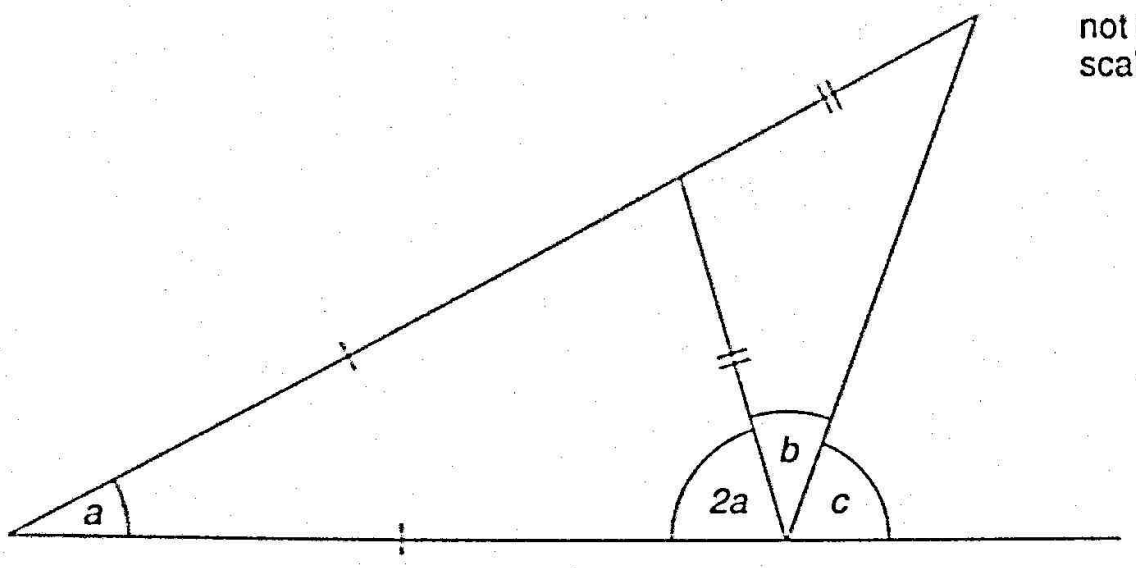
(iii) What are the dimensions of the base of his carton?

not to scale



Answer: ..... cm by ..... cm (3)

12. Calculate the size of each of the angles marked *a*, *b* and *c*.



Answer: $a =$ ..... ° (2)

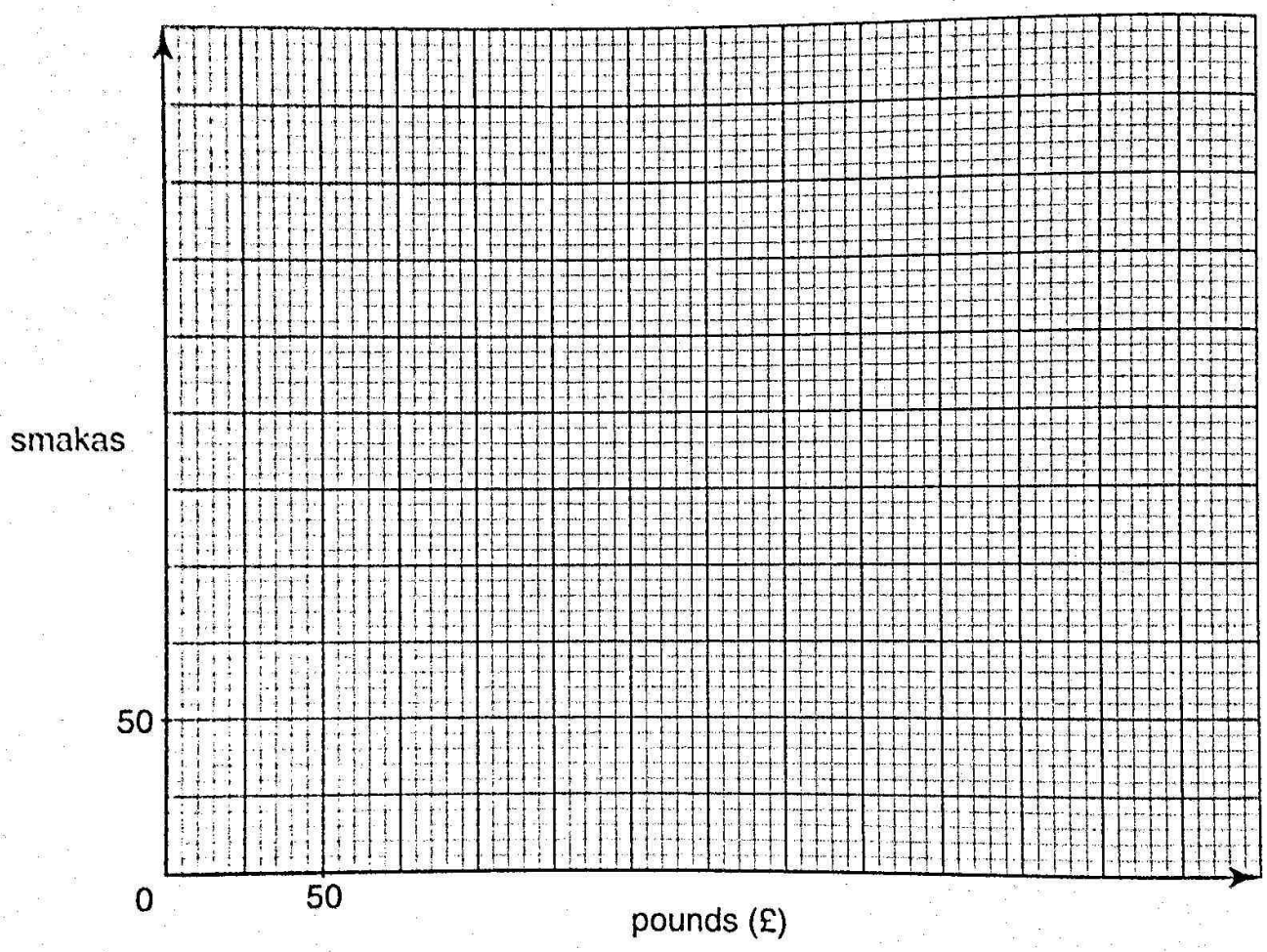
Answer: $b =$ ..... ° (2)

Answer: $c =$ ..... ° (1)

13. The Bloggs family go on a skiing holiday to Val Steepo, where the currency is the smaka. They discover that a £10 note is worth 7 smakas.

(i) Using this information, calculate how much £200 is worth in smakas.

Answer: ..... smakas (1)



(ii) On the grid, complete the scales and draw a graph to convert pounds to smakas for sums up to £300 (2)

(iii) Use your graph to answer the following question, showing clearly where you take your reading.

A pair of ski boots costs 200 smakas. How much is this in pounds (£)?

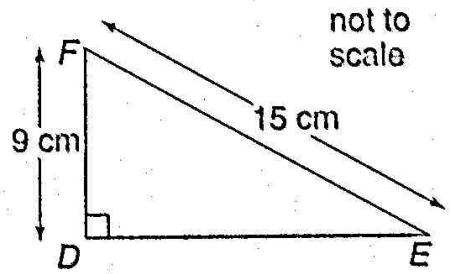
Answer: £..... (2)

14. (a) Construct isosceles triangle ABC such that $AB = 12$ cm, and $AC = BC = 7$ cm. The position of A is drawn for you.

$+$
A

(3)

(b) A right-angled triangle DEF is as shown.



(i) Calculate the distance DE.

Answer: ..... cm (3)

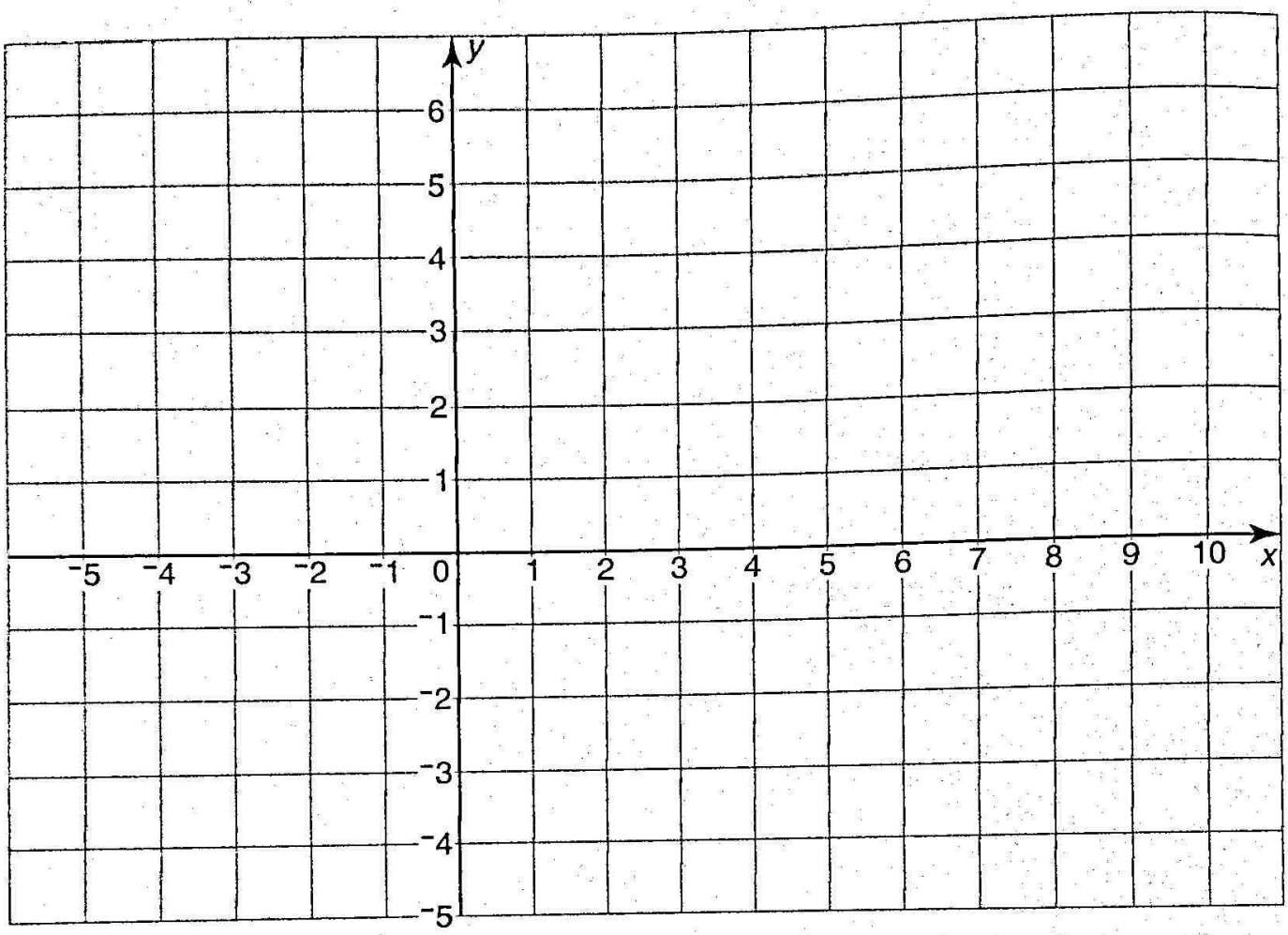
(ii) Calculate the area of triangle DEF.

Answer: ..... cm^2 (1)

(iii) Hence calculate the perpendicular distance from D to EF.

Answer: ..... cm (3)

15. (i) On the centimetre square grid below, plot the points (1, 1), (4, 1) and (2, 3). Join the points and label the triangle A. (1)



(ii) Draw and label the line $y = {}^{-}x$ (1)

(iii) Reflect triangle A in the line $y = {}^{-}x$ and label the image B. (1)

(iv) Rotate triangle A through 90° anticlockwise about the origin and label the image C. (2)

(v) Describe fully the single transformation that maps triangle B on to triangle C.

Answer: ..... (2)

16. (i) Giving your answers as fractions in their lowest terms, work out the value of:

(a) $\frac{1}{2} \times \frac{2}{3}$

Answer: ..... (1)

(b) $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5}$

Answer: ..... (1)

(c) $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{5}\right)$

Answer: ..... (2)

(ii) Work out the value of each of these series of products.

(a) $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{5}\right)\ldots\ldots\left(1+\frac{1}{99}\right)$

Answer: ..... (2)

(b) $\left(1-\frac{1}{4}\right)\left(1-\frac{1}{9}\right)\left(1-\frac{1}{16}\right)\left(1-\frac{1}{25}\right)\ldots\ldots\left(1-\frac{1}{100}\right)$

Answer: ..... (3)

(Total marks: 100)