Independent Schools
Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

LEVEL 3: NON-CALCULATOR PAPER

Practice Paper 2009–2010

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.

- You must show all your working or you may receive no marks.

- Answers given as fractions should be reduced to their lowest terms.

1. Ann, Beth, Chris and Donna stop at the newsagent's shop on their way home from school.

(i) Ann buys a bar of chocolate costing 58p and a magazine costing £3.79
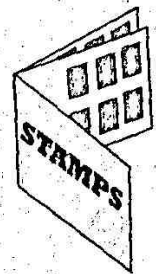How much does she spend altogether?
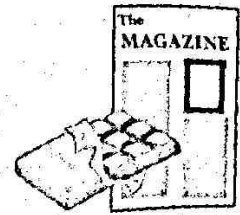
Answer: £ .... (1)

(ii) Beth spends £2.39 on a birthday card for her mother.
How much change does she receive if she pays with a £10 note?
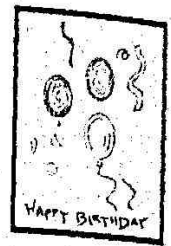
Answer: £ .... (1)

(iii) Chris buys twelve stamps costing 48p each.
What is the total cost of the twelve stamps?

Answer: £ .... (2)

(iv) Donna spends £5.20 on a packet of eight identical pens.
What would be the cost of one of these pens?

Answer: .... pence (2)

2. (a) Calculate

(i) $28 - 12 + 4 + 2 \times 3$

Answer: .... (2)

(ii) $\frac{3}{8} \times 4^3$

Answer: .... (2)

(b) (i) Write 140 as the product of its prime factors.

Answer: .... (2)

(ii) What is the smallest whole number by which 140 must be multiplied to obtain a square number?

Answer: .... (1)

3. Work out

(i) 2.52×0.7

Answer: .... (2)

(ii) $2.52 \div 0.7$

Answer: .... (2)

4. Look at the list of numbers below.

$$4 \qquad 5 \qquad 16 \qquad 20 \qquad 27 \qquad 29$$

Not using any number more than once, write down

(i) a multiple of 8

Answer: .... (1)

(ii) a square number

Answer: .... (1)

(iii) a cube number

Answer: .... (1)

(iv) a prime number

Answer: .... (1)

(v) a factor of 60

Answer: .... (1)

5. (a) The price of a DVD, which usually costs £18, is reduced by 15% in a sale.
   What is the sale price of the DVD?
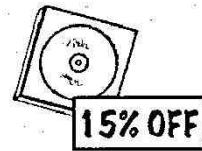
   Answer: £ .... (2)

   (b) Write 84 centimetres as a fraction of 3 metres.
   Give your answer in its simplest form.
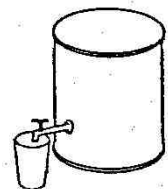
   Answer: .... (2)

6. (a) At Pete's garage, diesel costs 106.9 pence per litre.
   Mrs Cooper fills her fuel tank with 31 litres of diesel.
   Estimate the cost, in pounds, of filling her fuel tank with diesel.

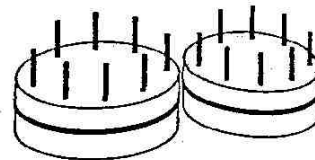   Answer: £ .... (2)

   (b) An urn contains 5.8 litres of orange juice.
   It is used to fill glasses which each hold 285 millilitres.
   Estimate how many glasses can be filled from the urn.

   Answer: .... (2)

7. (a) Sam is celebrating his birthday with 2 identical birthday cakes.
Sam eats $\frac{1}{4}$ of a cake, his sister eats $\frac{1}{6}$ of a cake and his friends eat $1\frac{1}{3}$ cakes between them.
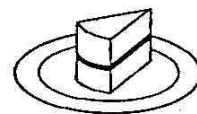
   (i) How many cakes have been eaten altogether?

   Answer: .... (3)

   Sam's mother and father share what is left of the cakes equally.
   (ii) What fraction of a cake does Sam's mother eat?

   Answer: .... (1)

   (b) $\frac{1}{3}$ of a class of 24 children are girls.
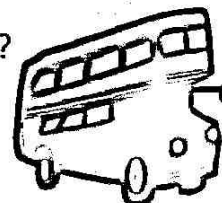 $\frac{3}{4}$ of the girls and $\frac{1}{2}$ of the boys learn a musical instrument.
   How many children in the class learn a musical instrument?

   Answer: .... (3)

   (c) It takes $1\frac{1}{2}$ hours to drive the red bus round its route.
   The red bus is driven round its route for 42 hours each week.
   How many times does the red bus complete the route each week?

   Answer: .... (2)

8. (a) When $a = 5$ $b = 2$ $c = ^-3$ find the value of

(i) $3a + 4c$

Answer: .... (1)

(ii) $a - bc$

Answer: .... (2)

(iii) $4c^2$

Answer: .... (2)

(iv) $\frac{c+a}{c-a}$

Answer: .... (2)

(b) The formula $s = \frac{(u+v)t}{2}$ relates distance, velocity and time.

Calculate t when $s = 60$ $u = 6$ and $v = 9$

Answer: $t =$ .... (3)

9. (a) Solve the following equations:

(i) $\frac{3}{8}m + 4 = 28$

Answer: $m =$ .... (2)

(ii) $3(2n - 4) = 10n + 4$

Answer: $n =$ .... (3)

(b) (i) Solve the following inequalities:

(a) $3q + 5 < 23$

Answer: .... (2)

(b) $^-2q \leqslant 10$

Answer: .... (1)
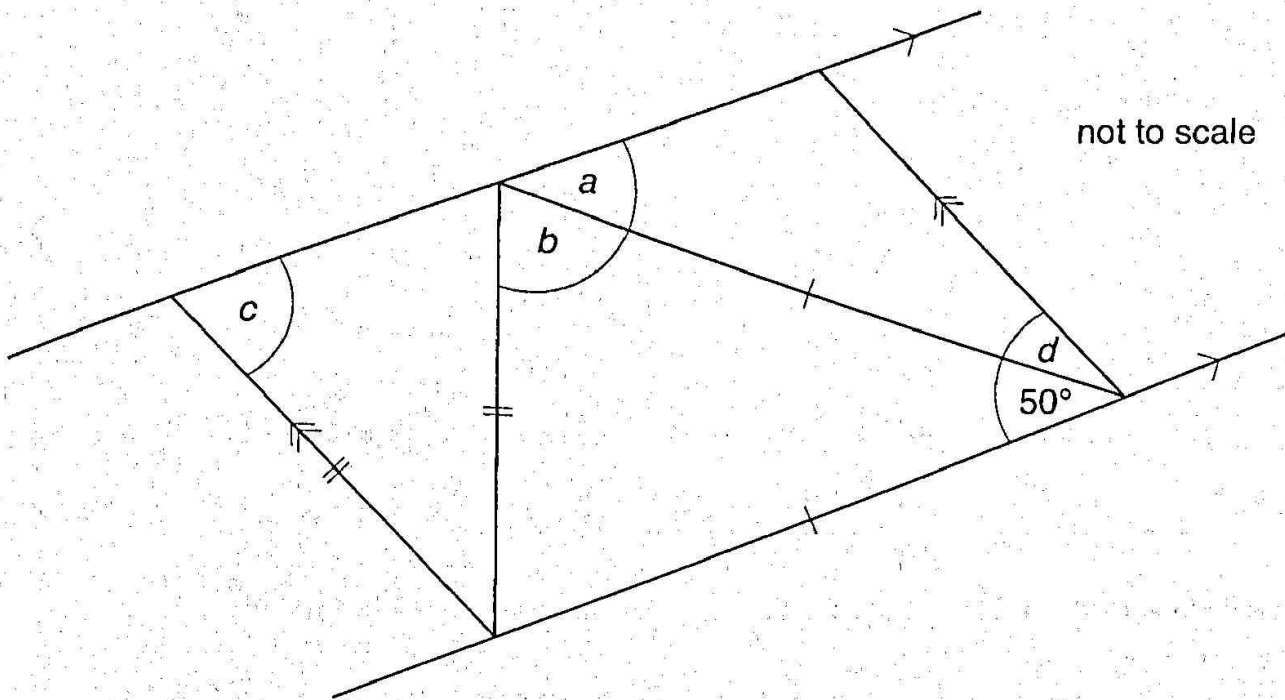
(ii) Show the range of values that q can take on the number line below.
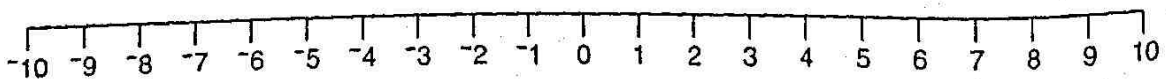
(2)

10. Calculate the size of each of the angles marked a, b, c and d.

not to scale

a

b

c

d

50°

Answer: a = ... ° (1)

Answer: b = ... ° (2)

Answer: c = ... ° (2)

Answer: d = ... ° (1)

11. Use the grid opposite to complete the following:

    (i) Plot the points (2, 3), (6, 3), (4, 5) and (2, 5).
        Join the points in order, to form a quadrilateral.
        Label the quadrilateral A.   (1)

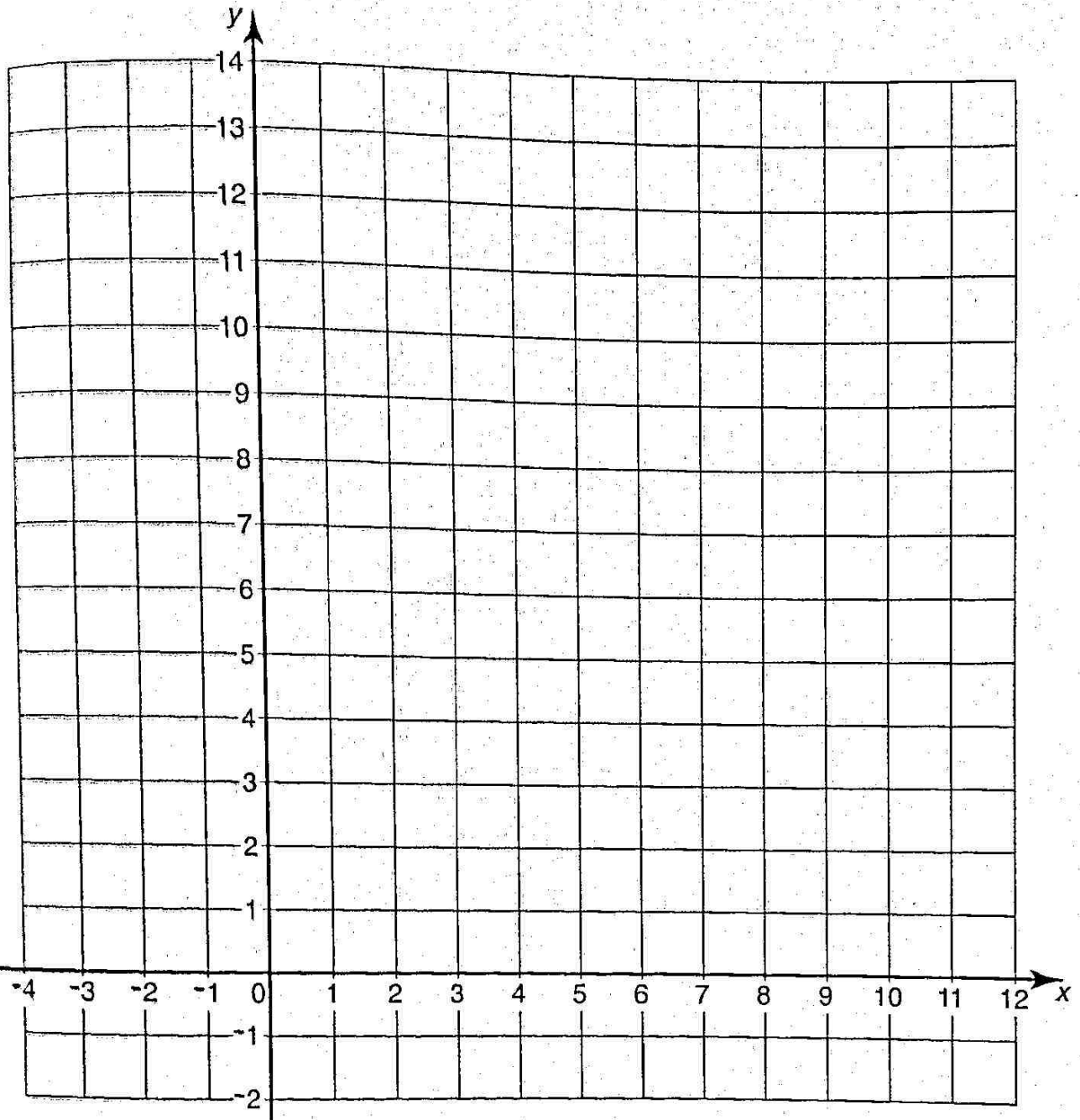   (ii) Reflect quadrilateral A in the line $y = 7$
        Label the image B.   (2)

    (iii) Rotate quadrilateral A through 90° anti-clockwise about the point (6, 7).
        Label the image C.   (2)

    (iv) Translate quadrilateral A by *4 units to the left* and *2 units up.*
        Label the image D.   (2)

10

12. Ma Baker's Coffee Shop sells four different types of cake.
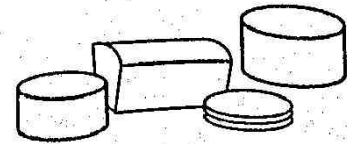
One week, Ma Baker sold 90 cakes as follows:

      35 were lemon

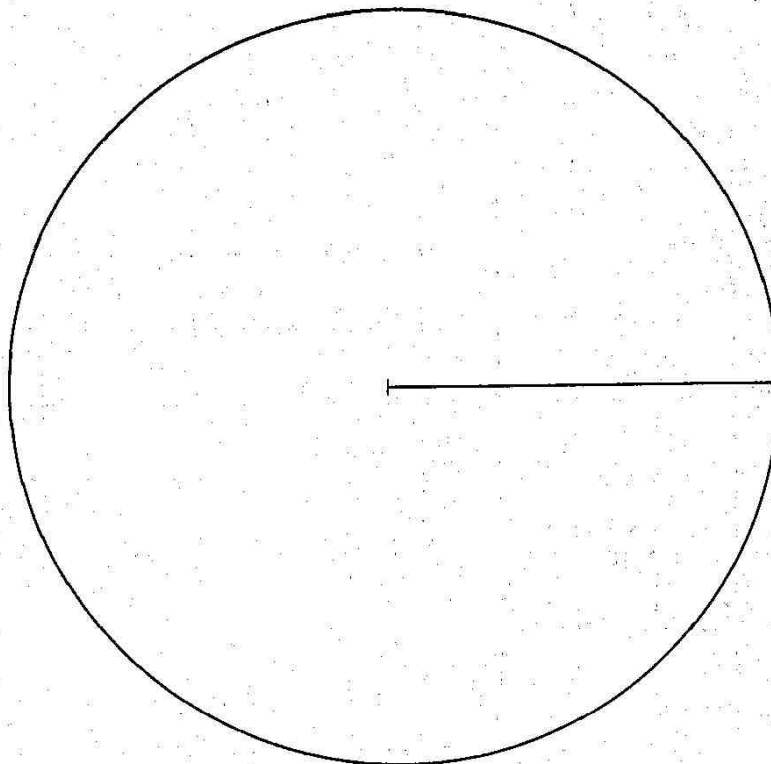 $\frac{1}{3}$ were chocolate

      10% were ginger

      the rest were coffee

(i) How many degrees will show each cake on a pie chart?

Answer: .... °   (1)

(ii) Draw a fully-labelled pie chart to show Ma Baker's cake sales.

(4)

(iii) The following week, sales of lemon, ginger and coffee cakes remained the same, but sales of chocolate cakes doubled.

(a) How many cakes did Ma Baker sell altogether during the second week?

Answer: ....   (1)

(b) What will be the angle for lemon cakes on a pie chart showing the sales for the second week?

Answer: .... °   (1)

13. Ravi has three green cards, numbered from 1 to 3, and five red cards, numbered from 1 to 5

He picks one green card and one red card at random.

(i) Complete the table below to show the possible combinations of cards he can pick.

		red card				
		1	2	3	4	5
green card	1	1, 1	1, 2	1, 3		
	2	2, 1				
	3	3, 1				

(1)

(ii) Use the table to state the probability that

(a) both cards show an odd number

Answer: .... (1)

(b) one card shows an odd number and one card shows an even number

Answer: .... (1)

(c) the sum of the numbers on the two cards is at least 5

Answer: .... (1)

(iii) Ravi notices that the product of the numbers on the two cards is a square number.
What is the probability that neither card shows a 3?

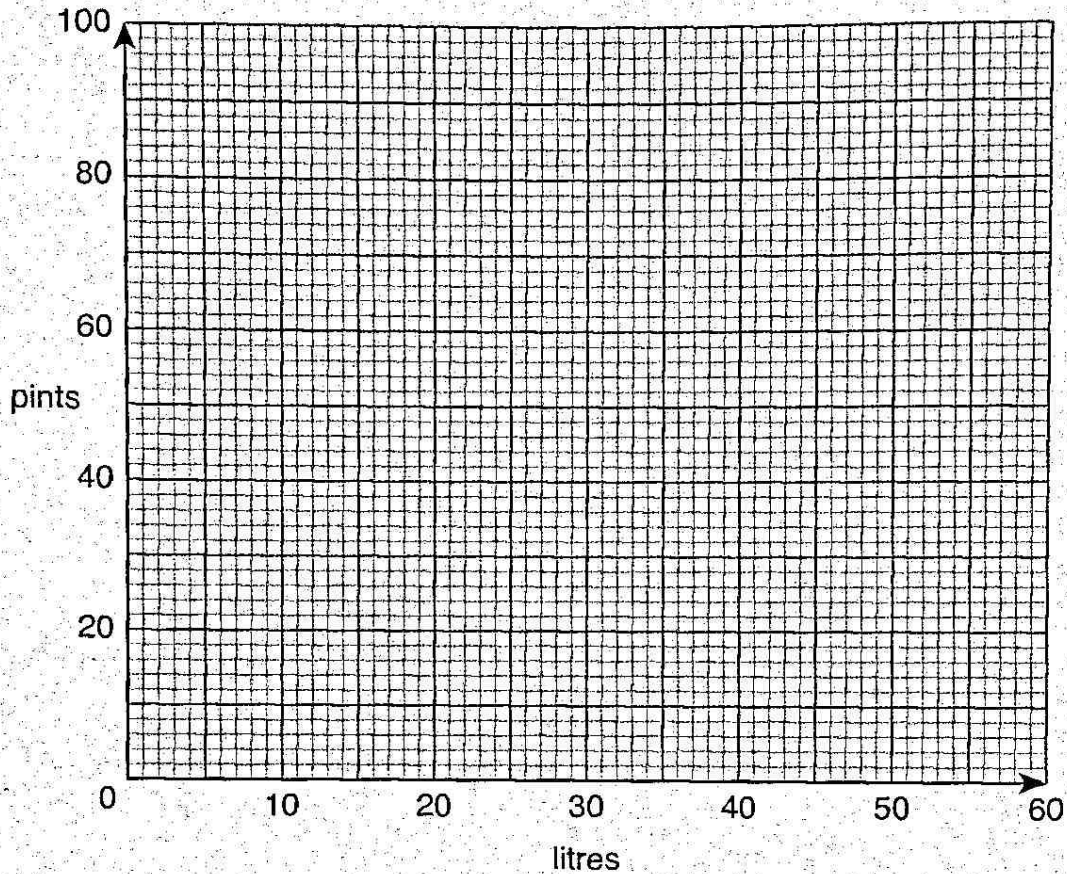Answer: .... (2)

Turn over

14.

8.8 pints are equivalent to 5 litres

(i) How many pints are equivalent to 25 litres?

Answer: .... pints   (1)

(ii) On the grid below draw a line to convert volumes in litres to pints up to 50 litres.

(2)

(iii) **Showing clearly where you take your readings,** use the graph to answer the following questions.

(a) A barrel holds 36 litres.

What is this volume in pints?

Answer: .... pints   (2)

(b) On Monday Debbie uses 25 litres of cream.

On Friday she uses 75 pints of cream.

How many more litres of cream does she use on Friday than on Monday?

Answer: .... litres   (2)

15. The table below shows the results obtained when adding consecutive odd numbers.

odd numbers	total
1	1
1 + 3	4
1 + 3 + 5	9
1 + 3 + 5 + 7	16

(i) Continue the pattern by filling in the next two rows in the table above. (2)

(ii) What is the total of the first eight odd numbers?

Answer: .... (1)

(iii) What is the total when the odd numbers from 1 to 19 are added together?

Answer: .... (1)

(iv) $1 + 3 + 5 + 7 +$ .... $+ n = 400$ follows the pattern above.

What is the value of n?

Answer: $n =$ .... (2)

(v) The number in the total column is t^2

Write down, in terms of t, the value of the last odd number in the pattern being added.

Answer: .... (2)

(Total marks: 100)