SURNAME ..... FIRST NAME .....

JUNIOR SCHOOL ..... SENIOR SCHOOL .....

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

LEVEL 3: NON-CALCULATOR PAPER

Monday 7 June 2010

Please read this information before the examination starts.

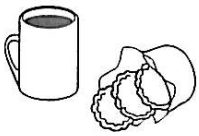
- This examination is 60 minutes long.
- **All** questions should be attempted.
- A row of dots ..... denotes a space for your answer.
- You must show all your working or you may receive no marks.
- Answers given as fractions should be reduced to their lowest terms.

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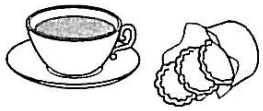
1. The Martin family have a snack at the station cafe.
   Mr Martin buys a mug of coffee for 95p and a packet of biscuits for 49p.

   (i) How much does Mr Martin pay altogether?



Answer: £ ..... (1)

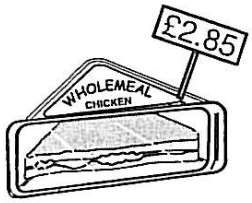
Mrs Martin pays £1.17 for a cup of tea and a packet of biscuits.



(ii) If the biscuits cost 49p, what is the price of the cup of tea?

Answer: ..... p (1)

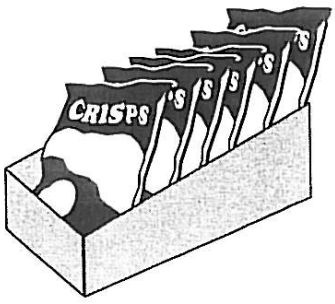
The 3 children each eat a sandwich costing £2.85



(iii) What is the total cost of the 3 sandwiches?

Answer: £ ..... (1)

They pay £2.22 altogether for 6 identical packets of crisps.



(iv) What is the cost of 1 packet of crisps?

Answer: ..... p (1)

2. (a) Write £2.10 as a fraction of £6 in lowest terms.

Answer: ..... (2)

(b) What is 18% of £8?

Answer: £ ..... (2)

(c) Write $\frac{7}{16}$ as a decimal.

Answer: ..... (2)

3. Calculate

(i) 2.4×0.4

Answer: ..... (2)

(ii) $240 \div 0.4$

Answer: ..... (2)

4. (a) 180 centimetres of cord are needed to make a skipping rope.

How many metres of cord are needed to make 25 of these skipping ropes?



Answer: ..... m (2)

(b) A total of 3 kilograms of jam is needed to fill 8 identical pots.

How many grams of jam does each pot contain?



Answer: ..... g (2)

5. (a) Calculate $4 - 3 \div 2 + 1$

Answer: ..... (2)

(b) Calculate the value of $(1\frac{1}{2})^2 - (\frac{1}{2})^2$

Answer: ..... (2)

(c) (i) Write 84 as a product of prime factors, using indices.

Answer: ..... (2)

(ii) Given that $315 = 3^2 \times 5 \times 7$

what is the largest number which divides exactly into both 84 and 315?

Answer: ..... (1)

6. (a) Simplify

(i) $3a^2 - 7a + 2a - 5a^2$

Answer: ..... (2)

(ii) $(3a^2b^3)^3$

Answer: ..... (2)

(iii) $\frac{18c^6}{12c^2}$

Answer: ..... (2)

(b) Multiply out

$2d^3(d^3 - 3)$

Answer: ..... (2)

7. (a) Given that $x = -4$ $y = 2$ and $z = -1$ find the value of

(i) $3x - 4y$

Answer: ..... (1)

(ii) $2xy - 5z$

Answer: ..... (2)

(iii) $(x - z^2)^3$

Answer: ..... (2)

(iv) $\frac{y^4z}{x}$

Answer: ..... (2)

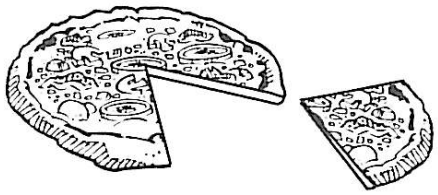
(b) The perimeter (P) of a rectangle is given by the formula $P = 2(l + w)$ when l is the length and w is the width of the rectangle.

Calculate the value of w when $P = 120$ and $l = 36$

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

8. (a) 5 friends order a *Giant Pizza.*

Sam eats $\frac{1}{4}$ of the pizza, Tim eats $\frac{1}{6}$ and Matt eats $\frac{1}{8}$ of it.



(i) What fraction of the pizza do Sam, Tim and Matt eat altogether?

Answer: ..... (2)

Ruth and Sarah share the rest of the pizza equally between them.

(ii) What fraction of the pizza does Ruth eat?

Answer: ..... (1)

(b) Auntie May uses $\frac{2}{5}$ of a ball of wool to knit 1 sock for Baby Bob.

How many balls of wool does Auntie May need to knit 10 socks for Baby Bob?



Answer: ..... (2)

(c) A maths lesson lasts for 40 minutes.

In the summer term, Maria has 30 hours of maths lessons.

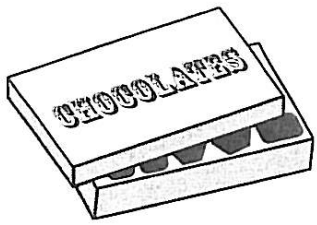
How many maths lessons does Maria have in the summer term?



Answer: ..... (2)

9. Boxes of chocolates are produced in 3 sizes.

Each box only contains toffee or soft centres in the ratio 5 : 7



(i) The small box of chocolates contains 10 chocolates with toffee centres.

How many chocolates in this box have soft centres?

Answer: ..... (1)

(ii) The medium box of chocolates contains 28 soft centres.

How many chocolates are there altogether in this box?

Answer: ..... (2)

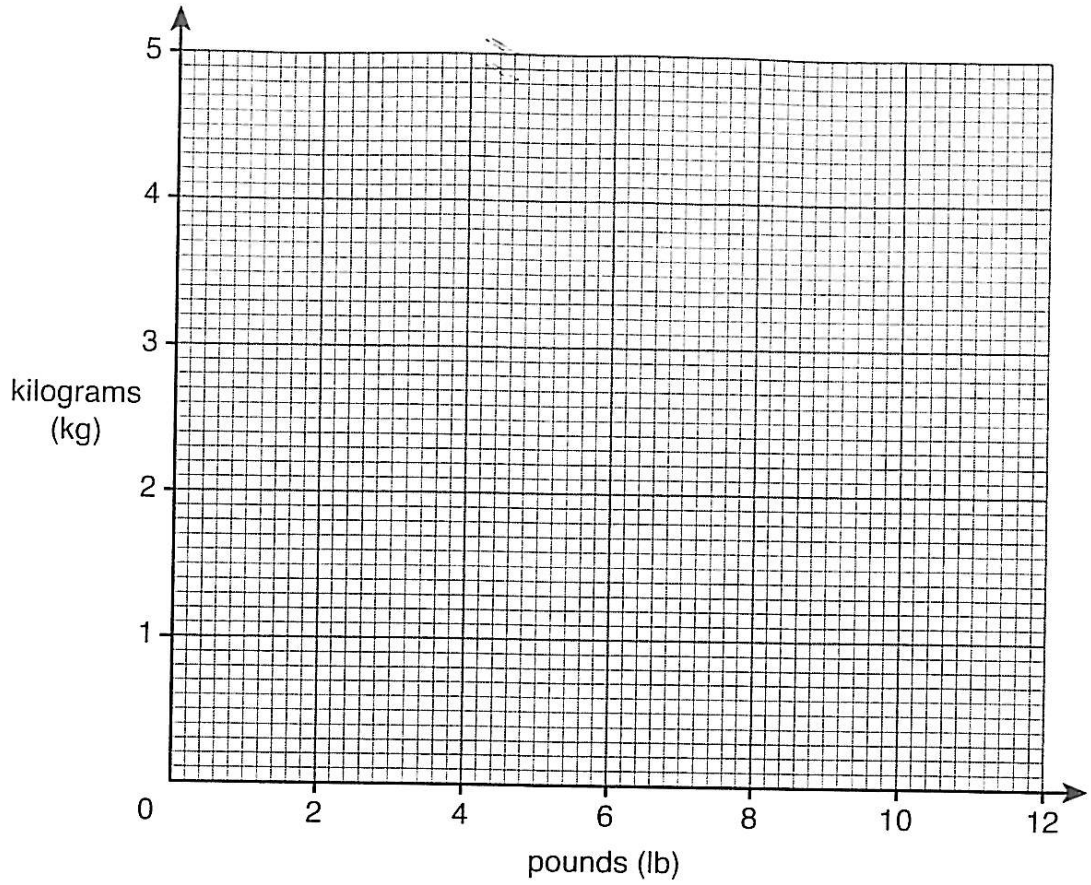
(iii) There is a total of 108 chocolates in the large box.

How many chocolates in the large box have toffee centres?

Answer: ..... (2)

10. Olly has a set of Victorian kitchen scales.

They are marked in pounds (lb) but Olly's cookbook uses only kilograms (kg).



To solve the problem, Olly draws a graph to convert pounds to kilograms.

Olly knows that **11 pounds = 5 kilograms**

(i) On the grid above draw a line to convert masses up to 11 pounds into kilograms. (2)

Use the graph to answer the following questions, **showing clearly where you take your readings.**

(ii) Olly needs $3\frac{1}{2}$ lb of stewing steak.

What is this mass in kg?

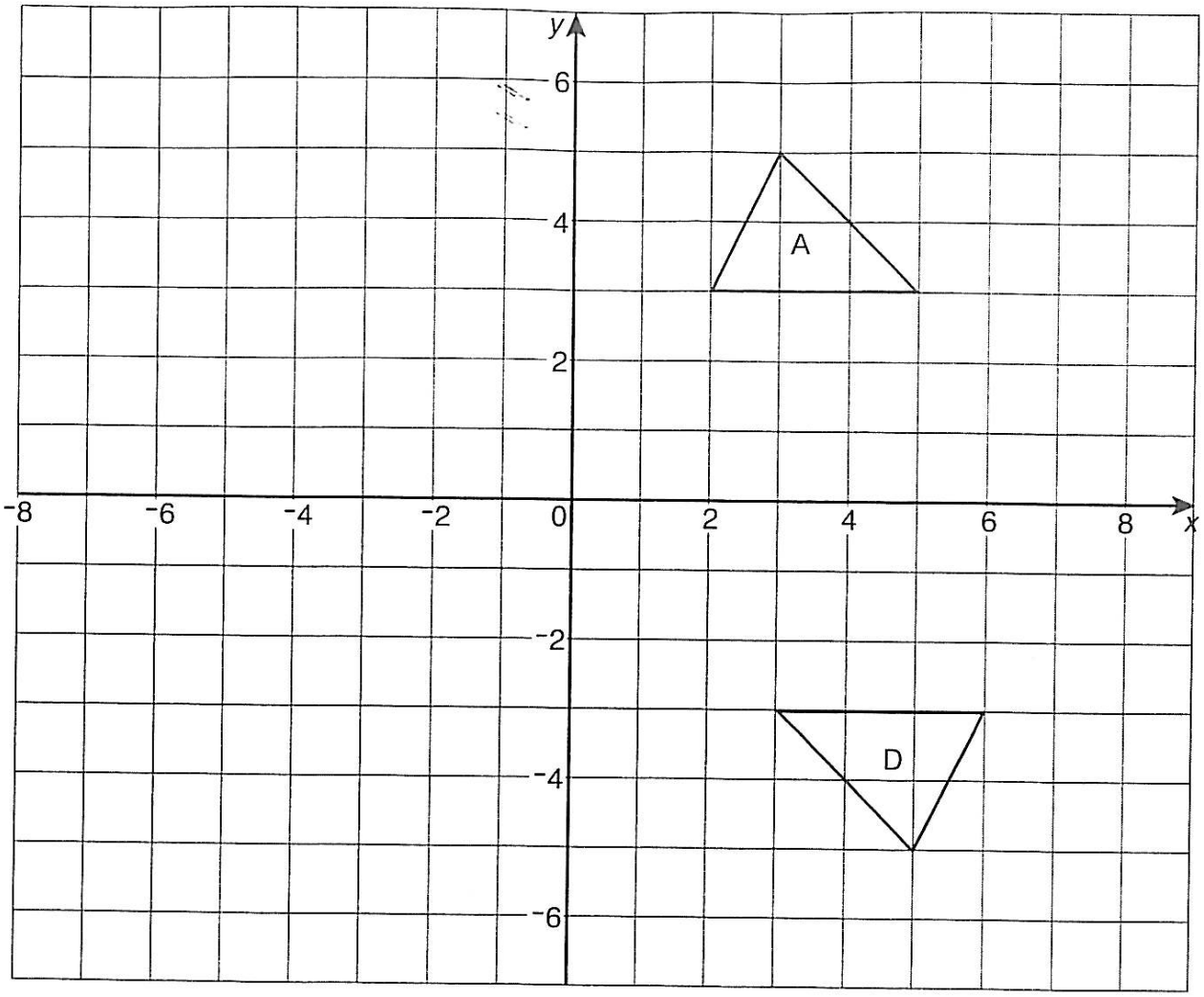
Answer: ..... kg (2)

(iii) Roasting a turkey takes 20 minutes per lb and then an extra 20 minutes.

What is the roasting time for a turkey with mass 4.6 kg?

Answer: ..... min (2)

11.



(a) Answer the following parts on the grid above.

(i) Draw and label the line $x = -1$ (1)

(ii) Reflect triangle A in the line $x = -1$
Label the image B. (1)

(iii) Enlarge triangle A by scale factor 2 with centre (3, 5).
Label the image C. (2)

(b) Describe in detail the single transformation which maps triangle A on to triangle D.

Answer: .....

..... (2)

12. *ABCD* is a rhombus in which $AB = 6$ centimetres and angle $ABC = 120°$

(i) Construct the rhombus accurately.
(AB has been drawn for you.)



(3)

(ii) Draw in the lines of symmetry of *ABCD*. (1)

(iii) Measure and write down the length of *AC*.

Answer: ..... cm (1)

(iv) What type of triangle is triangle *ABD*?

Answer: ..... (1)

(v) Calculate the area of *ABCD*.

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

13. The freezer at Scrooge's Store is stocked with different birds for Christmas.

There are 18 chickens
26 turkeys
10 ducks
6 geese

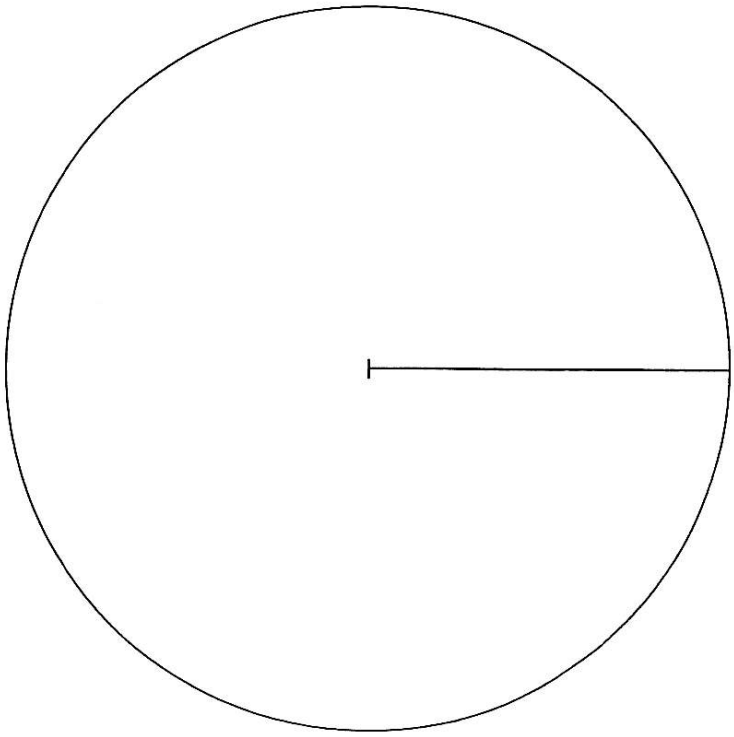


Scrooge wants to draw a pie chart to show this information.

(i) How many degrees will represent one bird?

Answer: ..... (1)

(ii) Draw a fully-labelled pie chart to show the information.



(4)

Before he makes any sale, Scrooge takes delivery of 12 more geese.
He draws another pie chart to include these birds.

(iii) What fraction of the new pie chart will now represent the geese?

Answer: ..... (2)

(iv) Scrooge sells turkeys for £t each and chickens for £c each.

(a) 1 turkey and 2 chickens cost £21

Write this information as an equation in terms of t and c.

Answer: ..... (1)

(b) A turkey costs £9 more than a chicken.

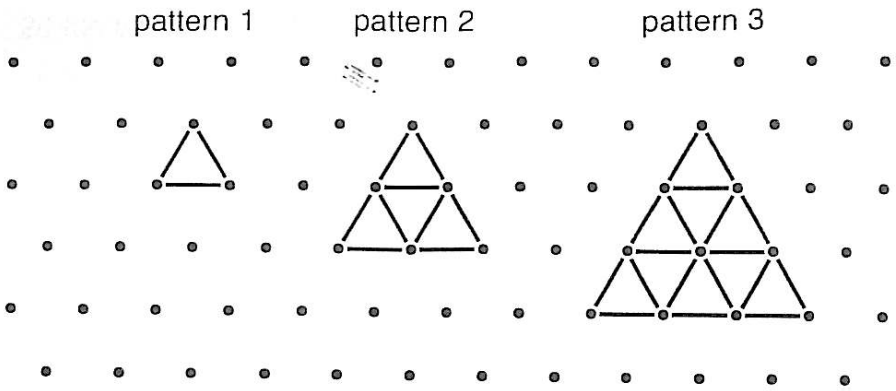
Write this information as an equation in terms of t and c.

Answer: ..... (1)

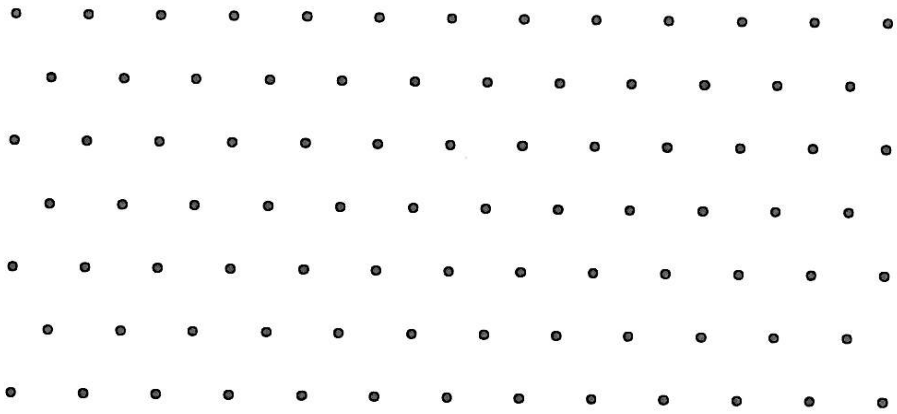
(c) Solve the equations simultaneously to find the cost of a turkey.

Answer: £ ..... (3)

14. The patterns below are made up of equilateral triangles each of side 1 centimetre with dots at each vertex.



(i) Draw pattern 4 below.



(1)

(ii) Complete the table below.

pattern number	1	2	3	4
number of 1-cm triangles	1	4		
length of perimeter, in cm	3			12
number of dots	3		10	

(3)

(iii) How many 1-cm triangles are there in pattern 12?

Answer: ..... (1)

(iv) What is the pattern number if the perimeter is 225 cm long?

Answer: ..... (1)

(v) The total number of dots, d, in pattern n is given by the formula

$$d = \frac{n^2 + 3n + 2}{2}$$

Using trial and improvement, find the pattern number which has 300 dots.

n	n^2	$3n$	$n^2 + 3n + 2$	$\frac{n^2 + 3n + 2}{2}$
10	100	30	132	66

Answer: n = ... (4)

TURN OVER FOR QUESTION 15

15. At Noah's Little Zoo there are just 3 chimps and 2 gorillas.
The mean number of bananas eaten by a chimp is 20 per week.
The mean number of bananas eaten by a gorilla is 30 per week.



(i) Is it true that the animal which eats the most bananas in a week **must** be a gorilla?
Give a reason for your answer.

Answer: YES / NO

Reason: .....

.....

..... (2)

(ii) Is it true that the mean number of bananas eaten by one of these animals is 25?
Give a reason for your answer.

Answer: YES / NO

Reason: .....

.....

..... (2)

(Total marks: 100)