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

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

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

LEVEL 3: NON-CALCULATOR PAPER

Monday 24 January 2011

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. (a) Anna buys 2 books costing £3.49 each and a cup of tea costing £1.65

How much does she spend altogether?



Answer: £ ..... (2)

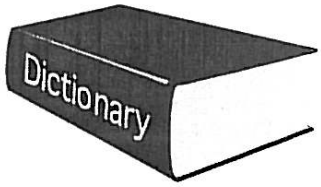
(b) Brendan buys a scarf costing £6.29 and he pays with a £20 note.

How much change does he receive?



Answer: £ ..... (1)

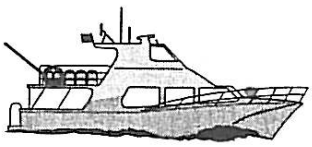
(c) Calculate the total mass of 12 large dictionaries, each with a mass of 3.45 kilograms.



Answer: ..... kg (2)

(d) The total cost of hiring a boat is shared equally between 8 friends.

If the total cost of hiring the boat is £532, how much does each friend pay?



Answer: £ ..... (2)

2. Calculate

(i) $20 - 2^3 \div 4$

Answer: ..... (2)

(ii) $\frac{1}{2} \times \sqrt{6^2 + 8^2}$

Answer: ..... (2)

3. You are told that **$135 \times 68 = 9180$**

Use this fact to work out

(i) 13.5×6.8

Answer: ..... (1)

(ii) $918 \div 1.35$

Answer: ..... (1)

(iii) 1.35×69

Answer: ..... (2)

4. (a) (i) Write 0.88 as a fraction in its simplest form.

Answer: ..... (2)

(ii) Write $\frac{7}{8}$ as a percentage.

Answer: .....% (2)

(iii) Write these numbers in order of size, starting with the smallest.

0.88 $\frac{7}{8}$ 90% $0.\dot{8}$

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

(b) Calculate 85% of £12

Answer: £ ..... (2)

5. Jamie has 2 identical full tubs of margarine.

He uses $1\frac{1}{3}$ tubs of margarine to make cakes and $\frac{2}{5}$ of a tub of margarine to make pastry.



(i) What fraction of a tub of margarine is left?

Answer: ..... (2)

(ii) Given that there are 800 grams of margarine left, what is the mass of margarine in a full tub?

Give your answer in kilograms.

Answer: ..... kg (2)

6. (a) Sheba the cat drinks $\frac{2}{3}$ of a pint of milk each day.

For how long will 6 pints of milk last Sheba?



Answer: ..... days (1)

(b) A large packet of sweets contains 25% more sweets than a standard packet.

What is the ratio of the number of sweets in a large packet to the number of sweets in a standard packet?

Give your answer in its simplest form.

Answer: ..... (2)

7. (i) Write 84 as a product of its prime factors.

Answer: ..... (2)

(ii) Bill starts a new tube of toothpaste every 84 days.

Ben starts a new tube of toothpaste every 30 days.

If they both start a new tube on January 1st, how many days are there until they next start a new tube on the same day?

(It may help you to know that 30 = 2 × 3 × 5)



Answer: ..... days (2)

8. (a) Given that $x = 3$ $y = -1$ and $z = -4$ find the value of

(i) $3x - 2z$

Answer: ..... (1)

(ii) $2y^2 - z^2$

Answer: ..... (2)

(iii) xyz

Answer: ..... (1)

(iv) $\frac{y+z}{y}$

Answer: ..... (2)

(b) A formula used in science is $J = mv - mu$

Calculate m if $J = 90$ $v = 8$ and $u = -2$

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

9. (a) Solve the following equations:

(i) $\frac{1}{4}a - 8 = 12$

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

(ii) $3(2b + 1) = 0$

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

(iii) $2 - c = 10 + 3c$

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

(b) (i) Solve the inequality $9 - 4d > 15$

Answer: ..... (2)

(ii) Write down the largest whole number which satisfies your answer to part (b) (i).

Answer: ..... (1)

9. (a) Solve the following equations:

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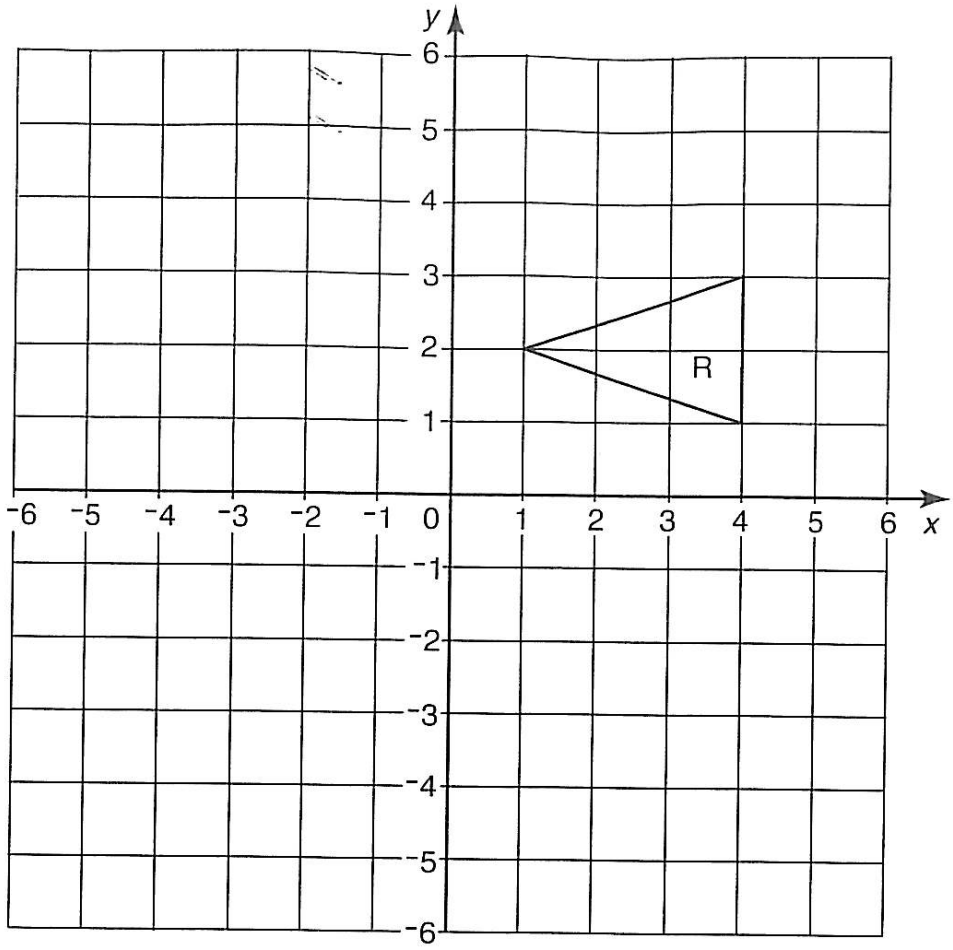
(b) (i) Solve the inequality $9 - 4d > 15$

Answer: ..... (2)

(ii) Write down the largest whole number which satisfies your answer to part (b) (i).

Answer: ..... (1)

10. Triangle R is drawn on the grid below.



(i) Write down the equation of the line of symmetry of R.

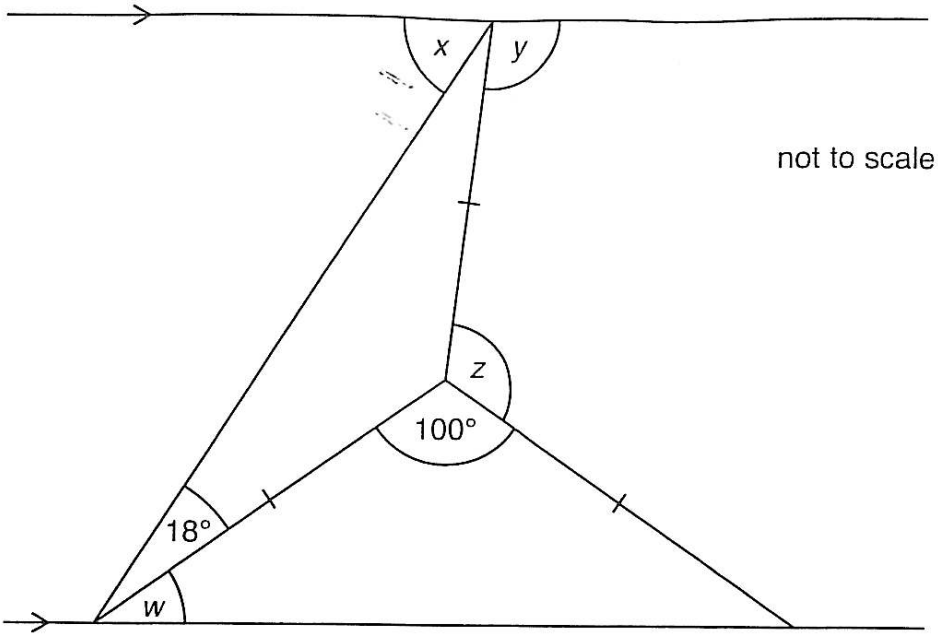
Answer: ..... (1)

(ii) Translate R by *3 squares left* and *4 squares down*.
Label the new shape S. (2)

(iii) Rotate R through 90° clockwise about the point (2, 0).
Label the new shape T. (2)

(iv) Enlarge R with scale factor 2 and centre (6, 1).
Label the new shape U. (2)

11. Calculate the size of each of the angles marked w, x, y and z.



not to scale

Answer: w = ... ° (1)

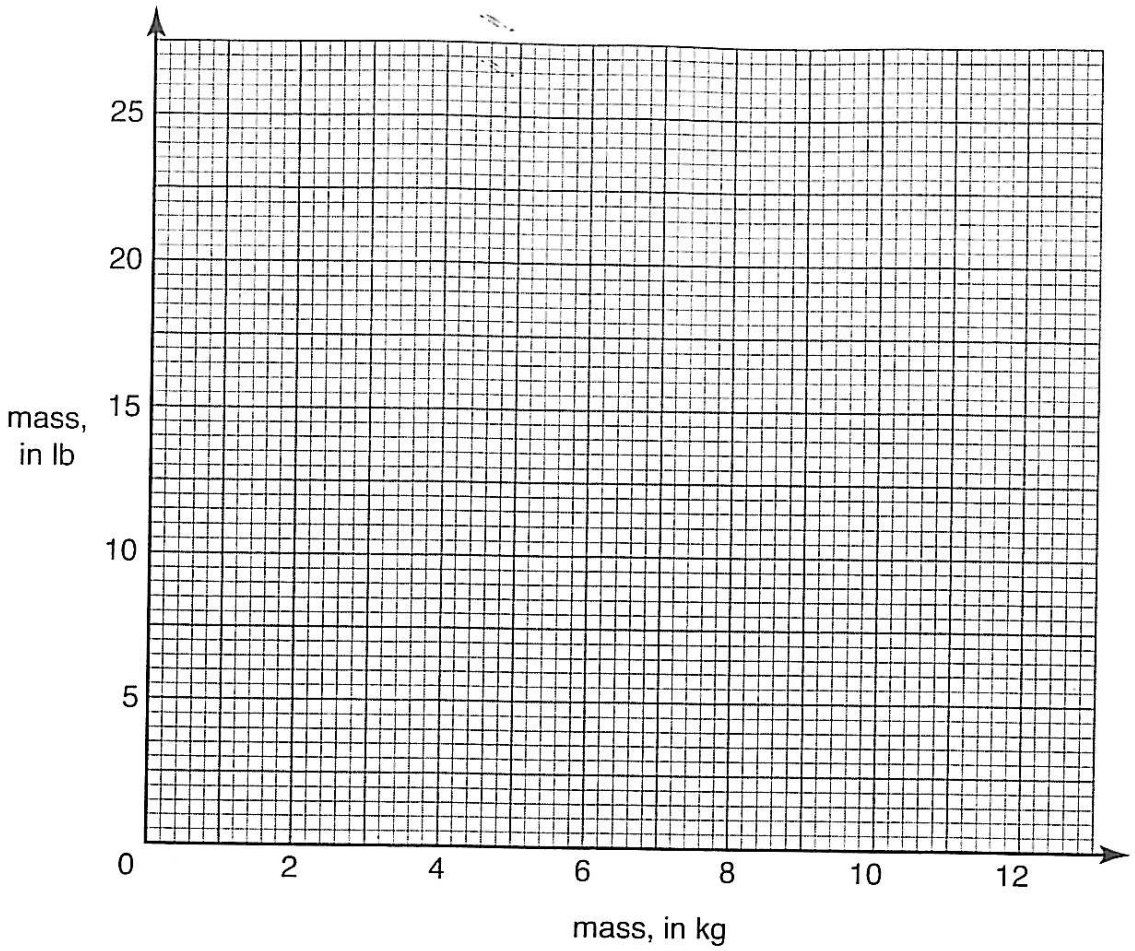
Answer: x = ... ° (1)

Answer: y = ... ° (2)

Answer: z = ... ° (2)

12. Fred knows that 10 kilograms (kg) are equivalent to 22 pounds (lb).

(i) On the grid below, draw a line to convert masses up to 12 kilograms into pounds. (1)



(ii) Use the graph to answer the following, **showing clearly where you take your readings**:

(a) How many pounds are equivalent to 11 kilograms?

Answer: ..... lb (1)

(b) How many kilograms are equivalent to 15 pounds?

Answer: ..... kg (1)

Barney lifts a large rock with a mass of 42 kilograms.



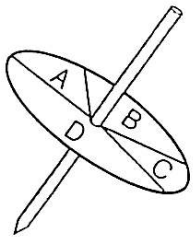
(iii) What is this mass in pounds?

Answer: ..... lb (2)

13. Here is a biased spinner.

It can land on A, B, C or D.

The probability that it lands on A, B or C is shown in the table below.



not to scale

letter	probability
A	0.1
B	0.3
C	0.05
D	

(i) Calculate the probability that it lands on D.

Answer: ..... (1)

(ii) If the spinner is spun 200 times, how many times would you expect it to land on B?

Answer: ..... (2)

Ian uses the spinner for a game at the Christmas fair.

It costs 50p to have a spin.

If the spinner lands on B, you get £1 back.

Everyone is allowed to have 1 spin.

(iii) Use your answer to part (ii) to estimate how much money Ian will make if 200 people have a spin.

Answer: £ ..... (2)

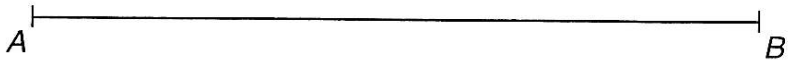
In fact, Ian makes £60

(iv) Estimate the number of people at the fair who have a spin.

Answer: ..... (1)

14. Triangle ABC is an isosceles triangle with $AB = AC = 10$ cm and $BC = 8$ cm.

(i) Using ruler and compasses, construct triangle ABC.
(The base AB is already drawn for you.)



(2)

A median of a triangle is a line joining the midpoint of one side to the opposite vertex.

(ii) Mark N, the midpoint of AB, and draw the median from N to C. (1)

(iii) Draw accurately the median AL. (1)

The three medians of the triangle should all cross at one point X.

(iv) Join B to X and extend to make the third median BM. (1)

(v) Measure XN and CN.

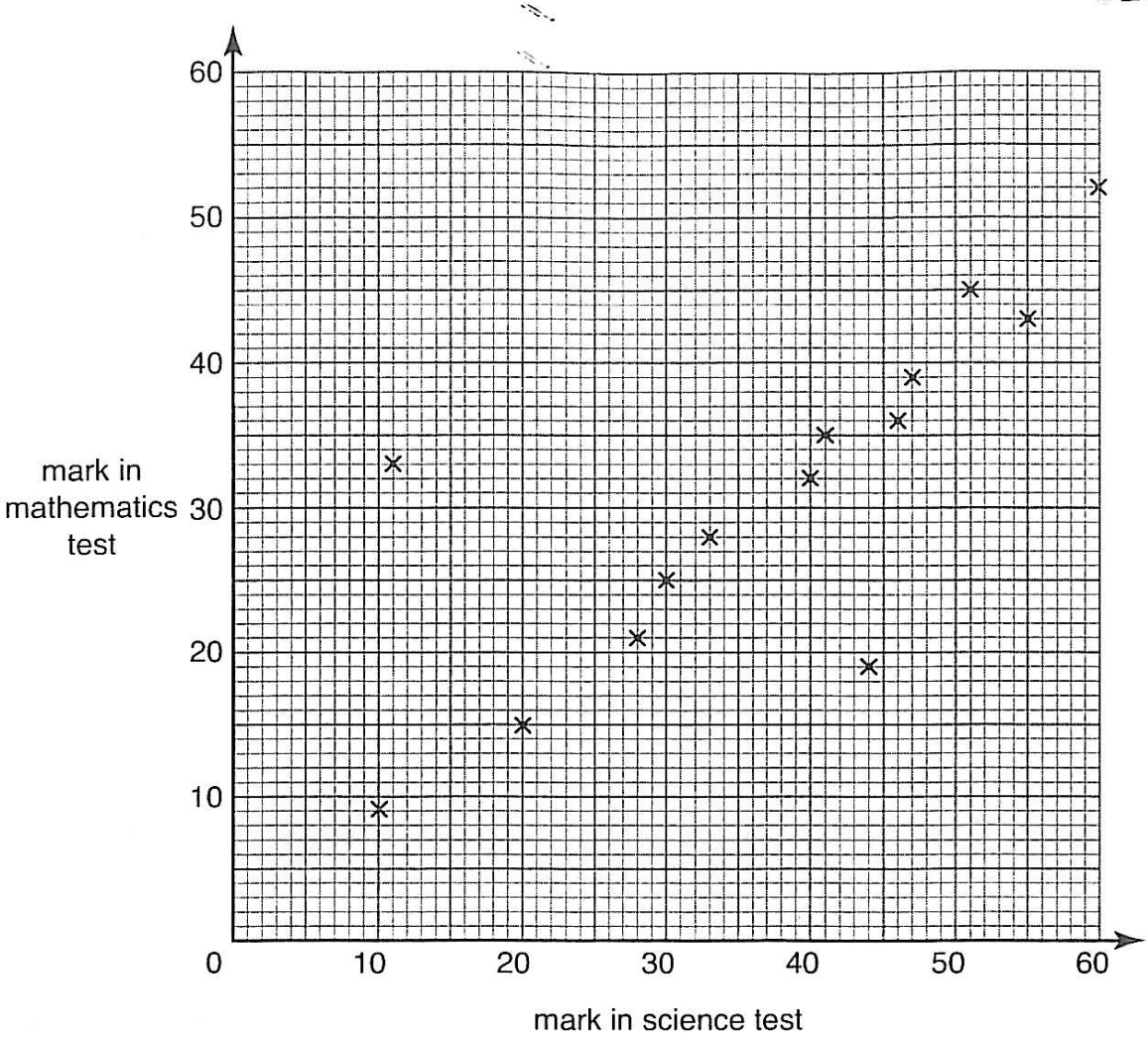
Answer: $XN =$ ..... cm, $CN =$ ..... cm (1)

(vi) If the area of triangle AXB is 12.22 cm^2, write down the area of triangle ACB.

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

15. The children in class 8 recently took tests in science and mathematics.
The scatter graph below shows their marks.





Safi was ill on the day of the tests and so took them later.
She scored 54 in science and 48 in mathematics.

(i) Plot a point on the graph to show Safi's marks. (1)

(ii) What type of correlation does this graph show?

Answer: ..... (1)

(iii) Draw a line of best fit on the graph. (1)

Paul did much better in mathematics than in science.
One point on the graph shows his marks.

(iv) Write down the mark he scored in the mathematics test.

Answer: ..... (1)

There are 15 students in the class.

The mean mark and the range of marks for the mathematics test are shown in the table below.

	science marks	mathematics marks
range	.....	43
mean	.....	30

(v) Use the graph to calculate the range of marks for the science test.
Write your answer in the table above.

(1)

The total of the science marks for the 15 students was 570

(vi) Calculate the mean mark scored in the science test.
Write your answer in the table above.

(2)

(vii) Use the data in the table to make 2 comparisons between the science and mathematics marks.

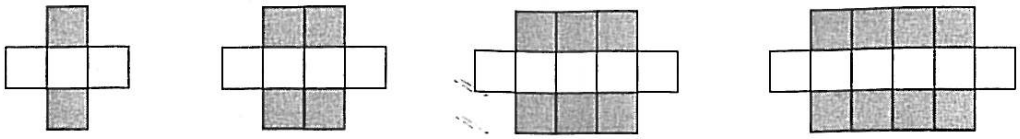
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..... (2)

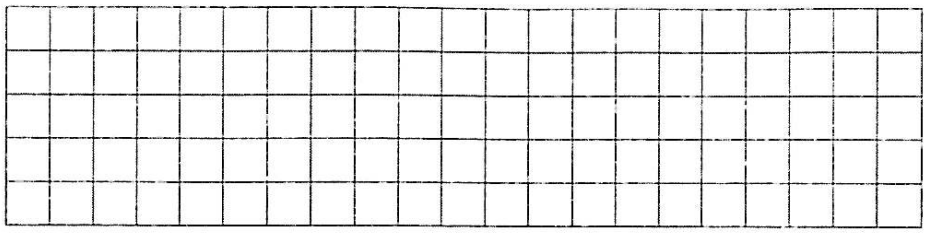
TURN OVER FOR QUESTION 16

16. Here is the start of a pattern made from black and white square tiles:



pattern 1 pattern 2 pattern 3 pattern 4

(i) Draw pattern 5 on the grid below.



(1)

(ii) Complete the table showing the number of tiles in each pattern.

pattern number	1	2	3	4	5
number of white tiles	3	4	5		
number of black tiles	2	4			
total number of tiles	5	8			

(2)

(iii) For pattern 10, calculate

(a) the number of white tiles

Answer: ..... (1)

(b) the total number of tiles

Answer: ..... (1)

(iv) One pattern has 20 more black tiles than white tiles.
What is the total number of tiles in this pattern?

Answer: ..... (2)

(v) One pattern has t white tiles.
Write an expression, in terms of t, for the number of black tiles in this pattern.

Answer: ..... (2)

(Total marks: 100)