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

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

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

LEVEL 3: NON-CALCULATOR PAPER

Monday 6 June 2011

Please read this information before the examination starts.

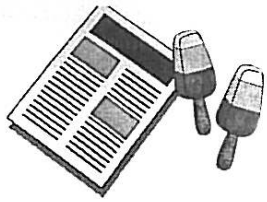
- This examination is 60 minutes long.
- **All** questions should be attempted.
- A row of dots ..... denotes a space for your answer.
- You must show all your working or you may receive no marks.
- Answers given as fractions should be reduced to their lowest terms.

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1. (a) Abi buys a magazine for £1.65 and two ice lollies which cost 39 pence each.

How much does she spend altogether?

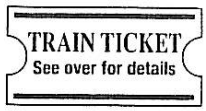


Answer: £ ..... (2)

(b) Mr Bevan's train ticket costs £117.28

He pays with three £50 notes.

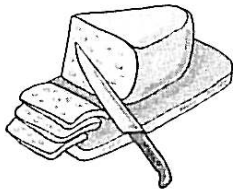
How much change should he receive?



Answer: £ ..... (2)

(c) Cheese costs 86 pence per 100 grams.

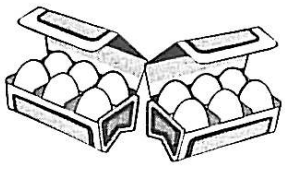
What is the cost of 450 grams of cheese?



Answer: £ ..... (2)

(d) A dozen duck eggs cost £3.24 in total.

What is the cost of one duck egg?



Answer: ..... p (2)

2. (a) (i) Write 0.725 as a percentage.

Answer: ..... % (1)

(ii) Write $\frac{27}{40}$ as a decimal.

Answer: ..... (2)

(b) Calculate $\frac{5}{8}$ of £50

Answer: £ ..... (2)

(c) Write 375 metres as a fraction of 1 kilometre in its lowest terms.

Answer: ..... (2)

3. (a) Calculate $2\frac{1}{2} - 1\frac{2}{3}$

Answer: ..... (2)

(b) (i) Write 300 as the product of prime factors, using indices.

Answer: ..... (3)

(ii) What is the smallest whole number by which 300 must be multiplied to give a cube number?

Answer: ..... (2)

4. (a) Calculate $12 - (6 + 2) \div 4 \times 2$

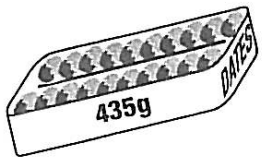
Answer: ..... (2)

(b) Jack chooses a number, doubles it and then squares the result.
What number does Jack choose if his final answer is 121?

Answer: ..... (2)

5. (a) A box contains 435 grams of dates.

How many kilograms of dates are there altogether in 24 of these boxes?



Answer: ..... kg (3)

(b) There are 12 identical bottles of wine in every case.

Carol the caterer buys one and a half cases, which gives her 13.5 litres of wine.

How many millilitres of wine are there in one bottle?



Answer: ..... ml (3)

6. Simplify

(i) $4a^2 - 7ab - 2ab + a^2$

Answer: ..... (2)

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

Answer: ..... (2)

(iii) $\frac{(2a^3)^3}{4a}$

Answer: ..... (2)

7. Multiply out the bracket and simplify

$7 - 4(2a + 1) + 3a$

Answer: ..... (2)

8. (a) Given that $a = 3$ $b = -2$ $c = -5$ and $d = 1$ find the value of

(i) $3a - bc$

Answer: ..... (2)

(ii) $2a^2 + 2d^2$

Answer: ..... (2)

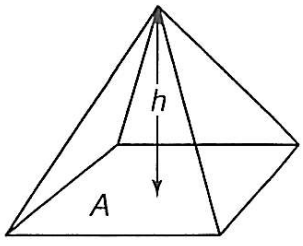
(iii) $\frac{a-c}{b}$

Answer: ..... (2)

(b) The volume of a pyramid, V, is given by the formula

$$V = \frac{1}{3}Ah$$

where A is the base area and h is its height.
Calculate h when $V = 256$ and $A = 48$



Answer: h = ... (3)

9. Lily uses these ingredients to make strawberry sorbet:

For 6 people	300 millilitres water 100 grams sugar 450 grams strawberries 2 eggs



(i) Calculate the ingredients needed to make this sorbet for 15 people.

Answer: ..... ml water

..... g sugar

..... g strawberries

..... eggs (2)

(ii) For how many people is Lily making this sorbet if she uses 750 grams of sugar?

Answer: ..... (1)

10. (a) Babs drinks $\frac{2}{5}$ of a pint of juice each day.
How many pints of juice will Babs drink in 10 days?



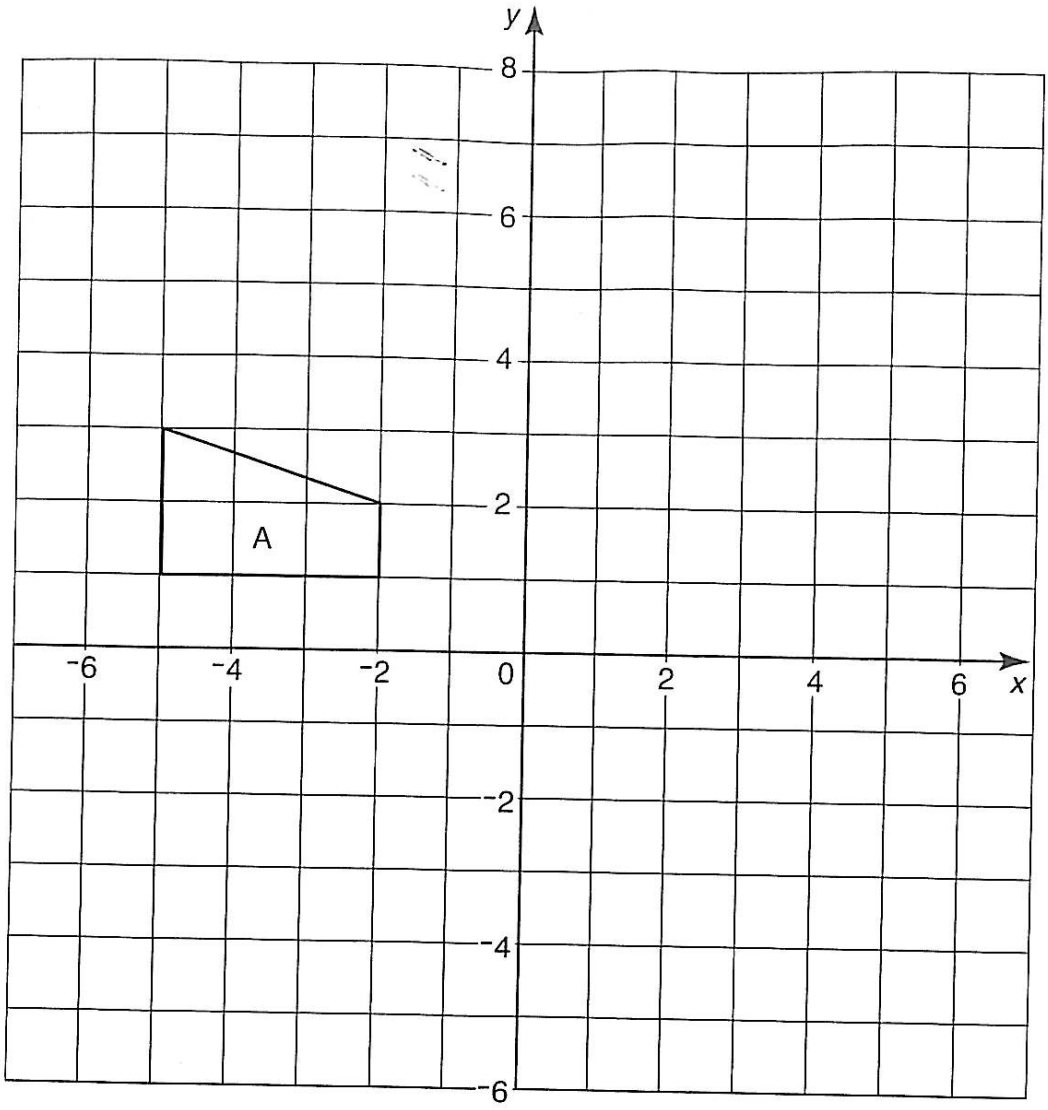
Answer: ..... pints (2)

(b) Every day Hal uses $\frac{3}{4}$ of a kilogram of grain to feed his chickens.
For how many days will a 24-kilogram bag of grain last Hal's chickens?



Answer: ..... days (2)

11.



On the grid above

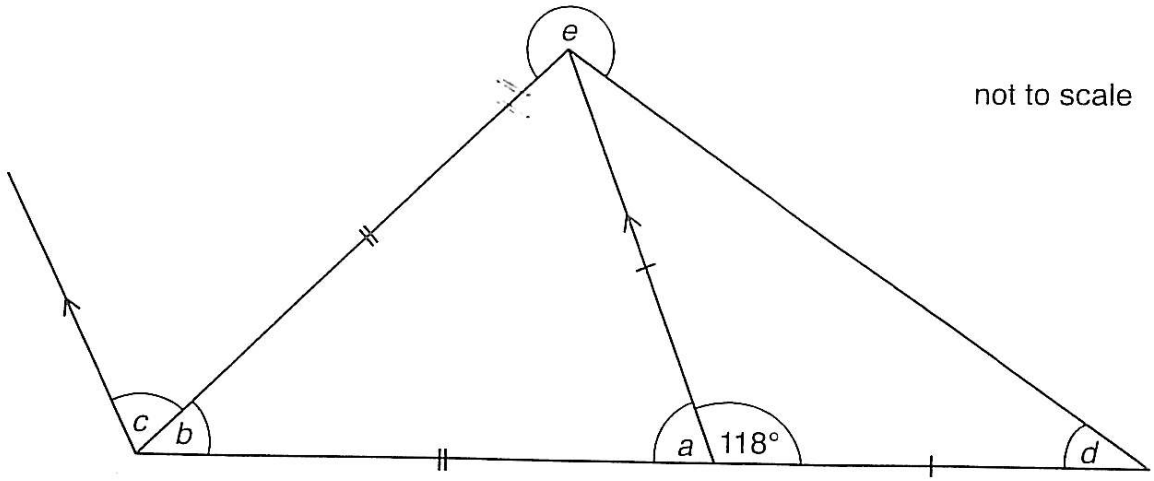
(i) (a) draw and label the line $y = x$ (1)

(b) reflect shape A in $y = x$ and label the image B (2)

(ii) rotate shape A through 90° clockwise about the point (1, 1) and label the image C (2)

(iii) draw another shape so that all four shapes form a pattern which has the line of symmetry $y = 1$ and label the shape D (2)

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



not to scale

Answer: a = ... ° (1)

b = ... ° (2)

c = ... ° (1)

d = ... ° (2)

e = ... ° (2)

13. Mr Archer grows vegetables on his 90 hectare farm as follows:

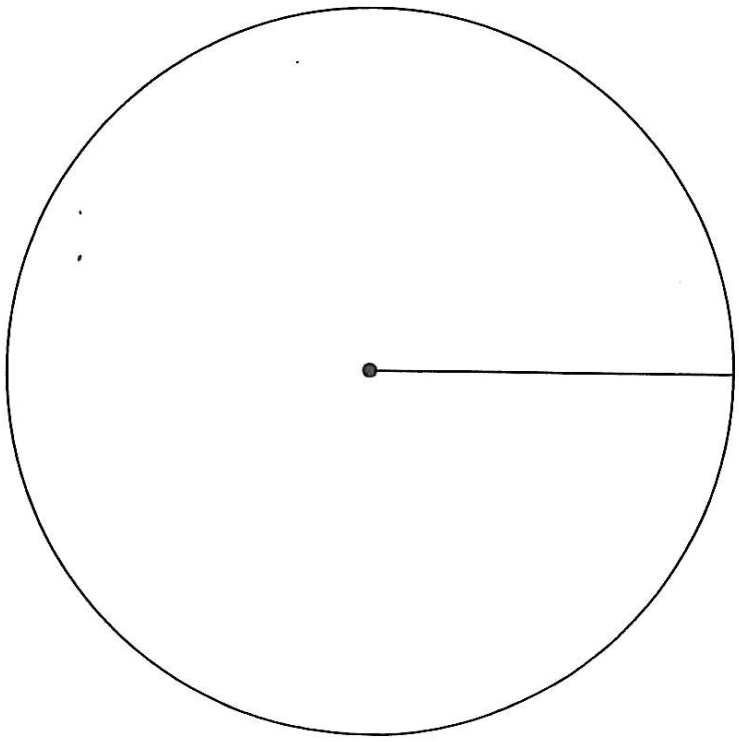
carrots	14 hectares
cauliflowers	36 hectares
onions	19 hectares
potatoes	21 hectares

Mr Archer wants to show this information in a pie chart.

(i) How many degrees will represent 1 hectare?

Answer: ..... (1)

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



(3)

The following year Mr Archer keeps the same area of carrots and potatoes but replaces the area of onions with more cauliflowers.

He draws a new pie chart.

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

Give your answer in its lowest terms.

Answer: ..... (2)

14. Joe has three cards.

One card has the digit 1 written on it, another has the digit 2 written on it and the last has the digit 3 written on it.

Joe places three cards in a row to make a three-digit number.

(i) Write down all the possible numbers which Joe can make using all three cards in any order.



Answer: ..... (2)

(ii) What is the probability that the three-digit number he makes is a multiple of 6?

Answer: ..... (1)

(iii) What is the probability that the number is prime?

Answer: ..... (1)

(iv) Joe places the three cards in a row face down at random.

Sue guesses what number will be shown when all three cards are turned over.

What is the probability that Sue is incorrect?

Answer: ..... (1)

15. (i) (a) For the equation $y = 2x - 6$

(i) what is the value of y when $x = 0$?

Answer: $y =$ ..... (1)

(ii) what is the value of x when $y = 2$?

Answer: $x =$ ..... (1)

(b) On the grid opposite, draw and label the graph of $y = 2x - 6$ (1)

(ii) (a) For the equation $y = 6 - x^2$ complete the table of values below.

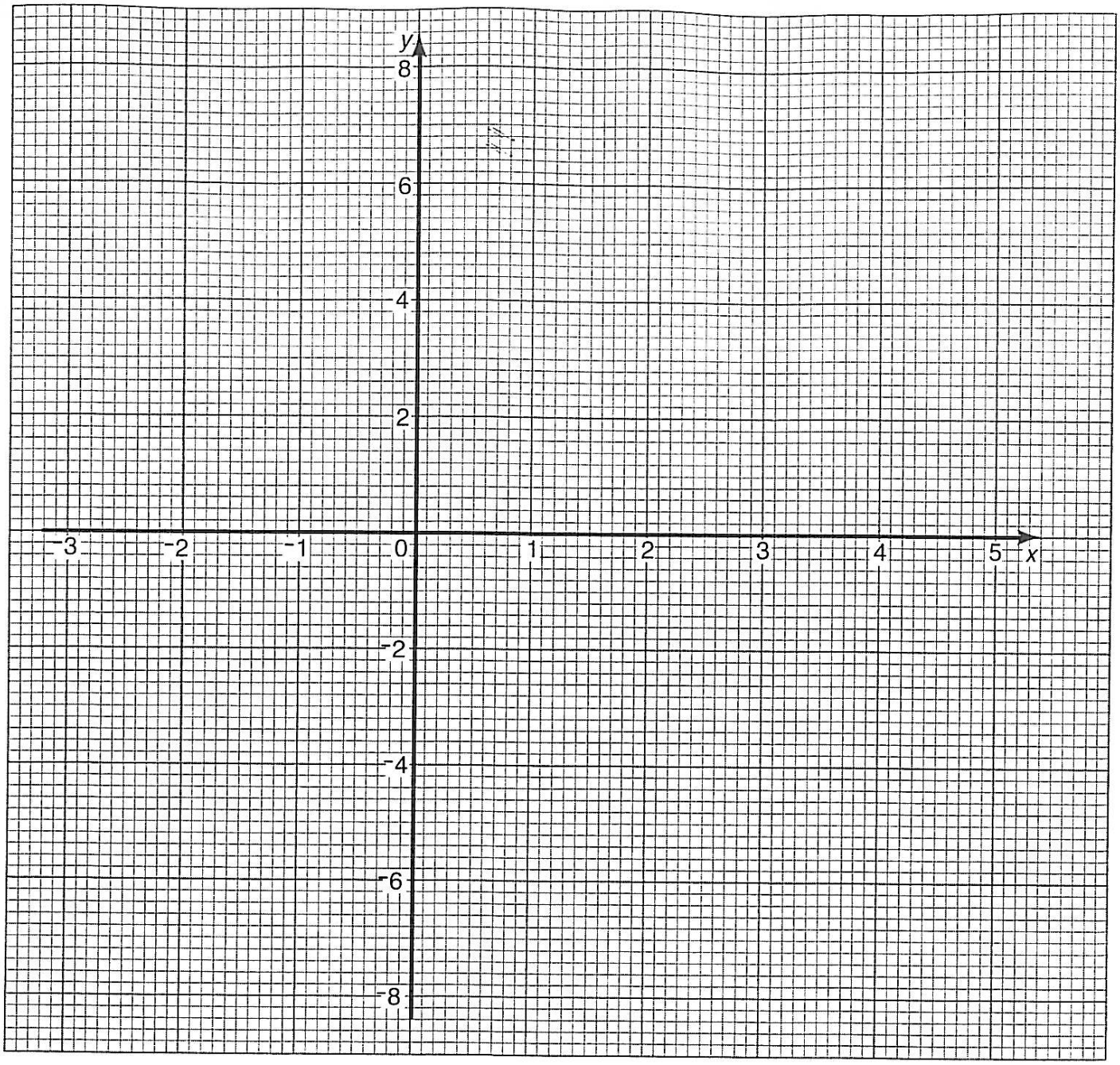
x	-2	-1	0	1	2	3
y		5				-3

(2)

(b) On the grid opposite, draw and label the graph of $y = 6 - x^2$ (2)

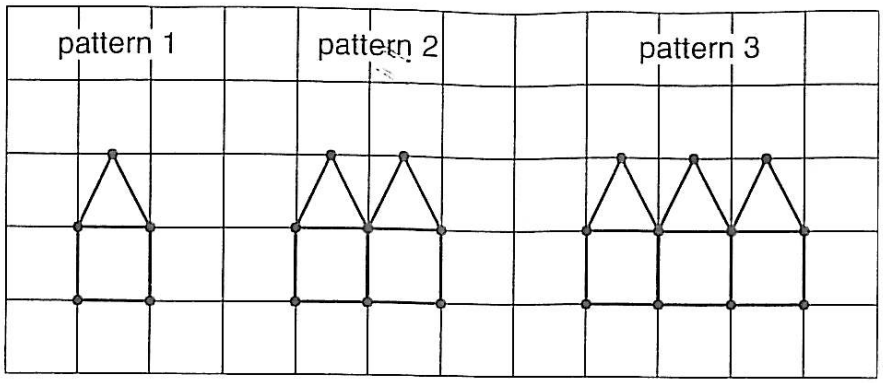
(iii) Write down the co-ordinates of the point with a positive x-coordinate where the line and curve intersect.

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

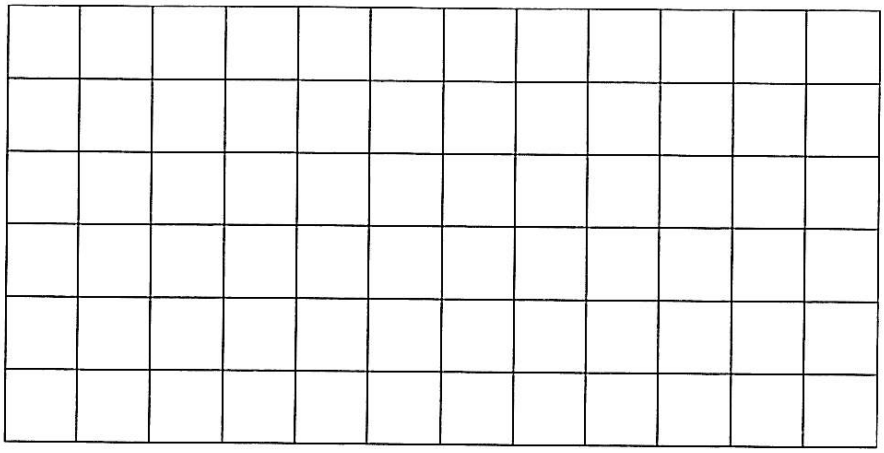

y
8
6
4
2
-3
-2
-1
0
1
2
3
4
5
x
-2
-4
-6
-8

16. In this question 2 adjacent dots are joined by a line.

Look at these three patterns.



(i) Draw pattern 4 on the grid below.



(1)

(ii) Complete the table below.

pattern number	1	2	3	4
number of lines	6	11		
number of dots	5		11	

(2)

(iii) How many lines are there in pattern 8?

Answer: ..... (1)

(iv) Which pattern has 50 dots?

Answer: ..... (2)

(v) In which pattern is the sum of the number of lines and the number of dots equal to 147?

Answer: ..... (2)

(vi) In one pattern, the difference between the number of lines and the number of dots is 25

How many lines are there in this pattern?

Answer: ..... (2)

(Total marks: 100)