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

Monday 7 June 2004

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 63.5 and 9.74

Answer: ..... (1)

(ii) the difference between 74 and 7.4

Answer: ..... (1)

(iii) 4.36×0.7

Answer: ..... (2)

(iv) $2.7 \div 0.4$

Answer: ..... (2)

2. (a) Write 48% as a fraction.

Answer: .... (1)

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

0

Answer: .... (2)

(c) Calculate 24% of £12.50

0

Answer: £..... (2)

(d) Calculate $\frac{4}{15}$ of 4.5 metres.

m (2)

3. (a) By writing each number correct to 1 significant figure, estimate the answer to

$$\frac{6.48 \times 194}{75.1}$$

Answer: ..... (3)

(b) Calculate $2^4 \times \sqrt[3]{27}$

Answer: ..... (2)

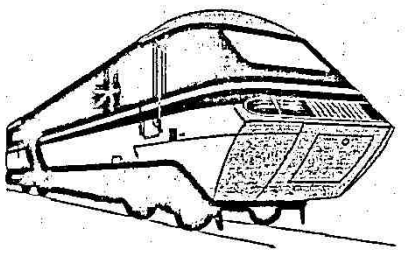
(c) (i) Write 240 as the product of prime factors using indices.

Answer: ..... (3)

(ii) What is the smallest integer by which 240 can be divided to make the result a perfect square?

Answer: ..... (2)

4. (a) It takes 1 hour 47 minutes to travel from Frumpton to London by train.
Ivor catches the 11:35 train from Frumpton.
At what time should Ivor arrive in London?

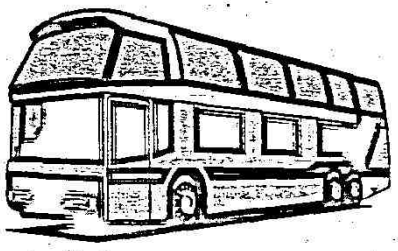


Answer: ..... (1)

(b) A top class distance runner averages 1 mile every 5 minutes.
How long will it take him to run 26 miles?

Answer: ..... h ..... min (2)

(c) How far does a bus travel in 25 minutes at 30 km/h?



Answer: ..... km (2)

(d) Write 90 km/h as a speed in metres per second.

Answer: ..... m/s (2)

5. (a) Simplify

(i) $3y^3 + 3y^3$

Answer: ..... (1)

(ii) $3y^3 \times 3y^3$

Answer: ..... (2)

(iii) $\frac{6y^3}{3y^6}$

Answer: ..... (2)

(b) Multiply out the brackets and simplify

$2(3p - 4q) - 5(p + 2q)$

Answer: ..... (3)

(c) Factorise completely

$16a^2 + 20a$

Answer: ..... (2)

6. (a) Solve

(i) $5a + 3 = 21 - a$

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

(ii) $\frac{2}{3}(b + 1) = 10$

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

(b) (i) Solve these inequalities

(a) $2n + 1 > 8$

Answer: ..... (2)

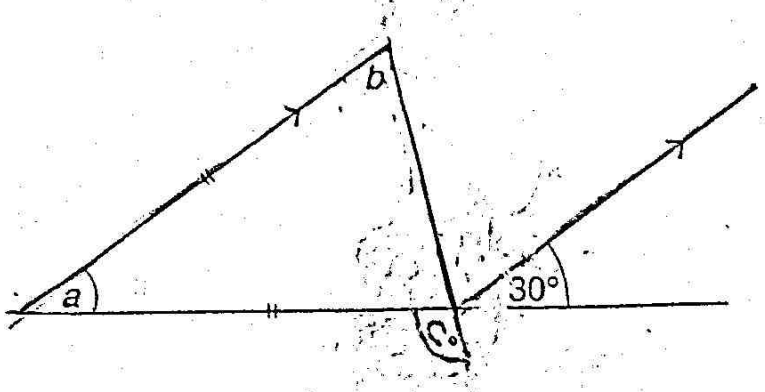
(b) $2(n - 3) \leqslant 6$

Answer: ..... (2)

(ii) Write down the integers that satisfy both inequalities in part (b)(i).

Answer: .... (1)

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

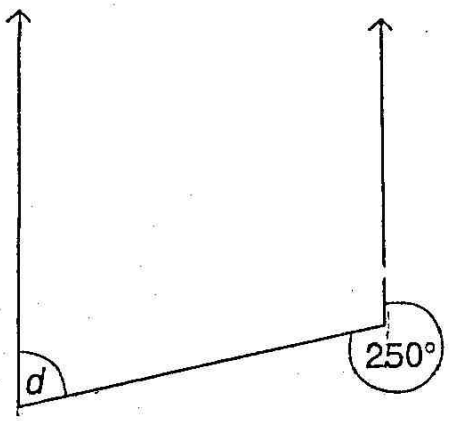


not to scale

Answer: *a* = ... ° (1)

Answer: *b* = ... ° (2)

Answer: *c* = ... ° (2)



not to scale

Answer: *d* = ... ° (2)

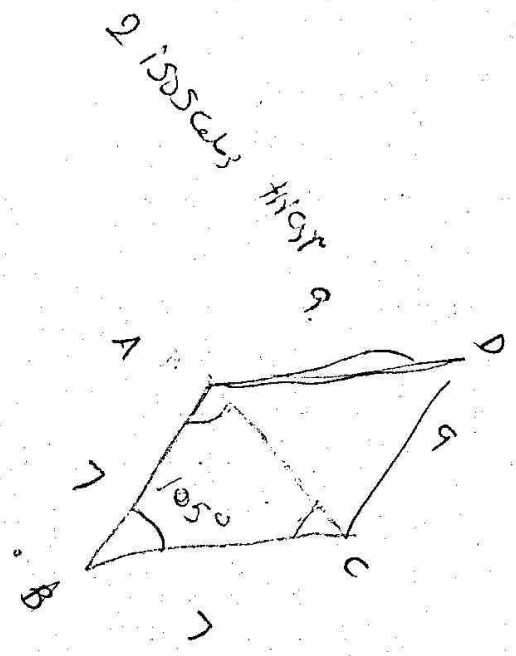
8. (i) Draw the quadrilateral *ABCD* when

BA = *BC* = 7 cm

DA = *DC* = 9 cm

angle *ABC* = 105°

The position of *B* has been marked for you.



(3)

(ii) What special name is given to *ABCD*?

Answer: ..... (1)

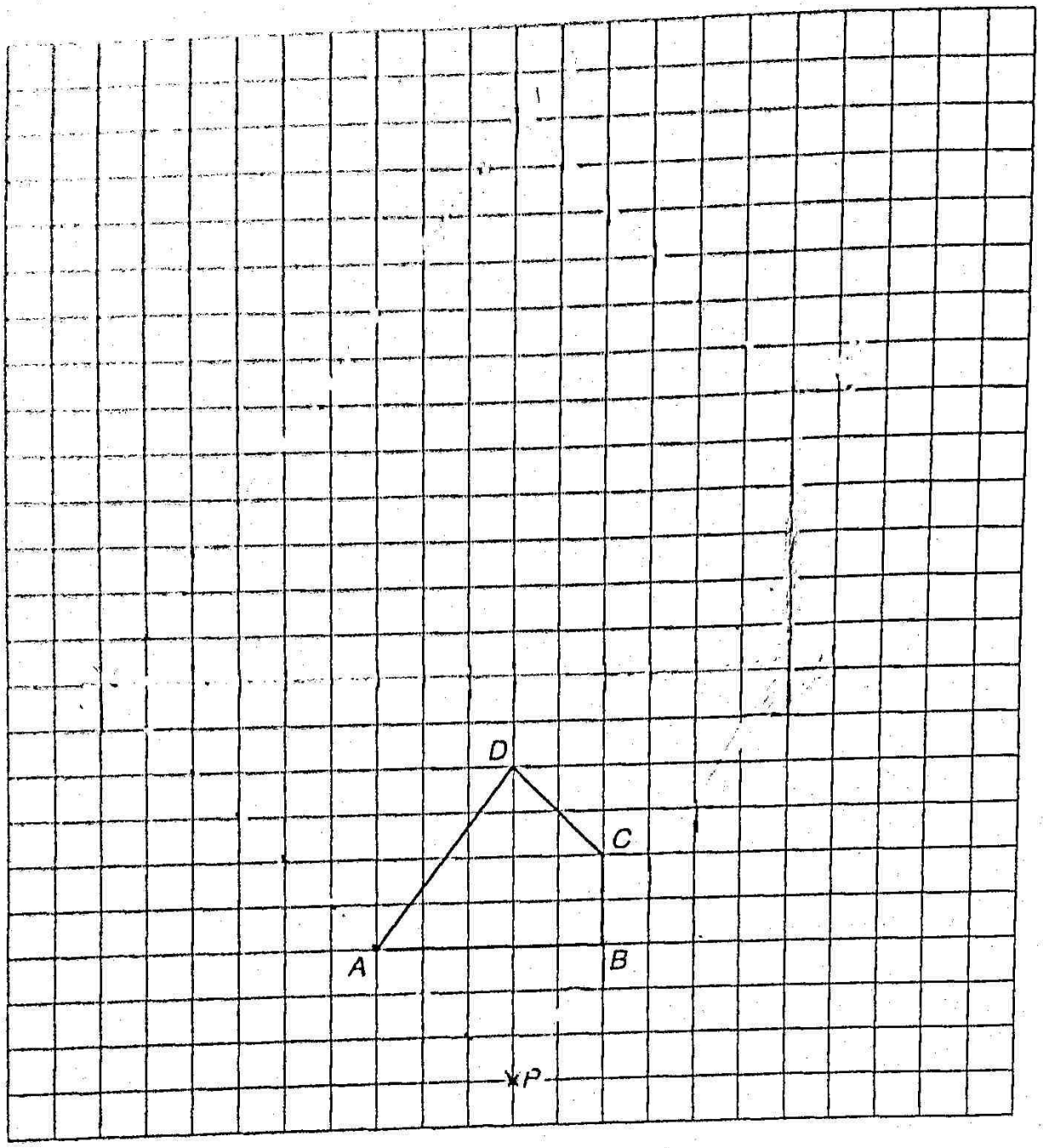
(iii) Measure and write down the length of *AC*.

Answer: *AC* = ... cm (1)

(iv) Measure and write down the size of angle *ADB*.

Answer: angle *ADB* = ... ° (2)

9.



On the grid

(i) with centre P, enlarge $ABCD$ by scale factor 3 (2)

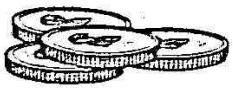
(ii) label the image $A'B'C'D'$. (1)

The area of $A'B'C'D'$ is 108 units^2.

(iii) What is the area of $ABCD$?

Answer: .... units^2 (2)

10. (a) 6 children share a sum of money.



Big Brother takes $\frac{4}{9}$ of it and Small Sister takes $\frac{1}{3}$ of it.

(i) What fraction of the sum of money remains?

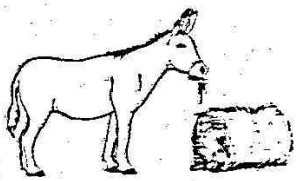
Answer: .... (2)

The Frightful Four then share what is left over equally between them.

(ii) What fraction of the sum of money does each take?

Answer: .... (1)

(b) Every day Jenny's donkey eats $\frac{3}{4}$ of a bale of hay.
How many bales will the donkey eat in 24 days?



Answer: .... (2)

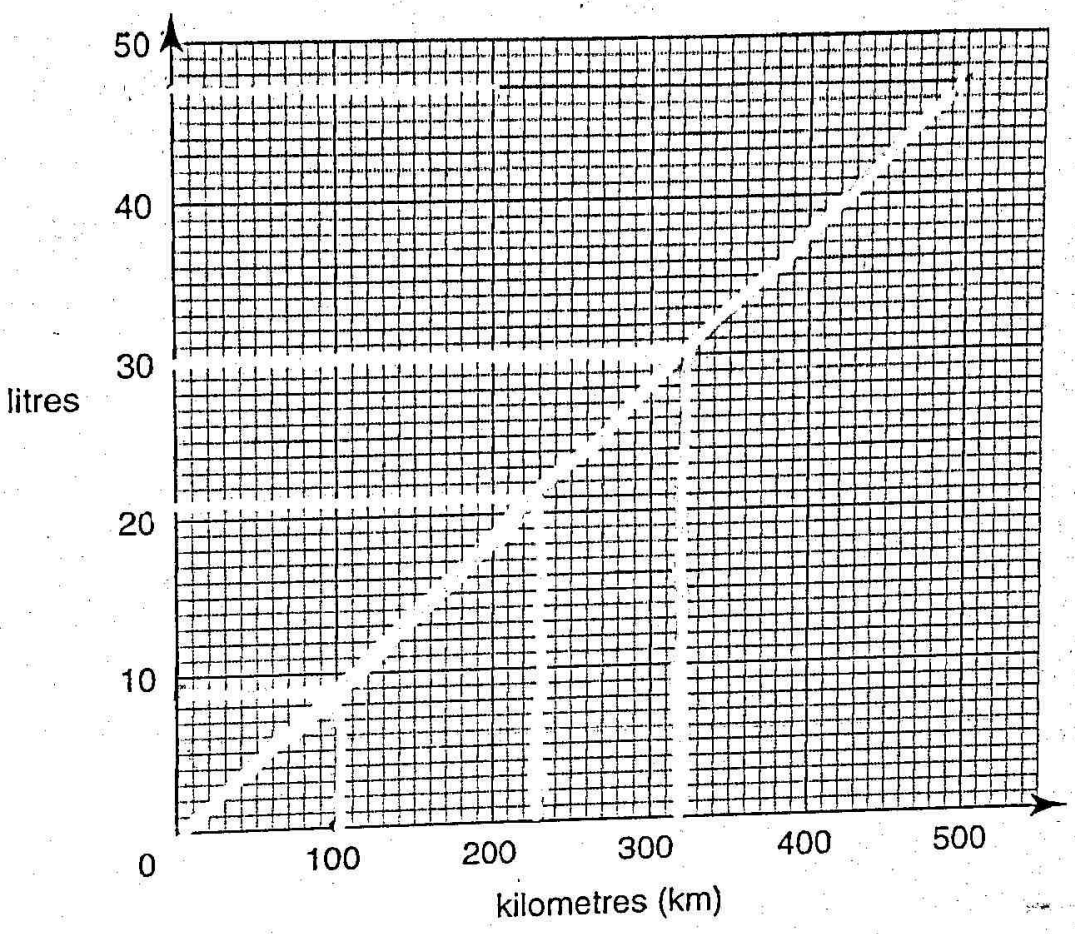
(c) In the desert, every soldier drinks $\frac{1}{5}$ ~~of a litre~~ of water each day.
An army patrol drinks 20 litres in a day.
How many soldiers are there in the patrol?

Answer: .... (2)

11. Bob's car uses on average 9 litres of petrol every 100 kilometres.

(i) Using this fact, calculate the number of litres of petrol that Bob's car uses to travel 500 kilometres.

Answer: ..... litres (1)



(ii) On the grid draw a line which shows how much petrol Bob's car uses for distances up to 500 km. (2)

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

(a) How far will the car travel on 30 litres of petrol?

Answer: ..... km (2)

(b) Bob wants to travel 230 kilometres. His car contains 5 litres of petrol. How much more petrol will he need?

Answer: ..... litres (2)

12. a and b are two positive numbers.
a is $2\frac{1}{2}$ times as large as b.

(i) Write down an equation in terms of a and b to show this.

Answer: ..... (1)

2 times a is 16 more than b.

(ii) Write down an equation in terms of a and b to show this.

Answer: ..... (1)

(iii) Using your answers to parts (i) and (ii), solve equations to find the value of a and b.

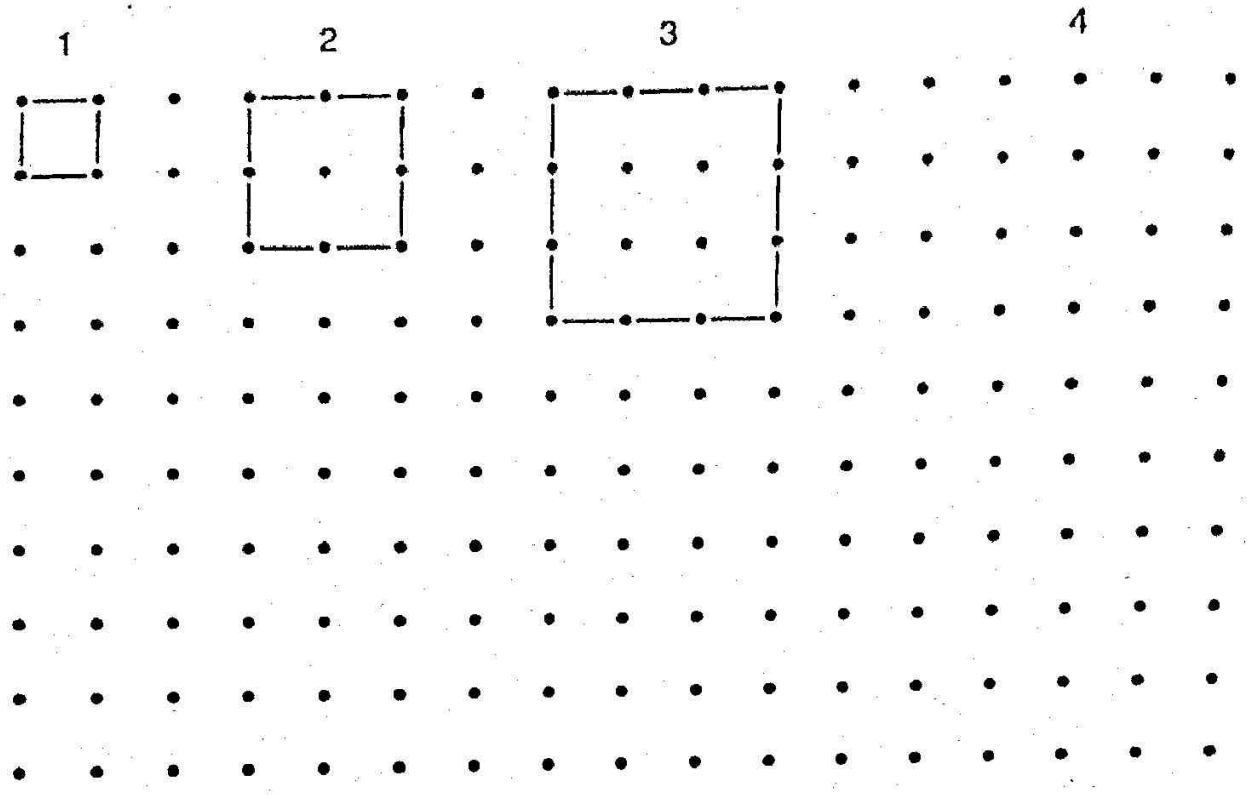
Answer: a = ...

Answer: b = ... (4)

(iv) Using your answers to part (iii), write the ratio of $\sqrt{10a}$ to $\sqrt{b}$ in its lowest terms.

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

13. Here are the first three patterns in a sequence with space for the fourth pattern.



(i) Draw pattern 4 on the dotted paper. (1)

(ii) Complete the table below.

pattern number	1	2	3	4	5	*n*
number of dots on perimeter	4	8				
number of dots inside pattern	0	1				
total number of dots	4	9				

(3)

(iii) How many dots are there on the perimeter of pattern 9?

Answer: ..... (1)

(iv) What is the number of the pattern which has 60 dots on its perimeter?

Answer: ..... (1)

(v) How many dots are there inside pattern 21?

Answer: ..... (1)

(vi) A pattern has a total of 900 dots.
How many dots are there inside this pattern?

Answer: ..... (3)

(Total marks: 100)