SURNAME ..... FIRST NAME .....
(Block capitals, please)
JUNIOR SCHOOL ..... SENIOR SCHOOL .....

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

PAPER 2

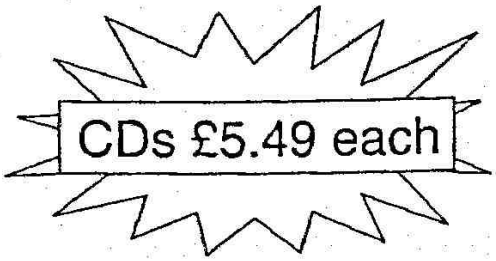
Non-Calculator Paper

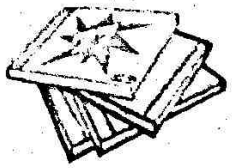
Monday 26 February 2007

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.





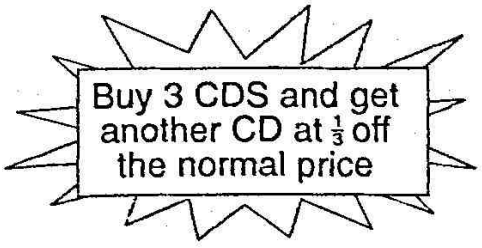
(i) Calculate the cost of buying 3 CDs.

Answer: £..... (1)

(ii) How much change should I receive from £20 when I buy 3 CDs?

Answer: £..... (1)

I notice that there is a special offer.

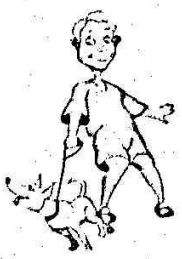


(iii) How much would 4 CDs cost using this special offer?

Answer: £..... (2)

2. In a survey of 20 children the number of pets owned by each child is recorded.

number of pets	tally	frequency
0	𝍸 II	7
1	III	3
2	𝍸 I	6
3		0
4	III	3
5	I	1
	TOTAL	20



Use the table above to find

(i) the mode

Answer: ..... pets (1)

(ii) the median

Answer: ..... pets (1)

(iii) the mean number of pets that each child has.

Answer: ..... pets (2)

3. (a) Write down the next two terms in each of the following sequences:

(i) 1, 1, 2, 3, 5, ...

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

(ii) 81, 27, 9, 3, ...

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

(iii) 1, 3, 7, 15, ...

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

(b) On day 1 of her holiday, Diana has £72 in her savings box. On day 2 she has £69, on day 3 she has £66 and so on.

(i) What is the formula for her savings, s_n, on the nth day of her holiday?

Answer: s_n = £ ..... (2)

(ii) On which day do Diana's savings run out?

Answer: ..... (1)

4. Andrew, Ben and Charlotte share a pie.
Andrew is given $\frac{2}{5}$ of the pie.

(i) What fraction of the pie is left?

Answer: ..... (1)

Ben is given $\frac{1}{2}$ of what is left.

(ii) What fraction of the whole pie is given to Ben?

Answer: ..... (1)

Charlotte is given $\frac{2}{3}$ of what remains of the pie and the rest is shared equally by 5 blackbirds.

(iii) What fraction of the whole pie does each blackbird have?

Answer: ..... (3)

5. In a raffle, the prize money is shared between Jane, Pauline and Ruth in the ratio 5:4:3

(i) If Pauline's share is £36, how much does Ruth receive?

Answer: £..... (1)

(ii) How much more does Jane receive than Ruth?

Answer: £..... (1)

Pauline divides her share equally between the other two girls.

(iii) What is the ratio of the amounts that Jane and Ruth now have?

Answer: (2)

6. (i) Write as a product of prime factors using indices

(a) 20

Answer: ..... (2)

(b) 30

Answer: ..... (1)

(c) 20×30

Answer: ..... (1)

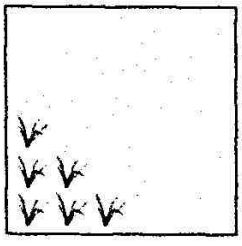
(ii) What is the smallest integer that will divide into 600 to give a square number?

Answer: ..... (1)

(iii) Joe has 600 plants.

He divides them into 24 equal groups and plants each group in the shape of a square.

How many plants are there along each side of a square?



Answer: ..... (2)

7. When $p = 3$ $q = {}^{-}2$ and $r = \frac{1}{2}$ find the value of

(i) r^2

Answer: ..... (1)

(ii) pqr

Answer: ..... (2)

(iii) $p^2 - 2qr$

Answer: ..... (2)

(iv) s, when $s = r(2p + q^3)$

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

8. (a) Solve the following equations:

(i) $3a = 2$

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

(ii) $3(b - 3) = b + 1$

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

(iii) $\frac{2c}{3} + \frac{1}{2} = \frac{3}{4}$

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

(b) (i) Solve the following inequalities:

(a) $2x - 3 \leq 7$

Answer: ..... (2)

(b) $1 - x < 4$

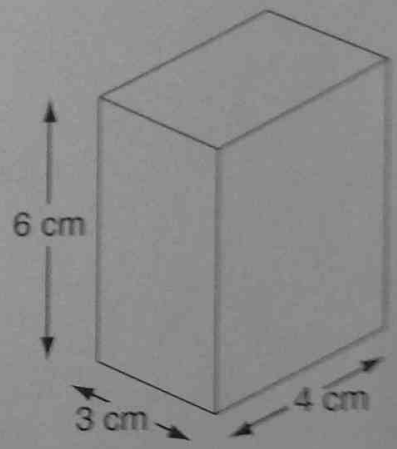
Answer: ..... (2)

(ii) What is the smallest integer that satisfies both inequalities in parts (a) and (b) above?

Answer: ..... (1)

9. (i) On the grid below, complete a net of the cuboid measuring 6 cm by 3 cm by 4 cm. One face is drawn for you. (2)

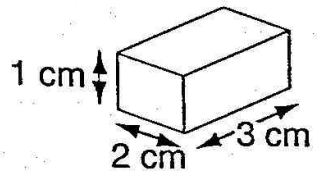
not to scale



(ii) Calculate the volume of the cuboid.

Answer: ..... cm^3 (2)

The inside of a box measures 6 cm by 3 cm by 4 cm. It is filled with small cuboids.



not to scale

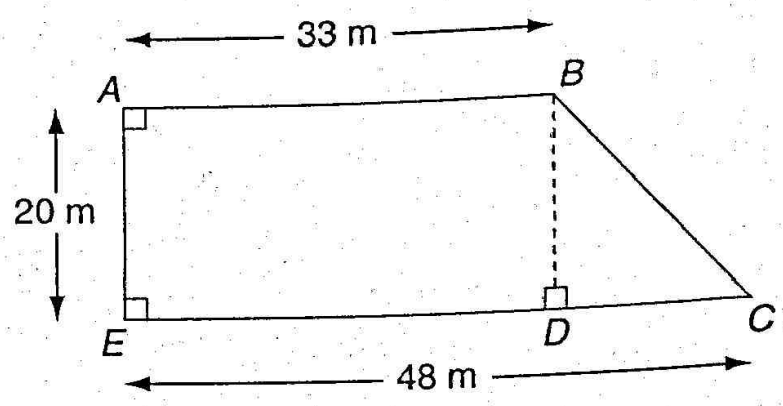
(iii) (a) How many small cuboids measuring 1 cm by 2 cm by 3 cm are needed to fill the box completely?

Answer: ..... (2)

(b) Calculate the total surface area of all the small cuboids in the box.

Answer: ..... cm^2 (3)

10. A field is in the shape of a trapezium *ABCDE*.



not to scale

Calculate

(i) the length *DC*

Answer: ..... m (1)

(ii) the perimeter of the field

Answer: ..... m (3)

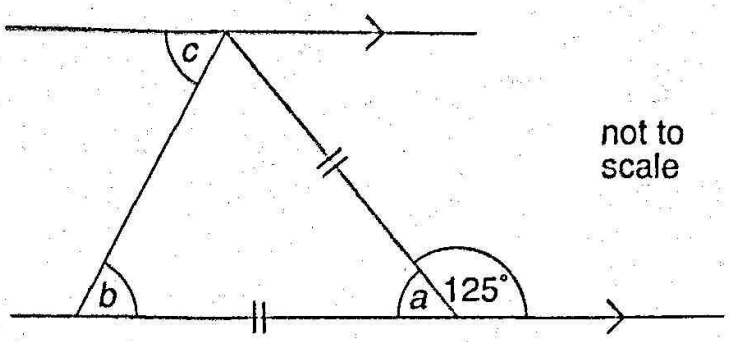
(iii) the area of the field.

Answer: ..... m^2 (2)

It is planned to divide the field in half by area, by putting a fence from *B* to a post, *P*, on the side *CE*.

(iv) How far from *E* should the post, *P*, be placed?

11. (a)



not to scale

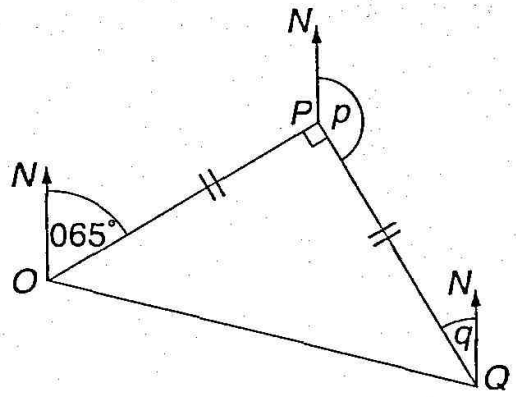
Calculate the size of each of the angles marked *a*, *b*, and *c*.

Answer: *a* = ... ° (1)

b = ... ° (2)

c = ... ° (1)

(b) The diagram shows the position of three towns *O*, *P* and *Q*.



not to scale

(i) Calculate the size of each of the angles marked p and q.

Answer: *p* = ... ° (2)

Answer: *q* = ... ° (1)

(ii) Find the bearing of *O* from *Q*.

Answer: ..... ° (2)

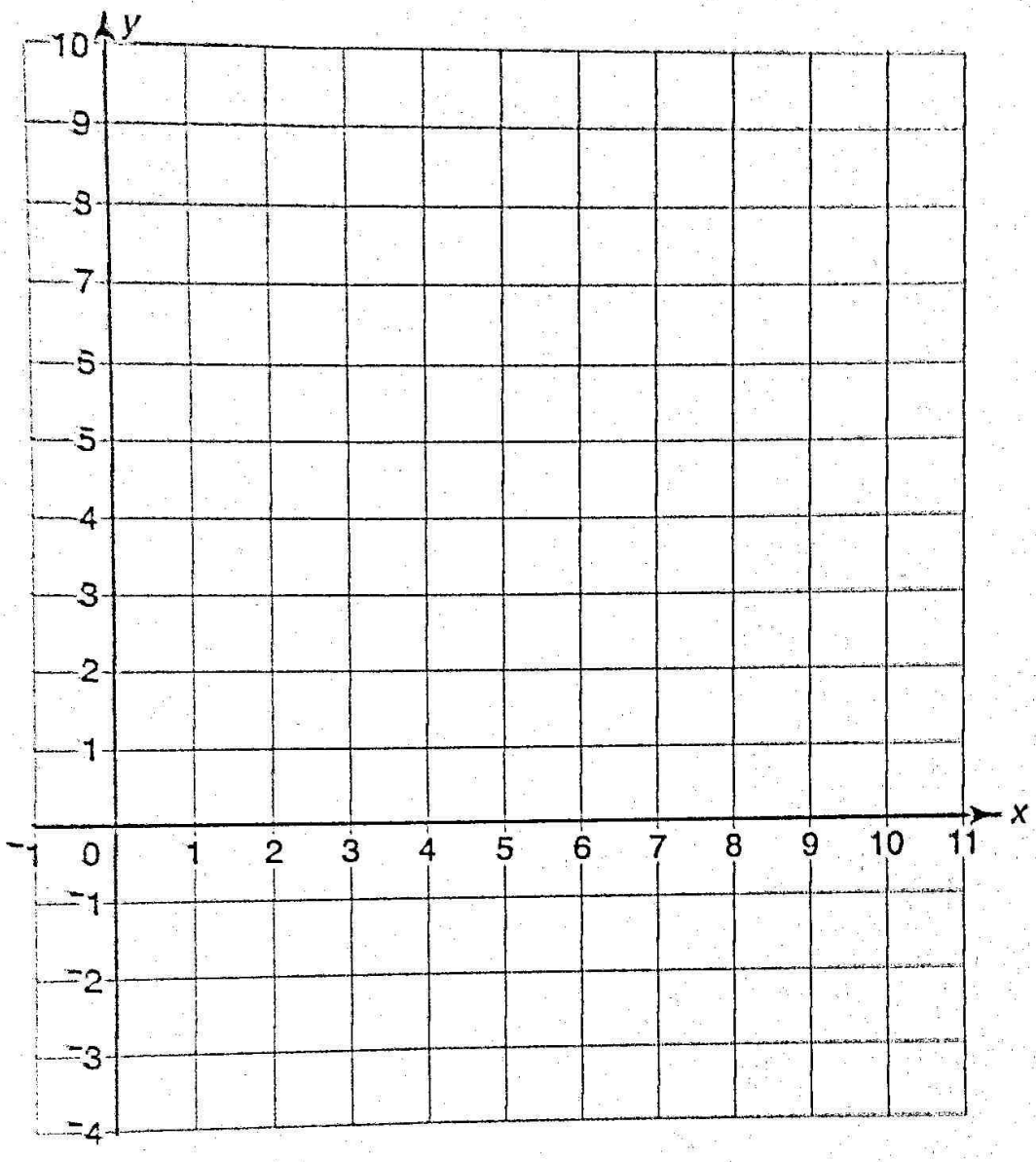
12. (a) ABC is a triangle with $AB = 8$ cm, $BC = 9$ cm and angle $ABC = 55°$.

(i) Construct triangle ABC. The point A has been marked for you. (3)

A +

(ii) Construct the point D such that $ABCD$ is a parallelogram. Complete the figure. (2)

15. (i) On the co-ordinate grid below, plot the points (2,0), (4,2) and (1,3). Join the points and label the triangle P. (1)



(ii) Reflect triangle P in the line $y = 3$ and label the image Q. (2)

(iii) Rotate triangle P by 180° about the point (4,4) and label the image R. (2)

(iv) With centre (0,3), enlarge triangle P by scale factor 2 and label the image S. (3)

(v) How many times larger is the area of S than the area of R?

Answer: ..... times (1)

14. Look at these number patterns:

(i) row 1:
$1 \times 1 = 1$ and $1 = 1$

row 2:
$11 \times 11 = 121$ and $1 + 2 + 1 = 4$

row 3:
$111 \times 111 = 12321$ and $1 + 2 + 3 + 2 + 1 = 9$

(a) Continue the pattern for row 4 and for row 5

row 4:
$1111 \times 1111 =$ ..... and ..... = ... (2)

row 5:
$11111 \times 11111 =$ ..... and ..... = ... (1)

(b) Which type of number is the final number in each row?

Answer: ..... (1)

(c) What is the final number in the row that starts $111111111 \times 111111111$?

Answer: ..... (2)

(ii) row 1:
$1 \times 1 \times 1 = 1$ and $1 = 1$

row 2:
$11 \times 11 \times 11 = 1331$ and $1 + 3 + 3 + 1 = 8$

What is the final number in the row that starts $111 \times 111 \times 111$?

Answer: ..... (2)

(Total marks: 100)