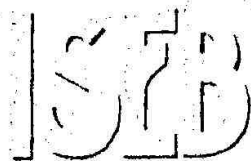


SURNAME FIRST NAME

JUNIOR SCHOOL SENIOR SCHOOL



Independent Schools
Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

PAPER 4: Calculator Paper

Tuesday 29 January 2008

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.
- Where answers are not exact they should be given to three significant figures, unless specified otherwise.
- The π button on your calculator should be used for calculations involving π .

1. (a) (i) Writing down all of the figures shown on your calculator, find the value of

$$\frac{18.5 + 7.06}{14.9 \times 0.58}$$

Answer: (2)

(ii) Write your answer to part (a) (i) correct to

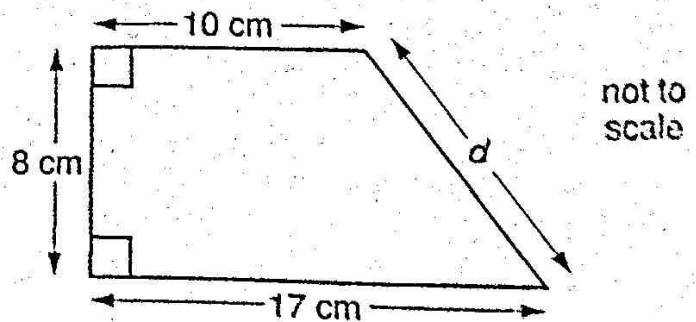
(a) 2 decimal places

Answer: (1)

(b) 2 significant figures

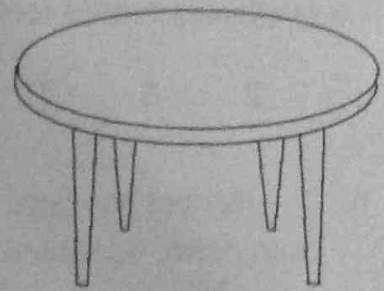
Answer: (1)

(b) Use Pythagoras' theorem to calculate the length d correct to 3 significant figures.



Answer: $d =$ cm (3)

2. Rebecca bought a second-hand dining table for £250
After cleaning and polishing it, she sold the table to Steve
for 28% more than she had paid for it.



- (i) How much did Steve pay for the table?

Answer: £ (2)

A year later, Steve decided to sell the table for £280

- (ii) How much money did he lose when he sold the table?

Answer: £ (1)

- (iii) Express this loss as a percentage of the price Steve paid for the table.

Answer: % (2)

3. This number sequence follows a rule.

2

5

10

17



37

50

65

- (i) One number has been covered by ink.
Write down the hidden number.

Answer: (1)

- (ii) From the numbers in the sequence, write down

0)

- (a) a prime number greater than 20

Answer: (1)

- (b) two numbers whose sum is 82

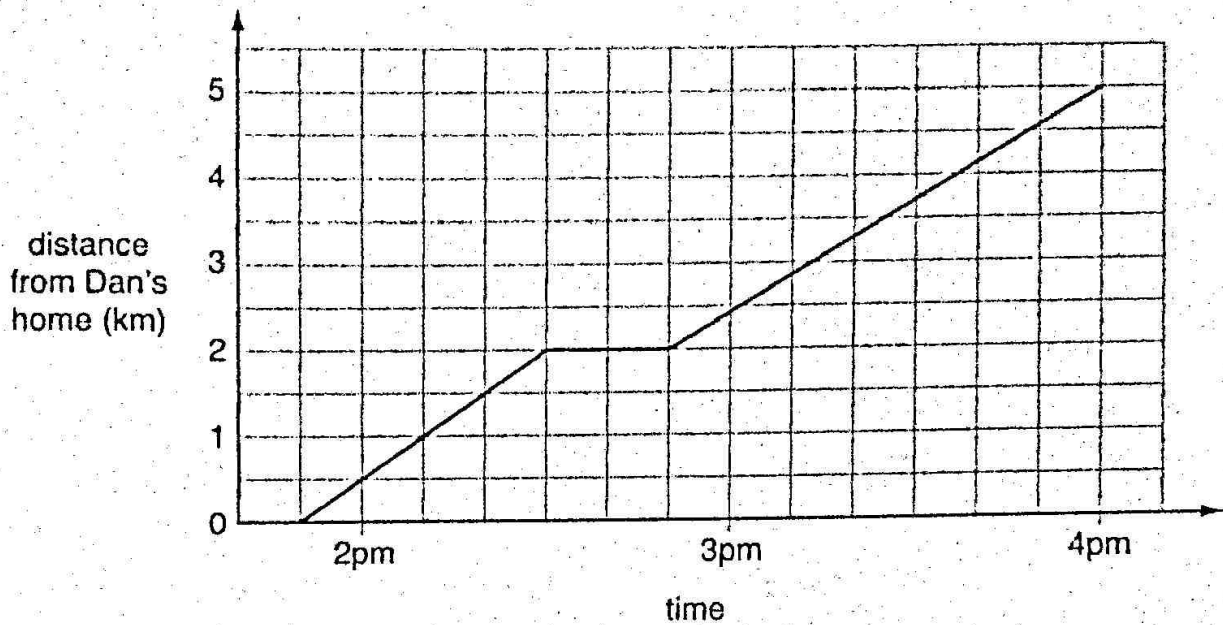
0)

Answer: and (1)

- (c) two different numbers which multiply together to make a square number

Answer: and (1)

4. One day, Dan and Kelly visited their granny who lived five kilometres from their home. Dan decided to walk and left home at 1.50pm. Here is a graph showing his journey.



- (i) What was his average speed until he stopped for a rest?

Answer: km/h (2)

- (ii) For how long did he rest?

Answer: minutes (1)

Kelly left home at 3pm and cycled at a steady speed of ten kilometres per hour.

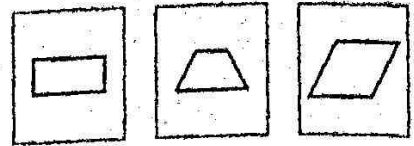
- (iii) (a) Draw a line on the grid above to represent her journey. (2)

- (b) Use your graph to find the time when Kelly overtook Dan.

Answer: pm (1)

5. Bob has a set of 36 cards.

Each card has a picture of a quadrilateral drawn on it, either the rectangle, the trapezium or the rhombus.



$\frac{2}{9}$ of the cards in the set have the rhombus on them.

(i) How many rhombus cards are there in the set?

Answer: (1)

Of the cards that do not have the rhombus on them, $\frac{3}{5}$ have the rectangle and the rest have the trapezium.

(ii) What fraction of the whole set of cards have a shape with rotational symmetry of order 2? 0

Answer: (2)

Anne picks a rhombus card and removes it from the set.

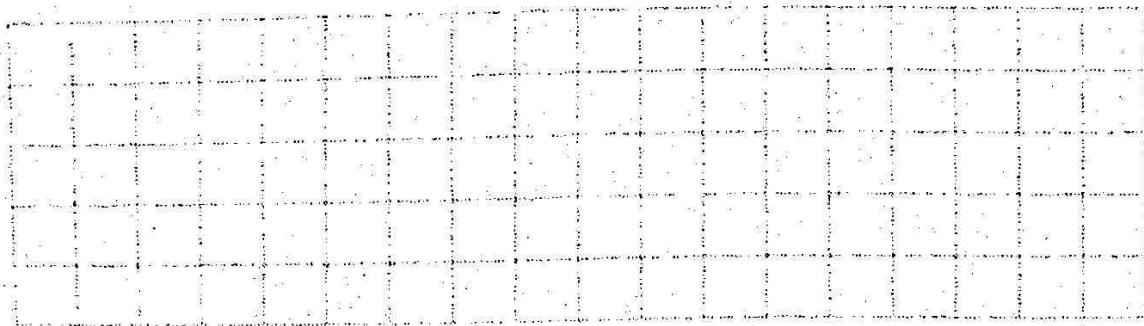
(iii) What fraction of the remaining cards do not have a rhombus on them?

Answer: (1) 0

Bob wants to add another shape to the set.

He says that it has exactly one line of symmetry and no parallel sides.

(iv) On the grid below, draw a quadrilateral which Bob could be thinking of.



(1)

6. (a) Multiply out and simplify
 $5(2a + b) - 2(a - 4b)$

Answer: (2)

- (b) Factorise fully $12c^3 + 4c^2$

Answer: (2)

- (c) Simplify $\frac{6d + d^2}{2d}$

Answer: (2)

7. (a) Solve the following equations:

(i) $\frac{x}{4} - 7 = 5$

Answer: $x = \dots\dots\dots$ (2)

(ii) $5y + 20 = 3(y + 4)$

Answer: $y = \dots\dots\dots$ (2)

(b) (i) Solve the inequality

$$2n + 5 > 13 + 6n$$

Answer: $\dots\dots\dots$ (2)

(ii) Write down the largest integer which satisfies your answer to (b) (i).

Answer: $\dots\dots\dots$ (1)

8. Josh and Mel have these three number cards.
 Josh picks a card at random and then replaces it.
 Mel then picks a card.
 They multiply their scores together.



(i) Complete the table to show all the possible products of their scores.

		Josh's number		
		3	5	6
Mel's number	3			
	5			30
	6			
	6			

(2)

(ii) What is the probability that the product is greater than 18?

Answer: (1)

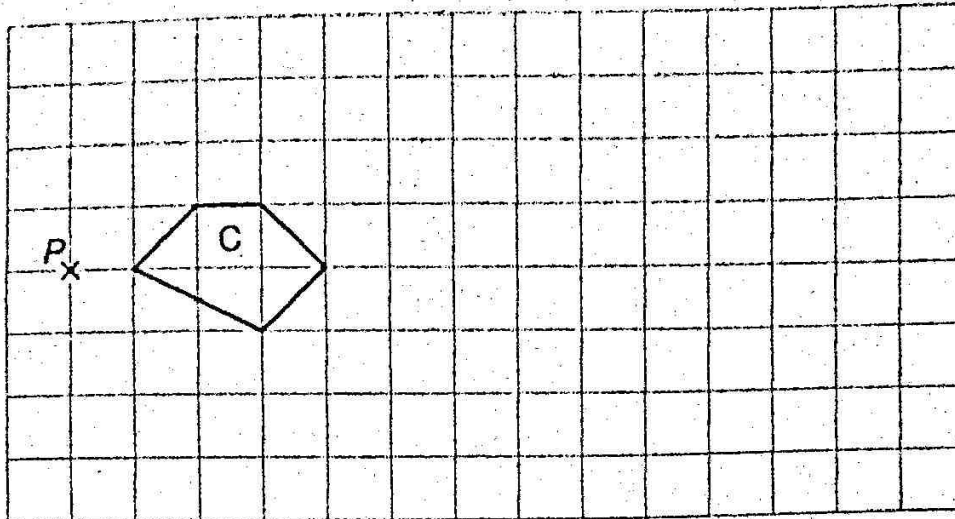
(iii) What is the probability that the product is a multiple of 3?

Answer: (1)

(iv) If the product is a multiple of 3, what is the probability that it is also a multiple of 5?

Answer: (2)

9. (a) (i) On the grid below, enlarge shape C with centre P and scale factor 3. Label the enlarged shape D.



(2)

- (ii) How many times larger is the perimeter of D than the perimeter of C?

(1)

Answer: times (1)

- (iii) How many times larger is the area of D than the area of C?

Answer: times (1)

- (b) Robin's bicycle wheel makes 442 complete turns when he cycles one kilometre.

- (i) Calculate the circumference of the wheel, giving your answer to the nearest centimetre.

(1)

Answer: cm (2)

- (ii) Find the radius of the wheel, giving your answer to the nearest centimetre.

Answer: cm (2)

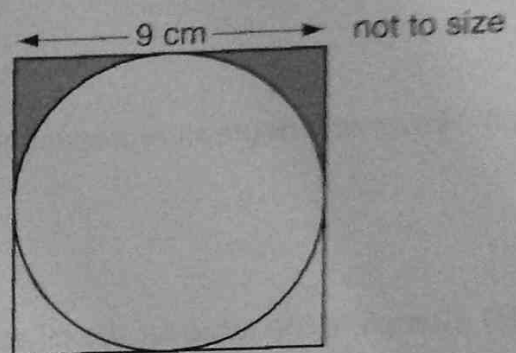
The radius of Penny's bicycle wheel is exactly half the radius of Robin's wheel.

(iii) How many complete turns does her wheel make when she cycles one kilometre?

Answer: turns (1)

10. The diagram shows a square and a circle. The circle touches the edges of the square.

(i) Calculate the area of the circle.



Answer: cm^2 (2)

(ii) Calculate the shaded area.

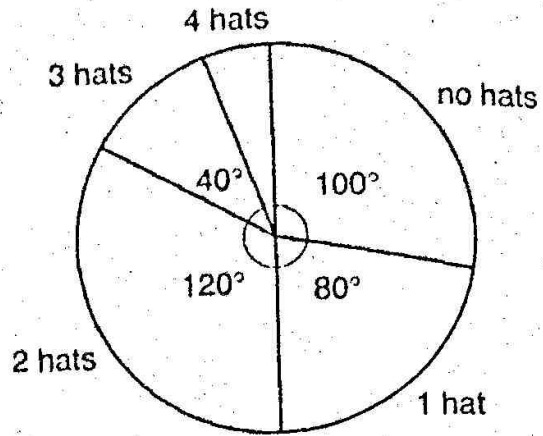
Answer: cm^2 (2)

(iii) What percentage of the square is shaded?

Answer: % (1)

11. Carla asked the 18 children in her class how many hats they owned.

Here is a pie chart of her results.



(i) What is the modal number of hats?

Answer: hats (1)

(ii) How many degrees represent each child in the class?

Answer: (1)

(iii) Complete the table for the class.

number of hats	frequency
0	
1	
2	
3	
4	

(2)

(iv) Find the total number of hats owned.

Answer: hats (2)

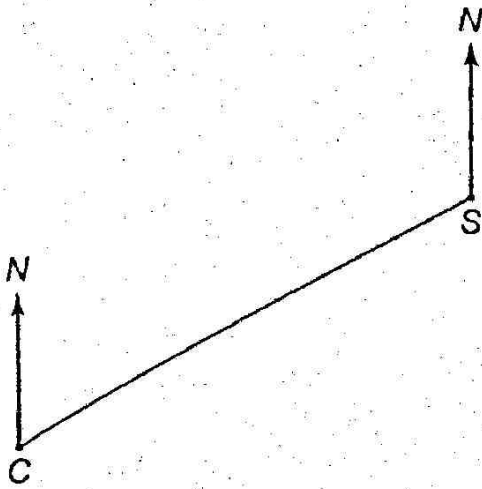
(v) What is the mean number of hats owned?

Answer: hats (1)

(vi) What is the median number of hats owned?

Answer: hats (2)

12. Costown (C) and Sinford (S) are two towns, shown in the scale drawing below.



(i) Measure and write down the bearing of Costown from Sinford.

Answer: (1)

(ii) A scale of 1 centimetre to represent 500 metres has been used in the drawing.
Write down the actual distance between Costown and Sinford.

Answer: km (1)

Tanville (T) is on a bearing of 107° from Costown and is exactly 4 km from Sinford.

(iii) Plot and label the position of Tanville accurately on the diagram above. (2)

A crow flies in a straight line from Tanville to Costown at an average speed of 24 km/h.

(iv) For how many minutes does the crow fly?

Answer: min (3)

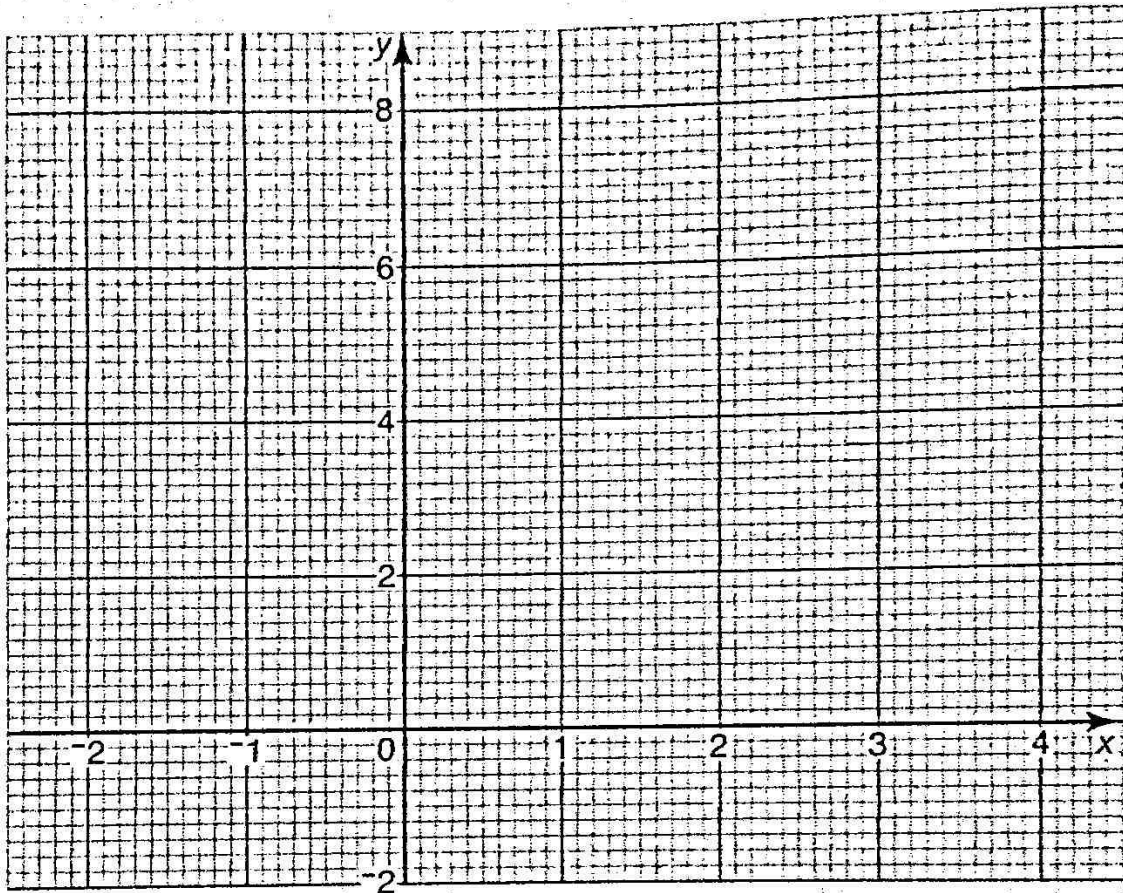
13. (i) (a) When $y = x^2 - 2x$ complete the table of values below:

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

(2)

(b) On the grid below, draw the curve of $y = x^2 - 2x$

(2)



(ii) (a) When $x + 2y = 2$ complete the table of values below.

x	-2	0	4
y		1	

(1)

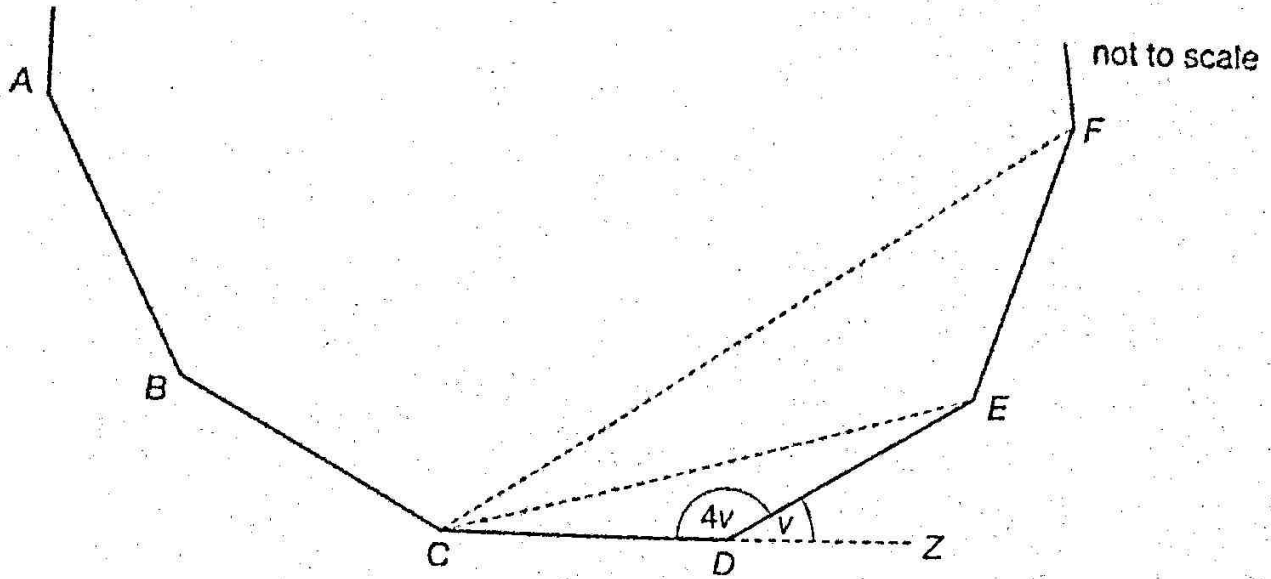
(b) On the grid above, draw the line $x + 2y = 2$

(1)

(iii) From your graph, find the two values of x where the curve and line intersect.

Answer: $x = \dots\dots\dots$ and $\dots\dots\dots$ (2)

14. $ABCDEF$ is part of a regular polygon.



CD is extended to Z .

(i) Calculate the size of the angle marked v .

Answer: $v = \dots\dots\dots^\circ$ (2)

(ii) Write down the number of sides of the regular polygon.

Answer: $\dots\dots\dots$ (1)

(iii) Calculate the size of the angle DCE .

Answer: $\widehat{DCE} = \dots\dots\dots^\circ$ (2)

(iv) Calculate the size of angle FEC .

Answer: $\widehat{FEC} = \dots\dots\dots^\circ$ (2)

(v) Hence calculate the size of angle EFC .

Answer: $\widehat{EFC} = \dots\dots\dots^\circ$ (2)

15. James enjoys 'think of a number' puzzles.

He asks his sisters, Xara and Yasmin, to each think of a whole number.



Let x represent Xara's number and y represent Yasmin's number.

He asks Xara to multiply her number by 3 and Yasmin to multiply her number by 2 and then to tell him the sum of their results.

They say the answer is 19

(i) Write an equation, in terms of x and y , to represent this statement.

Answer: (1)

Next, he asks Xara to multiply her number by 4 and then subtract Yasmin's number.

This time they tell him the answer is 18

(ii) Write an equation, in terms of x and y , to represent this statement.

Answer: (1)

(iii) Solve your two equations to find the values of x and y .

Answer: $x =$

$y =$ (4)

(iv) Write down an instruction, using both x and y , which James could give so that his sisters' answer would be -6

Answer: (1)

(Total marks: 100)