Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

Leave blank

General Certificate of Secondary Education
June 2003

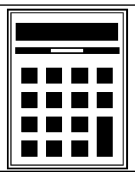
ASSESSMENT and QUALIFICATIONS ALLIANCE

MATHEMATICS (SPECIFICATION A) 3301/2I
Intermediate Tier
Paper 2 Calculator

I

Tuesday 10 June 2003 9.00 am to 11.00 am

In addition to this paper you will require:
- a calculator
- mathematical instruments.



Time allowed: 2 hours

Instructions
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this booklet.
- If your calculator does not have a π button, take the value of π to be 3.14 unless otherwise instructed in the question.

Information
- The maximum mark for this paper is 100.
- Mark allocations are shown in brackets.
- Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer booklet.
- You are expected to use a calculator where appropriate.

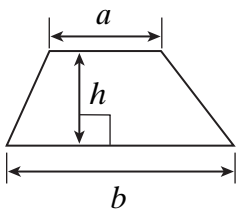
Advice
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	**Mark**
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20 – 21	
22 – 23	
24	
TOTAL	
Examiner's Initials	

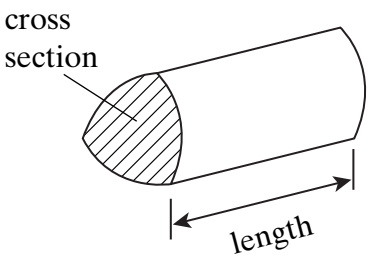
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

Area of trapezium = $\frac{1}{2}(a+b)h$



Volume of prism = area of cross section × length



Answer **all** questions in the spaces provided.

1 The table shows the exchange rates between different currencies.

£1 (pound) is worth	1.64 euros
$1 (dollar) is worth	1.05 euros

(a) Jane changes £400 into euros.
How many euros does she receive?

.....

.....

Answer ..... euros *(2 marks)*

(b) Sonia changes 672 euros into dollars.
How many dollars does she receive?

.....

.....

Answer ..... dollars *(2 marks)*

2 An approximate rule for converting degrees Fahrenheit into degrees Centigrade is

$$C = \frac{F - 30}{2}$$

Use this rule to convert 22 °F into °C.

.....

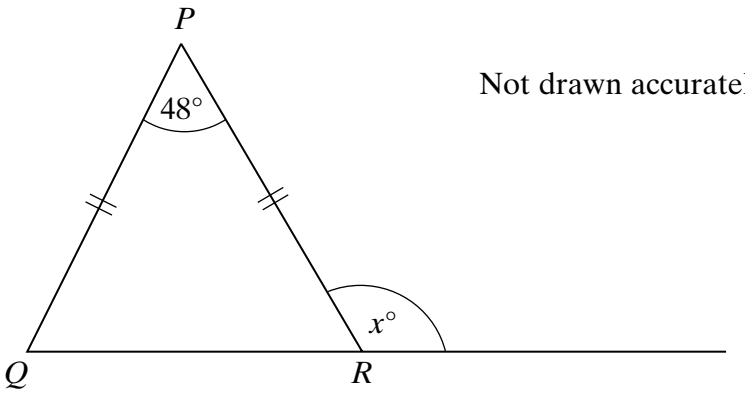
.....

.....

Answer ..... degrees Centigrade *(2 marks)*

6

3 (a) Triangle PQR is isosceles.
$PQ = PR$.



Not drawn accurately

Work out the value of x.

.....

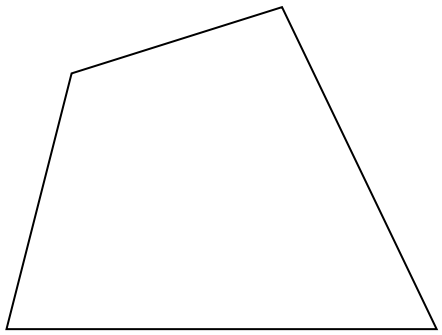
.....

.....

.....

Answer ..... degrees *(3 marks)*

(b) Explain why the sum of the interior angles of any quadrilateral is 360°.



.....

.....

.....

.....

(2 marks)

4 (a) Tom has £2 200.
He gives $\frac{1}{4}$ to his son and $\frac{2}{5}$ to his daughter.
How much does Tom keep for himself?
You **must** show all your working.

.....

.....

.....

.....

Answer £ ..... *(3 marks)*

(b) Mrs Jones inherits £12 000.
She divides the £12 000 between her three children Laura, Mark and Nancy in the ratio 7 : 8 : 9, respectively.
How much does Laura receive?

.....

.....

.....

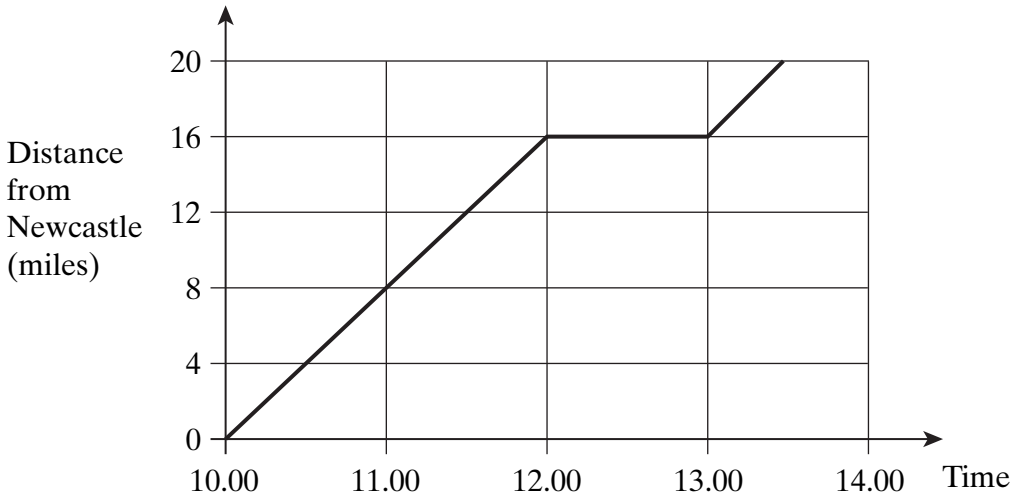
.....

Answer £ ..... *(2 marks)*

TURN OVER FOR THE NEXT QUESTION

10

5 Wayne cycles from Newcastle to Ashington, a distance of 20 miles.
The diagram shows the distance-time graph of his journey.



(a) Describe what is happening between 12.00 and 13.00

.....

.....

(1 mark)

(b) How far does Wayne travel in the first 2 hours of his journey?

Answer ..... miles *(1 mark)*

(c) What is Wayne's average speed over the first 2 hours of his journey?

.....

.....

Answer ..... mph *(2 marks)*

(d) Darren travels from Ashington to Newcastle by bus.
He leaves Ashington at 10.00 and arrives in Newcastle at 11.00
On the diagram draw a possible distance-time graph of Darren's journey.

(1 mark)

6 Solve the equations

(a) $8z - 5 = 11$

.....

.....

Answer $z =$ ..... *(2 marks)*

(b) $3(w - 2) = 9$

.....

.....

.....

.....

Answer $w =$ ..... *(3 marks)*

7 A circular pond has a radius of 2.2 m.

(a) Calculate the circumference of the pond.

.....

.....

Answer ..... m *(2 marks)*

(b) Calculate the area of the pond.

.....

.....

Answer ..... *(3 marks)*

15

8 Forty people take a driving test at Centre *A* on one day.
The table shows the results.

	Pass	**Fail**
Male	10	13
Female	6	11

(a) A person is chosen at random from the group.
What is the probability that the person is male?

.....

.....

Answer ..... *(2 marks)*

(b) A person is chosen at random from the group.
What is the probability that the person passed the test?

.....

.....

Answer ..... *(1 mark)*

(c) It is known that throughout Britain the probability of a person passing their test is 0.7
John says it is easier to pass the test at Centre *A*.
Explain why John could be wrong.

.....

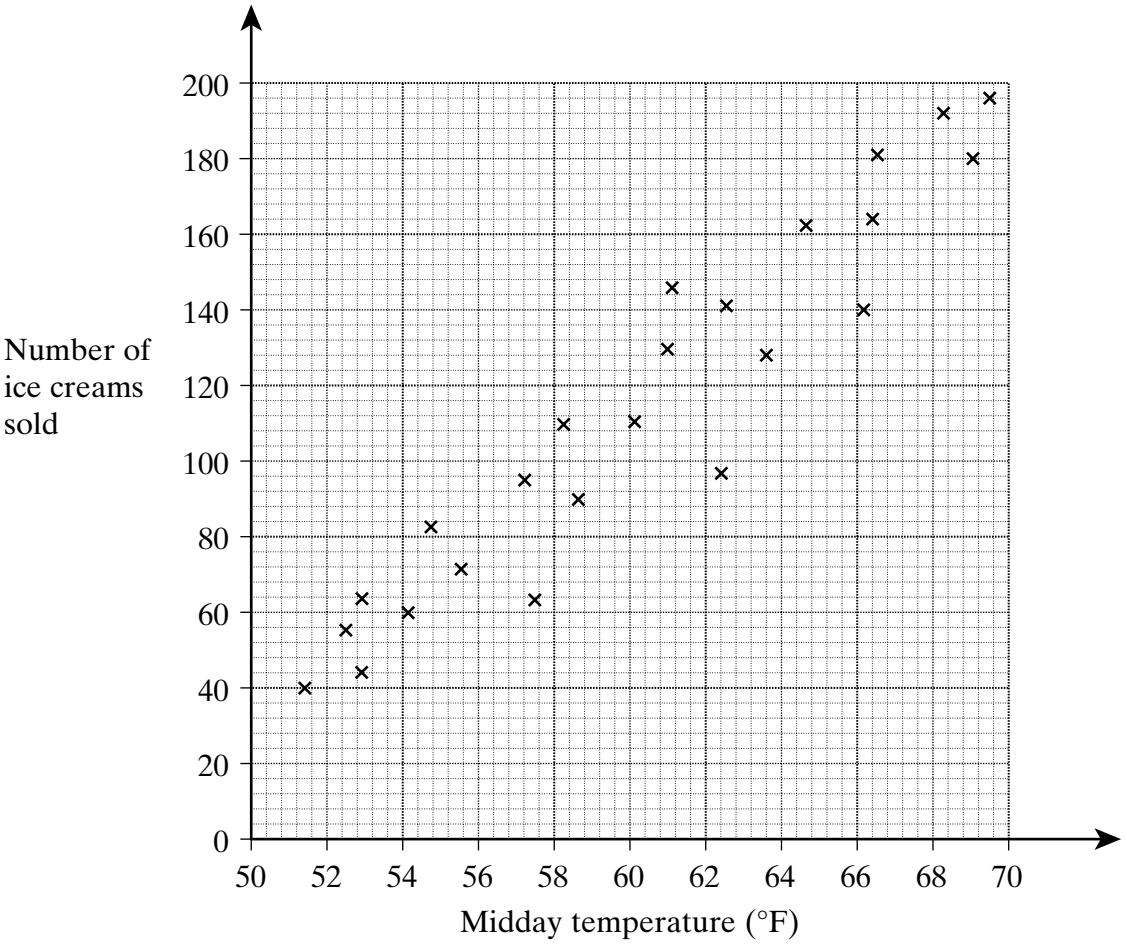
.....

.....

(1 mark)

LEAVE MARGIN BLANK

9 The scatter graph shows the number of ice creams sold plotted against the midday temperature.



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

(1 mark)

(b) Describe the relationship between the number of ice creams sold and the midday temperature.

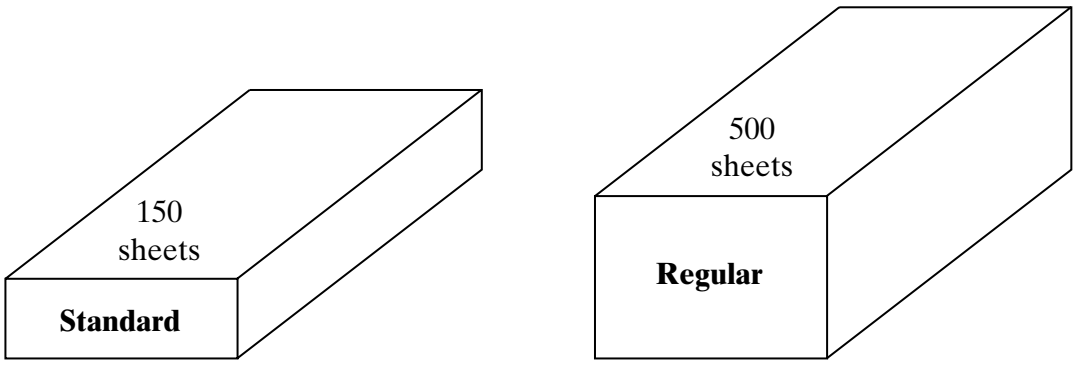
.....

.....

(1 mark)

6

10 A shop sells two different packs of the same brand of paper.



Cost 95p

Cost £3.20

Which of the two packs gives the better value for money?
You **must** show all your working.

.....

.....

.....

.....

.....

.....

(4 marks)

11 Here are three statements about probability.
Tick a box to show whether you agree or disagree with each statement.
Give a reason for each answer.

(a) Graham says, "The probability that it will rain tomorrow is $\frac{6}{5}$ "

☐ Agree ☐ Disagree

Reason .....

.....

(1 mark)

(b) Mandy says, "In my box of chocolates there are 13 soft centres and 15 hard centres so the probability of my choosing a soft centre is $\frac{13}{28}$ "

☐ Agree ☐ Disagree

Reason .....

.....

(1 mark)

(c) Tom tosses a fair coin twice.
He gets a head both times.
He says, "The probability that I will get a head the next time I throw the coin is $\frac{1}{8}$ "

☐ Agree ☐ Disagree

Reason .....

.....

(1 mark)

7

12 (a) Miss Evans earns £240 per week.
She is awarded a pay rise of 3.5%.

Mr Dale earns £220 per week.
He is awarded a pay rise of 4%.

Whose weekly pay increases by the greater amount of money?
You **must** show all your working.

.....

.....

.....

.....

.....

.....

Answer ..... *(4 marks)*

(b) In 2003 the State Pension was increased by 2% to £78.03
What was the State Pension before this increase?

.....

.....

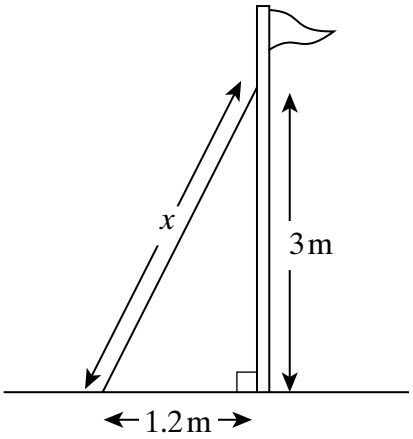
.....

.....

Answer £ ..... *(3 marks)*

LEAVE MARGIN BLANK

13 A support for a flagpole is attached at a height of 3m and is fixed to the ground at a distance of 1.2 m from the base.



Not to scale

Calculate the length of the support (marked x on the diagram).

.....

.....

.....

.....

.....

.....

.....

Answer ..... m *(3 marks)*

TURN OVER FOR THE NEXT QUESTION

10

14 Parveen is using trial and improvement to find a solution to the equation

$$x^3 + 7x = 30$$

This table shows her first two trials.

x	$x^3 + 7x$	Comment
2	22	Too small
3	48	Too big

Continue the table to find a solution to the equation.

Give your answer to 1 decimal place.

Answer ..... *(3 marks)*

15 Jane records the times taken by 30 pupils to complete a number puzzle.

Time, t (minutes)	**Number of pupils**
$2 < t \leqslant 4$	3
$4 < t \leqslant 6$	6
$6 < t \leqslant 8$	7
$8 < t \leqslant 10$	8
$10 < t \leqslant 12$	5
$12 < t \leqslant 14$	1

Calculate an estimate of the mean time taken to complete the puzzle.

.....

.....

.....

.....

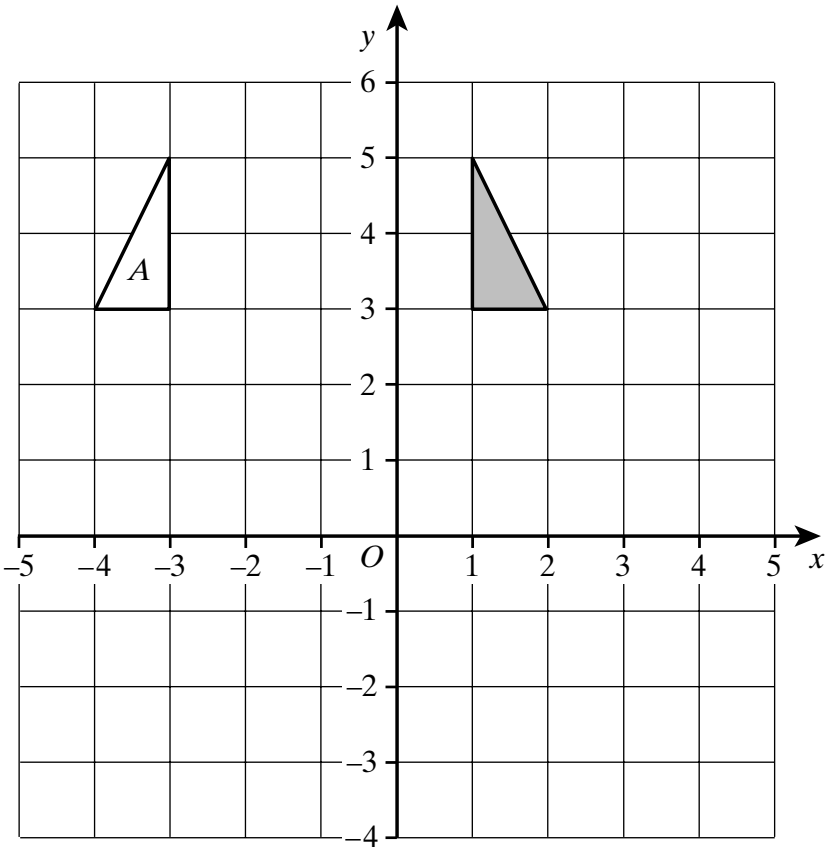
.....

Answer ..... minutes *(4 marks)*

TURN OVER FOR THE NEXT QUESTION

7

16 (a)



(i) Describe fully the **single** transformation that takes the shaded triangle to triangle *A*.

.....

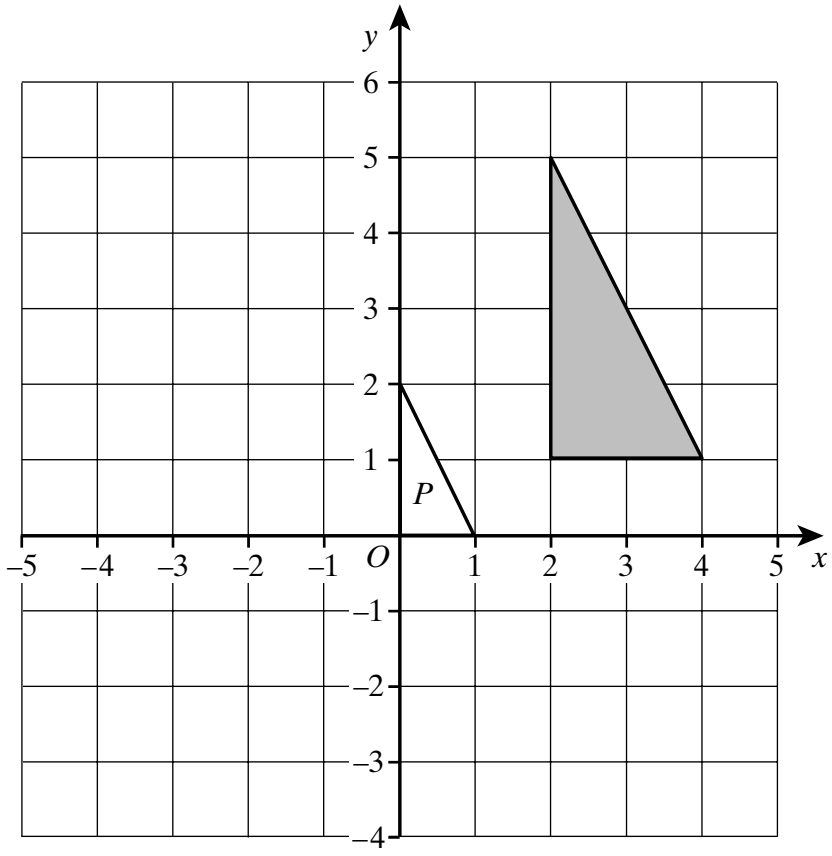
.....

(2 marks)

(ii) On the grid above translate the **shaded** triangle by 2 squares to the right and 4 squares down.

(1 mark)

(b) Triangle *P* is an enlargement of the shaded triangle.



(i) What is the scale factor of the enlargement?

Answer ..... *(1 mark)*

(ii) What is the centre of enlargement?

Answer (..... , ...) *(1 mark)*

5

17 (a) Simplify $4x - 5x + 7x$

.....

Answer ..... *(1 mark)*

(b) Simplify

(i) $x^5 \times x^{-2}$

.....

.....

Answer ..... *(1 mark)*

(ii) $y^5 \div y^{-2}$

.....

.....

Answer ..... *(1 mark)*

(c) Expand and simplify $(4x - 3)(x + 5)$

.....

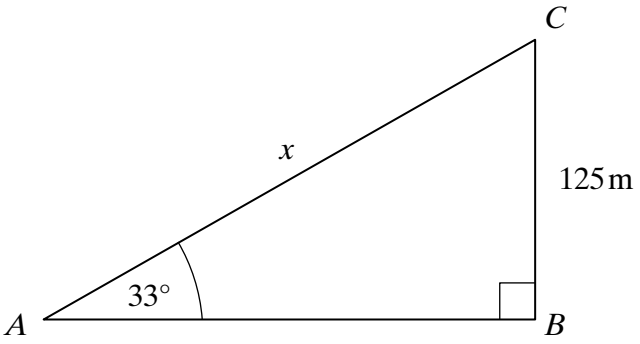
.....

.....

.....

Answer ..... *(3 marks)*

18 ABC is a right-angled triangle.
$BC = 125$ m.
Angle $CAB = 33°$.



Not drawn accurately

Find the length of AC (marked x in the diagram).
Give your answer to an appropriate degree of accuracy.

.....

.....

.....

.....

.....

.....

Answer ..... m *(4 marks)*

TURN OVER FOR THE NEXT QUESTION

10

19 (a) (i) Use your calculator to find $\sqrt{28.9^2 - 9.24^2}$

Give **all** the figures in your calculator display.

.....

.....

Answer ..... *(1 mark)*

(ii) Write your answer to 3 significant figures.

.....

Answer ..... *(1 mark)*

(b) Find the value of $(3.18 \times 10^5) \times (4.25 \times 10^3)$.

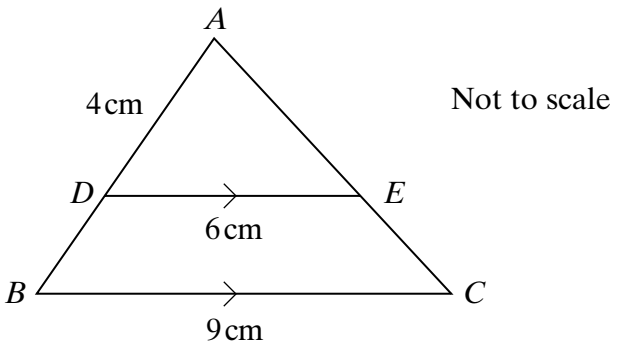
Give your answer in standard form.

.....

.....

Answer ..... *(2 marks)*

20 Triangles ADE and ABC are similar.
DE is parallel to BC.
$AD = 4\,\text{cm}$, $DE = 6\,\text{cm}$ and $BC = 9\,\text{cm}$.



Calculate the length of BD.

.....

.....

.....

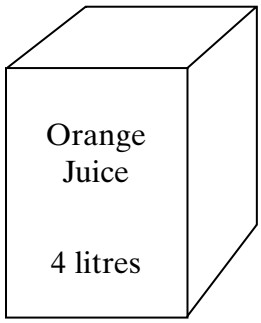
.....

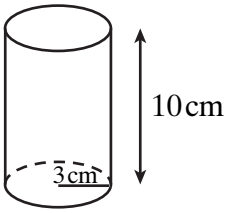
Answer ..... cm *(3 marks)*

TURN OVER FOR THE NEXT QUESTION

7

21 A large carton contains 4 litres of orange juice.
Cylindrical glasses of height 10 cm and radius 3 cm are to be filled from the carton.





How many glasses can be filled?
You **must** show all your working.

.....

.....

.....

.....

.....

Answer ..... glasses *(5 marks)*

22 Make x the subject of the formula

$$w = x^2 + y$$

.....

.....

.....

.....

Answer $x =$ ..... *(2 marks)*

LEAVE MARGIN BLANK

23 Jenny is organising a barbecue.
There are 30 bread rolls in a pack.
There are 16 sausages in a pack.
She needs **exactly** the same number of bread rolls as sausages.
What is the smallest number of each pack she must buy?
You **must** show all your working.

.....

.....

.....

.....

.....

Answer ..... packs of rolls

and ..... packs of sausages *(3 marks)*

24 (a) Solve the equation $\frac{23 - 2x}{5} = 3$

.....

.....

.....

.....

Answer x = ... *(3 marks)*

(b) Solve the inequality $3x + 8 < 29$

.....

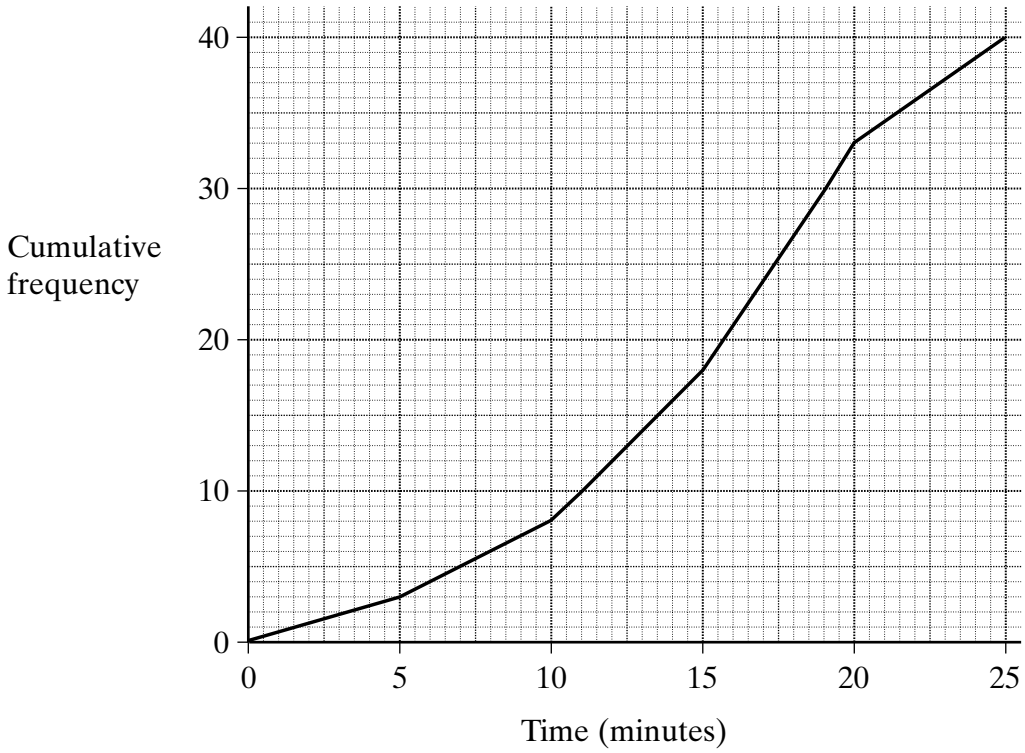
.....

.....

Answer ..... *(2 marks)*

15

25 The length of time, in minutes, of 40 telephone calls was recorded.
A cumulative frequency diagram of this data is shown on the grid below.



Use the diagram to find the limits between which the middle 50% of the times lie.

.....

.....

Answer ..... minutes and ..... minutes *(2 marks)*

END OF QUESTIONS

2