

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

Leave blank
-------------

General Certificate of Secondary Education  
June 2005



**MATHEMATICS (SPECIFICATION A) 3301/11**  
**Intermediate Tier**  
**Paper 1 Non-Calculator**

Tuesday 7 June 2005 1.30 pm to 3.30 pm

<p><b>In addition to this paper you will require:</b> mathematical instruments. You must <b>not</b> use a calculator.</p>	
---	--

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	
TOTAL	
Examiner's Initials	

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.

**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.
- The use of a calculator is **not** permitted.

**Advice**

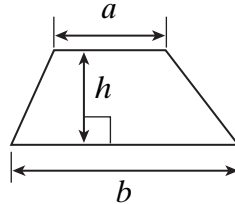
- In all calculations, show clearly how you work out your answer.

---

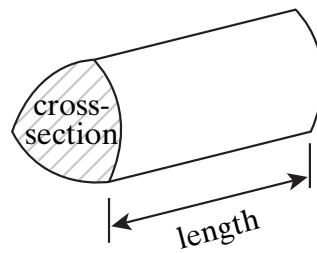
**Formulae Sheet: Intermediate Tier**

You may need to use the following formulae:

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

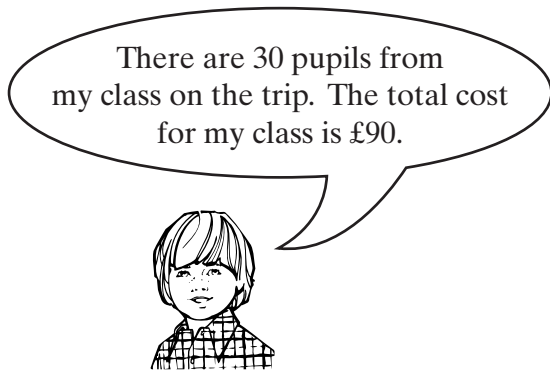


**Volume of prism** = area of cross-section  $\times$  length



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

- 1 Jim's class and Rosie's class go on a trip to the zoo.  
Each pupil pays the same amount.



Jim



Rosie

What is the total cost for Rosie's class?

.....

.....

.....

.....

Answer £ ..... (3 marks)

- 2 (a) Use the formula  $a = 5b + 2c$  to work out  $a$  when  $b = 3$  and  $c = -4$

.....

.....

Answer ..... (2 marks)

- (b) Use the formula  $a = 5b + 2c$  to work out  $c$  when  $a = 16$  and  $b = 2$

.....

.....

.....

Answer ..... (3 marks)

Turn over ►

**3** Work out

(a)  $5.4 - 1.28$

.....

.....

.....

Answer ..... (1 mark)

(b)  $3.64 \times 2 + 13.7$

.....

.....

.....

Answer ..... (3 marks)

(c)  $0.3 \times 100 + 2.4 \times 10$

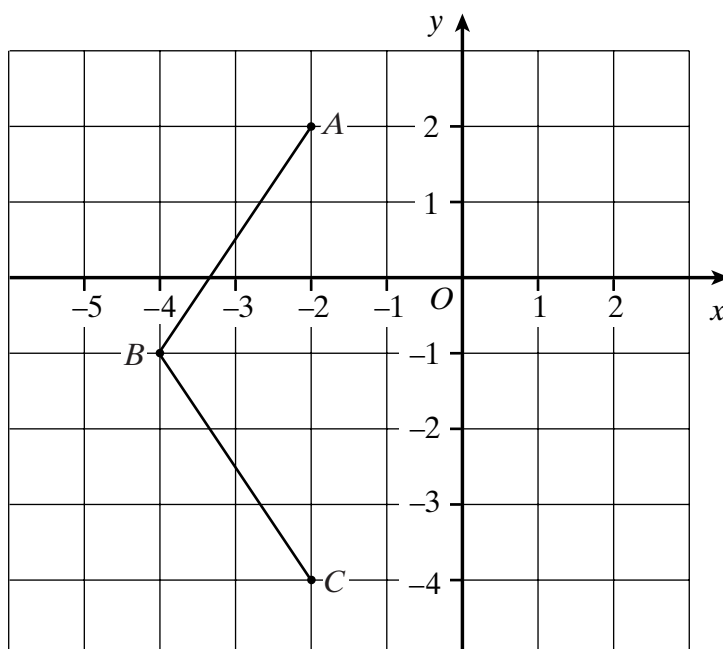
.....

.....

.....

Answer ..... (2 marks)

- 4 (a)  $AB$  and  $BC$  are two sides of a rhombus  $ABCD$ .



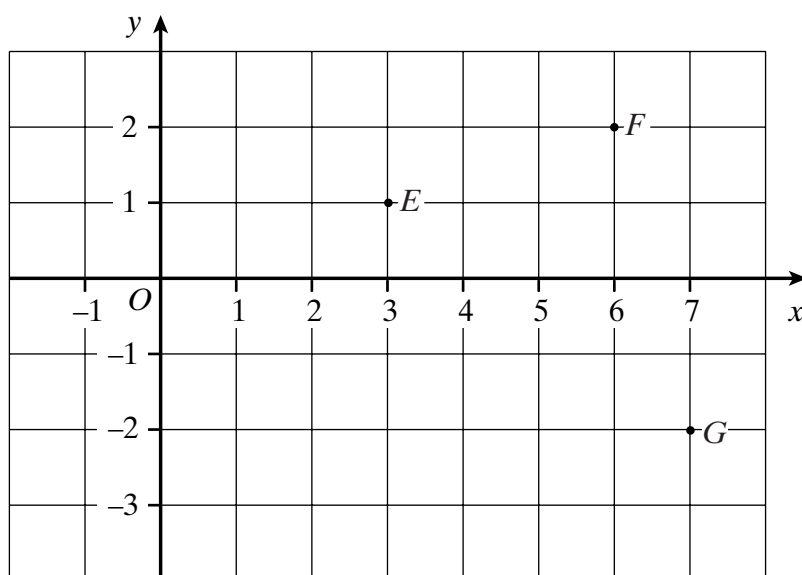
- (i) Draw the rhombus  $ABCD$ .

(1 mark)

- (ii) Write down the coordinates of  $D$ .

Answer  $D$  ( ..... , ..... ) (1 mark)

- (b)  $EFGH$  is a parallelogram.



Write down the coordinates of  $H$ .

Answer  $H$  ( ..... , ..... ) (2 marks)

Turn over ►

- 5 The table shows the races that 60 primary school pupils entered on their Sports Day. They each entered one race.

Race entered	Number of pupils
Egg and spoon	18
3-legged	20
Sack	12
Obstacle	10

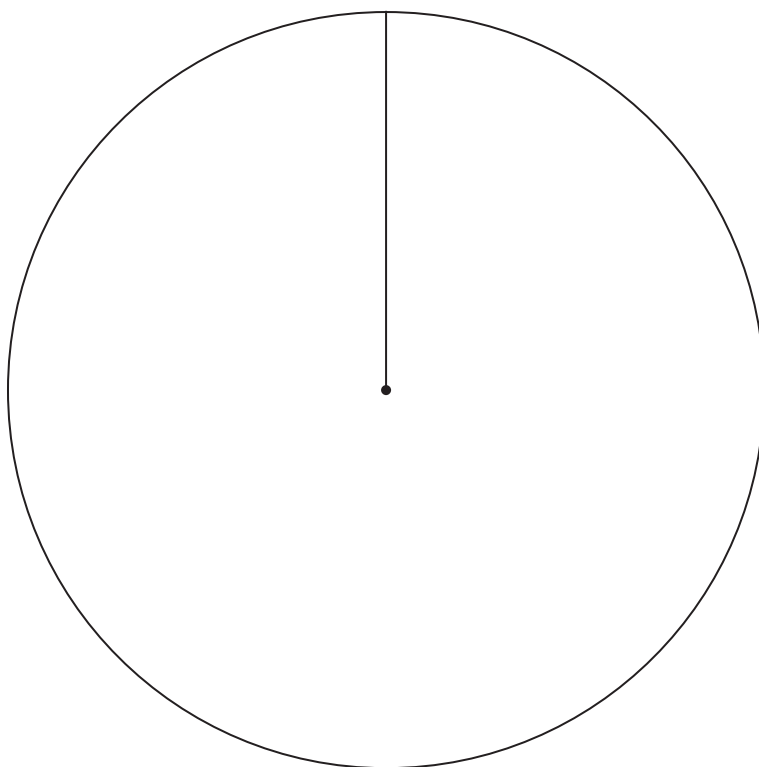
- (a) Draw and label a pie chart to represent the information in the table.

.....

.....

.....

.....



(4 marks)

- (b) Work out the percentage of pupils who entered the egg and spoon race.

.....

.....

Answer ..... % (2 marks)

- (c) The pupils in the obstacle race took these times in seconds.

23    36    18    29    44    39    36    54    43    41

Draw an ordered stem and leaf diagram to show this information.

.....

.....

.....

.....

.....

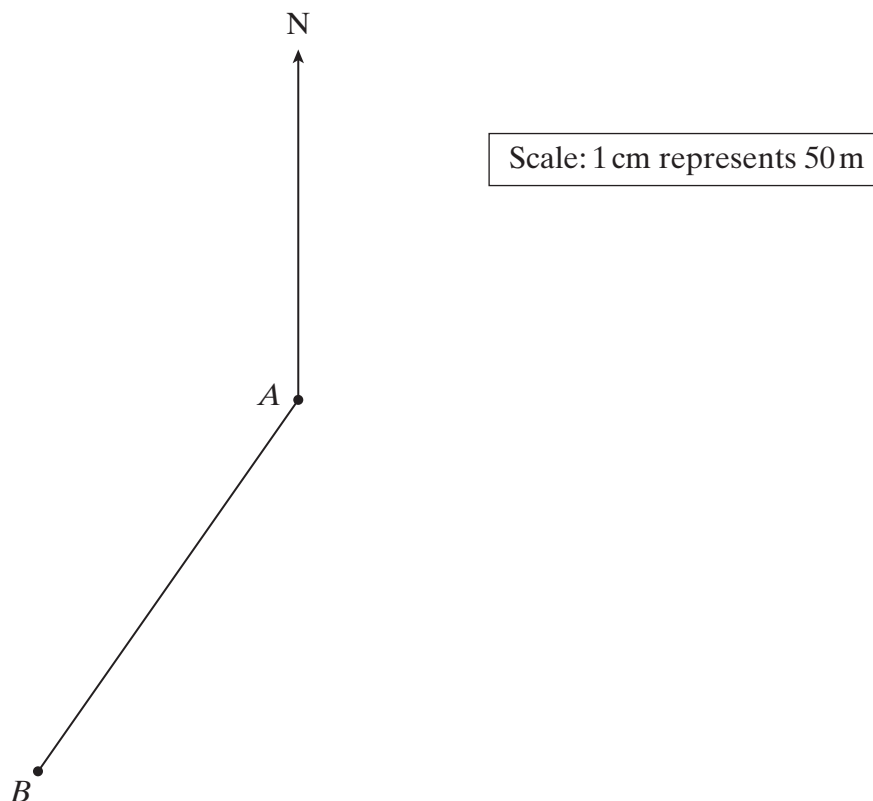
Key:    |    2    |    3    represents 23 seconds


(3 marks)

**TURN OVER FOR THE NEXT QUESTION**

Turn over ►

- 6 The diagram shows a scale drawing of one side,  $AB$ , of a triangular field,  $ABC$ .



- (a) Use the diagram to calculate the actual distance from  $A$  to  $B$ .

.....  
 .....

Answer ..... metres (2 marks)

- (b) Measure and write down the three figure bearing of  $B$  from  $A$ .

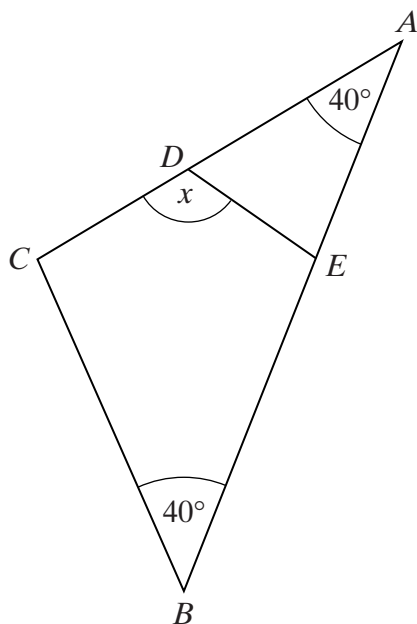
Answer ..... $^{\circ}$  (1 mark)

- (c) The bearing of  $C$  from  $A$  is  $130^{\circ}$ .  
 The actual distance from  $A$  to  $C$  is 350 metres.  
 Mark the point  $C$  on the diagram.

.....  
 (2 marks)



- 7  $ABC$  is an isosceles triangle.  
 $BCDE$  is a kite.



Not drawn accurately

Work out the value of  $x$ .

.....

.....

.....

.....

.....

Answer ..... degrees (3 marks)

**TURN OVER FOR THE NEXT QUESTION**

Turn over ►

- 8 Tom works 12 hours each week.  
He earns £4 per hour.  
Tom saves  $\frac{1}{3}$  of his earnings each week.  
How many weeks does it take Tom to save £80?  
You **must** show all your working.

.....

.....

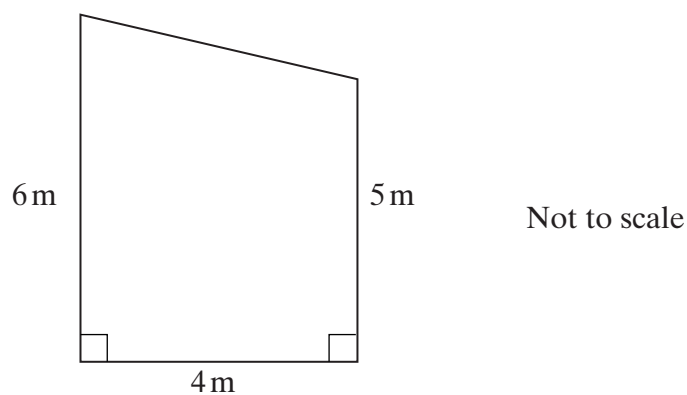
.....

.....

.....

Answer ..... weeks (4 marks)

- 9 The diagram shows the side wall of a building.



Calculate the area of the wall.  
You **must** show all your working.

.....

.....

.....

.....

.....

Answer ..... (4 marks)

**10**  $p$  and  $q$  are odd numbers.

- (a) Is  $p + q$  an odd number, an even number or could it be either?  
Tick the correct box.

☐

odd

☐

even

☐

either

(1 mark)

- (b) Is  $pq$  an odd number, an even number or could it be either?  
Tick the correct box.

☐

odd

☐

even

☐

either

(1 mark)

**11** (a) Write 18 as the product of its prime factors.

.....

.....

.....

Answer ..... (2 marks)

(b) What is the least common multiple (LCM) of 12 and 18?

.....

.....

Answer ..... (1 mark)

Turn over ►

**12** Here is a number machine.



Use the number machine to complete the table.

<b>Input</b>	2		$n$	
<b>Output</b>	11	35		$x$

.....

.....

.....

.....

.....

.....

.....

.....

(6 marks)

**13** On Monday Joe drinks  $2\frac{1}{3}$  pints of milk.

On Tuesday he drinks  $1\frac{3}{4}$  pints of milk.

Work out the total amount of milk that Joe drinks on Monday and Tuesday.

.....

.....

.....

.....

.....

.....

Answer ..... pints (3 marks)

- 14 (a) Complete this table of values for  $y = (2 + x)(3 - x)$

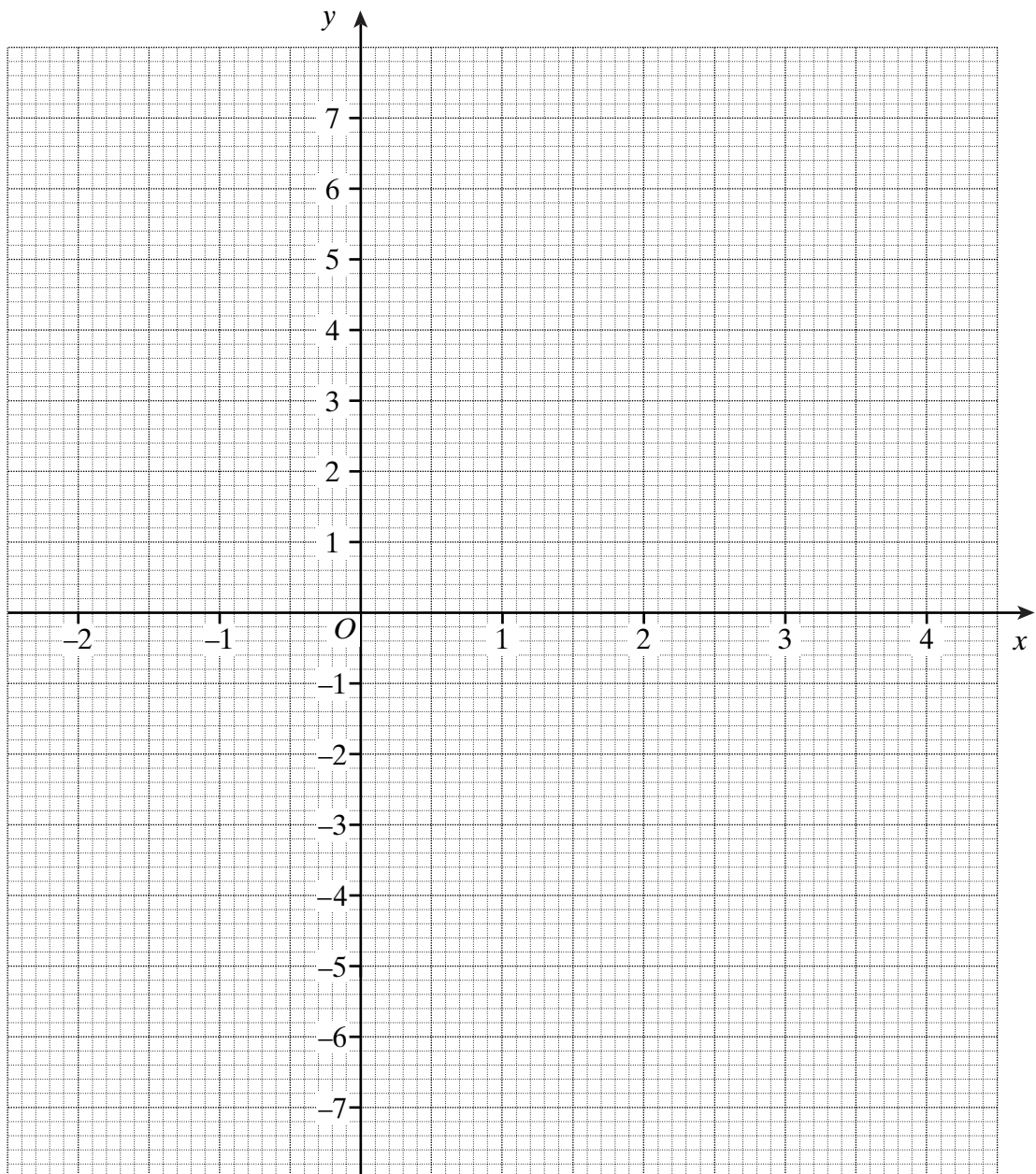
$x$	-2	-1	0	1	2	3	4
$y$		4	6	6	4	0	

.....

.....

(2 marks)

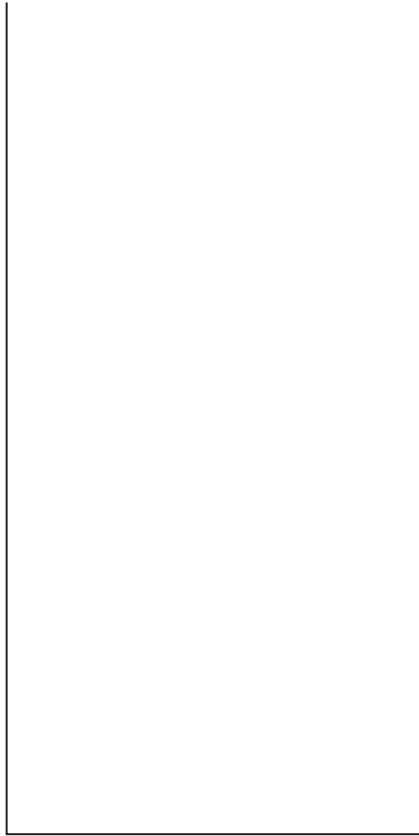
- (b) On the grid, draw the graph of  $y = (2 + x)(3 - x)$  for values of  $x$  from -2 to +4.



(2 marks)

Turn over ►

**15** The diagram shows an L shape.



Draw the locus of all points 2 cm from the L shape.

*(3 marks)*

16 (a) Factorise  $x^2 + 4x$

.....  
.....

Answer ..... (1 mark)

(b) Solve the inequality  $7y < 3y + 6$

.....  
.....

Answer ..... (2 marks)

(c) Make  $r$  the subject of the formula  $p = 3 + 2r$

.....  
.....  
.....  
.....

Answer  $r =$  ..... (2 marks)

**TURN OVER FOR THE NEXT QUESTION**

Turn over ►

**17** A box contains a number of counters.

Each counter is coloured red (**R**) or white (**W**).

Each counter is also numbered **1** or **2**.

The table shows the probabilities of picking the different colours and numbers when a counter is picked at random from the box.

		Number	
		1	2
Colour	R	$\frac{1}{5}$	$\frac{1}{10}$
	W	$\frac{1}{4}$	$\frac{9}{20}$

- (a) Write down the colour and the number of the counter that is **least likely** to be picked at random from the box.

.....  
 .....

Answer Colour ..... Number ..... (1 mark)

- (b) Sam says that there are 50 counters in the box.  
 Explain why Sam must be wrong.

.....  
 .....  
 .....  
 (1 mark)

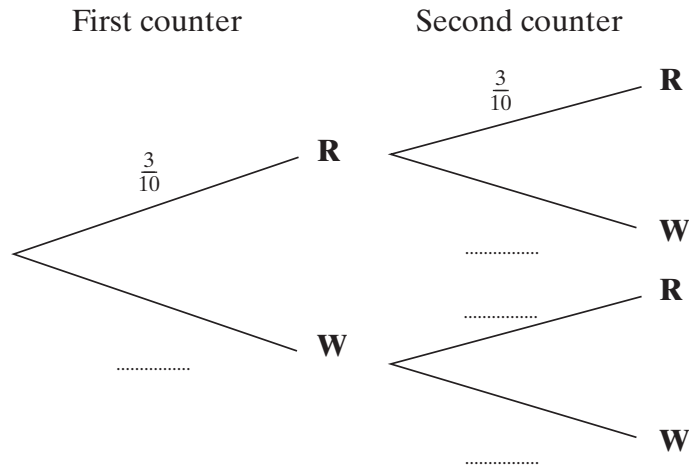
- (c) Show that the probability of picking a red counter (**R**) at random from the box is  $\frac{3}{10}$

.....  
 .....  
 .....  
 .....  
 (2 marks)



- (d) A counter is picked at random from the box.  
The counter is put back in the box.  
A second counter is then picked at random from the box.

(i) Complete the tree diagram.



(1 mark)

- (ii) What is the probability that both counters are red?

.....  
.....

Answer ..... (2 marks)

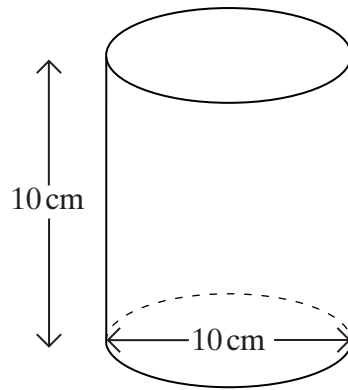
- 18** A sprinter runs 200 metres in 20.42 seconds.  
Estimate his average speed in kilometres per hour.  
You **must** show your working.

.....  
.....  
.....  
.....  
.....  
.....

Answer ..... km/h (4 marks)

Turn over ►

- 19** The diagram shows a cylinder.  
The diameter of the cylinder is 10 cm.  
The height of the cylinder is 10 cm.



Not drawn accurately

- (a) Work out the volume of the cylinder.  
Give your answer in terms of  $\pi$ .

.....

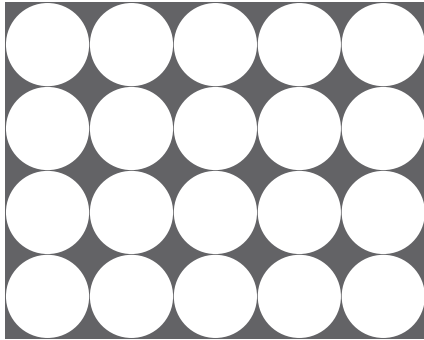
.....

.....

.....

Answer .....  $\text{cm}^3$  (3 marks)

- (b) Twenty of the cylinders are packed in a box of height 10 cm.  
The diagram shows how the cylinders are arranged inside the box.  
The shaded area is the space between the cylinders.



Not drawn accurately

Work out the volume inside the box that is **not** filled by the cylinders.  
Give your answer in terms of  $\pi$ .

.....

.....

.....

.....

.....

.....

.....

Answer .....  $\text{cm}^3$  (4 marks)

Turn over ►

- 20** (a) Solve the equation  $\frac{1}{2}x - 5 = \frac{1}{4}x + 3$

.....

.....

.....

.....

.....

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

- (b) (i) Factorise  $x^2 + 5x - 14$

.....

.....

.....

Answer ..... (2 marks)

- (ii) Hence solve the equation  $x^2 + 5x - 14 = 0$

.....

.....

Answer ..... (1 mark)

**21** Some large numbers are written below.

$$1 \text{ million} = 10^6$$

$$1 \text{ billion} = 10^9$$

$$1 \text{ trillion} = 10^{12}$$

(a) How many millions are there in one trillion?

.....

.....

Answer ..... (1 mark)

(b) Write 8 billion in standard form.

.....

Answer ..... (1 mark)

(c) Work out 8 billion multiplied by 3 trillion.  
Give your answer in standard form.

.....

.....

.....

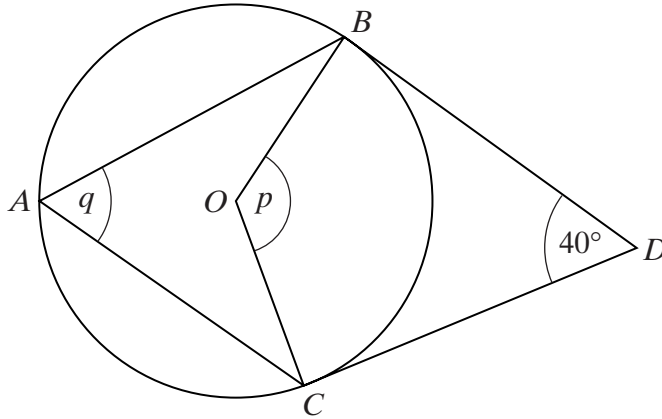
Answer ..... (2 marks)

**TURN OVER FOR THE NEXT QUESTION**

**Turn over** ►

- 22**  $A, B$  and  $C$  are points on the circumference of a circle with centre  $O$ .  
 $BD$  and  $CD$  are tangents.  
 Angle  $BDC = 40^\circ$

Not drawn accurately



- (a) Work out the value of  $p$ .

.....

.....

.....

Answer ..... degrees (2 marks)

- (b) Hence write down the value of  $q$ .

.....

.....

.....

Answer ..... degrees (1 mark)

**END OF QUESTIONS**

**THERE ARE NO QUESTIONS PRINTED ON THIS PAGE**

**THERE ARE NO QUESTIONS PRINTED ON THIS PAGE**