Ma

KEY STAGE 3

TIERS 5–7

2006

Mathematics test

Paper 1

Calculator **not** allowed

Please read this page, but do not open your booklet until your teacher tells you to start. Write your name and the name of your school in the spaces below.

First name _____

Last name _____

School _____

Remember

- The test is 1 hour long.
- You **must not** use a calculator for any question in this test.
- You will need: pen, pencil, rubber and a ruler.
- Some formulae you might need are on page 2.
- This test starts with easier questions.
- Try to answer all the questions.
- Write all your answers and working on the test paper – do not use any rough paper. Marks may be awarded for working.
- Check your work carefully.
- Ask your teacher if you are not sure what to do.

For marker's use only | Total marks |

QCA/06/1928

Instructions

Answers

This means write down your answer or show your working and write down your answer.

Calculators

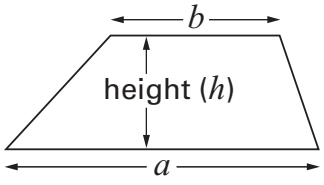
You **must not** use a calculator to answer any question in this test.

Formulae

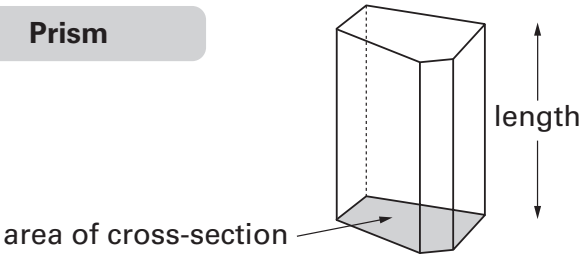
You might need to use these formulae

Trapezium

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



Prism



Volume = area of cross-section × length

1. (a) Show that **9 × 28** is **252**

1 mark

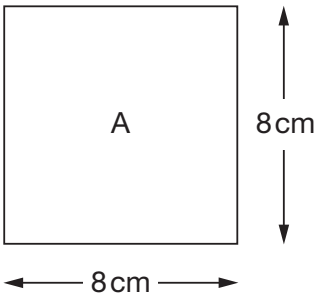
(b) What is **27 × 28**?

You can use part (a) to help you.

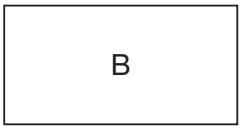
2 marks

2. (a) I have a square piece of paper.

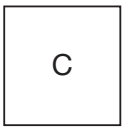
The diagram shows information about this square labelled A.



I fold square A **in half** to make rectangle B.



Then I fold rectangle B **in half** to make square C.

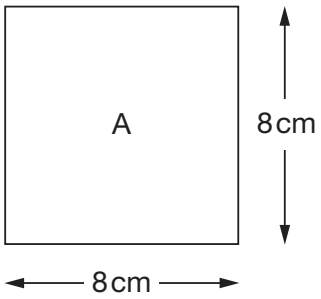


Complete the table below to show the area and perimeter of each shape.

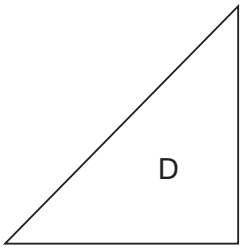
	Area	Perimeter
Square A	cm^2	cm
Rectangle B	cm^2	cm
Square C	cm^2	cm

3 marks

(b) I start again with square A.



Then I fold it **in half** to make triangle D.



What is the **area** of triangle D?

_____ cm^2

1 mark

(c) One of the statements below is true for the **perimeter** of triangle D.

Tick (✓) the correct one.

The perimeter is less than 24 cm. ☐

The perimeter is 24 cm. ☐

The perimeter is greater than 24 cm. ☐

Explain your answer.

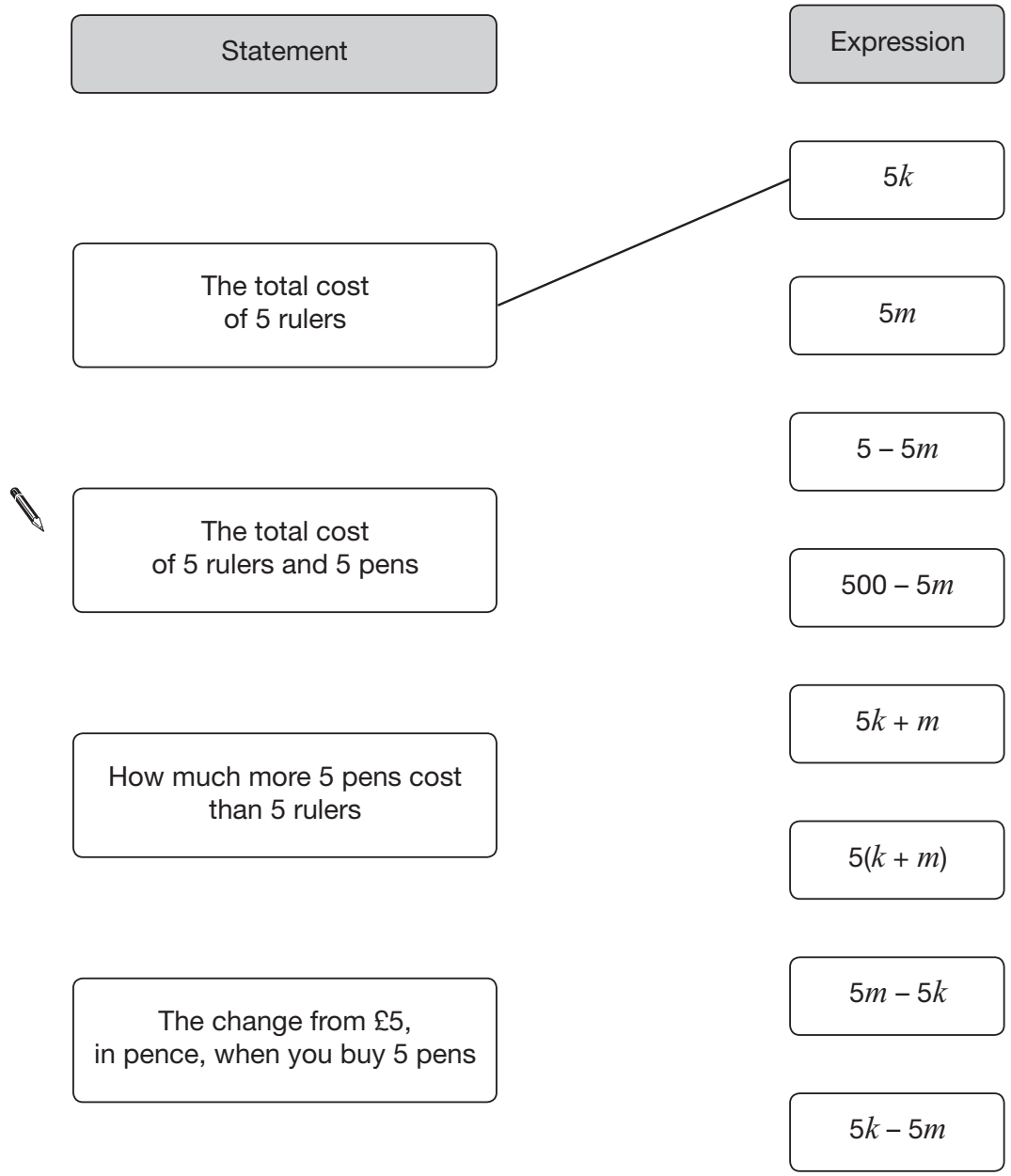
1 mark

3. A ruler costs k pence.

A pen costs m pence.

Match each statement with the correct expression for the amount in pence.

The first one is done for you.



1 mark

1 mark

1 mark

4. (a) Work out the missing values.

10% of 84 = _____

5% of 84 = _____

$2\frac{1}{2}$% of 84 = _____

2 marks

(b) The cost of a CD player is £84 **plus** $17\frac{1}{2}$ % tax.

What is the **total** cost of the CD player?

You can use part (a) to help you.

£

2 marks

5. Solve these equations.

$2k + 3 = 11$

$k =$ _____ 1 mark

$2t + 3 = -11$

$t =$ _____ 1 mark

6. (a) I am thinking of a number.

My number is a **multiple of 4**

Tick (✓) the true statement below.

My number must be even	My number must be odd	My number could be odd or even
☐	☐	☐

Explain how you know.

1 mark

(b) I am thinking of a **different** number.

My number is a **factor of 20**

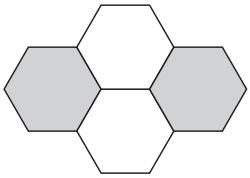
Tick (✓) the true statement below.

My number must be even	My number must be odd	My number could be odd or even
☐	☐	☐

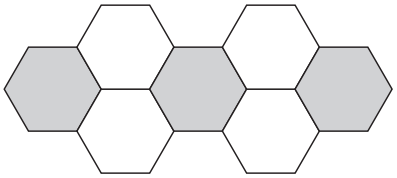
Explain how you know.

1 mark

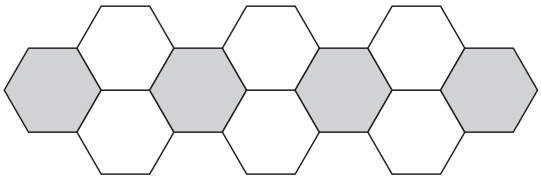
7. Look at this sequence of patterns made with hexagons.



pattern number **1**



pattern number **2**



pattern number **3**

To find the number of hexagons in pattern number n you can use these rules:

Number of **grey** hexagons	=	$n + 1$
Number of **white** hexagons	=	$2n$

Altogether, what is the total number of hexagons in **pattern number 20**?

_____

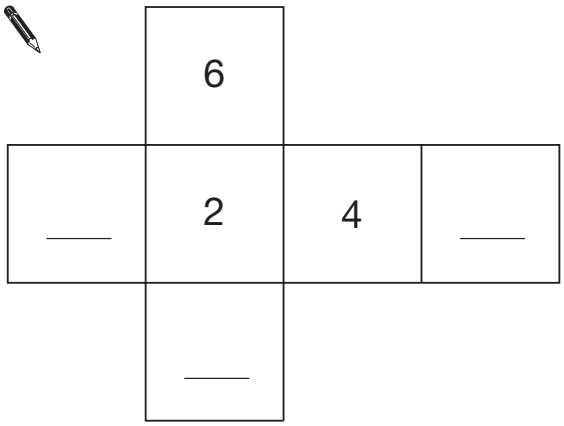
_____

2 marks

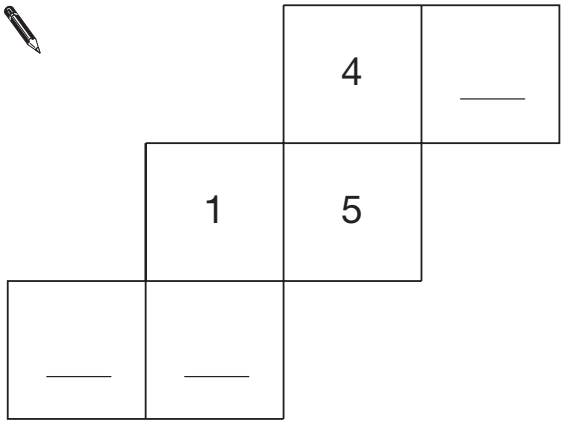
8. The diagrams show nets for dice.

Each dice has six faces, numbered 1 to 6

Write the missing numbers so that the numbers on **opposite faces add to 7**



1 mark



1 mark

9. (a) Put these values in order of size with the **smallest first**.

5^2 3^2 3^3 2^4

_____ _____ _____ _____

smallest largest

2 marks

(b) Look at this information.

5^5 is 3125

What is $\mathbf{5^7}$?

_____

2 marks

10. Write the correct operations (+ or – or × or ÷) in these statements.

a ____ a = 0

a ____ a = 1

a ____ a = $2a$

a ____ a = a^2

2 marks

11. Solve this equation.

$3y + 14 = 5y + 1$

y = _____

2 marks

12. Hanif asked ten people:

'What is your favourite sport?'

Here are his results.

football	*cricket*	*football*	*hockey*	*swimming*
hockey	*swimming*	*football*	*netball*	*football*

(a) Is it possible to work out the **mean** of these results?

☐ Yes ☐ No

Explain how you know.

1 mark

(b) Is it possible to work out the **mode** of these results?

☐ Yes ☐ No

Explain how you know.

1 mark

13. (a) Give an example to show the statement below is **not** correct.

When you multiply a number by 2, the answer is always greater than 2

1 mark

(b) Now give an example to show the statement below is **not** correct.

When you subtract a number from 2, the answer is always less than 2

1 mark

(c) Is the statement below correct for all numbers?

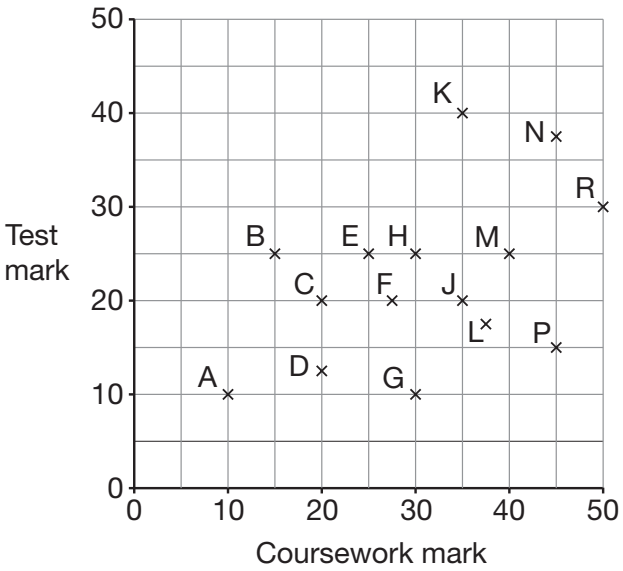
The square of a number is greater than the number itself.

☐ Yes ☐ No

Explain how you know.

1 mark

14. The scatter graph shows 15 pupils' coursework and test marks.



To find a pupil's **total** mark, you add the coursework mark to the test mark.

(a) Which pupil had the highest **total** mark?

_____

1 mark

(b) Look at the statement below. Tick (✓) True or False.

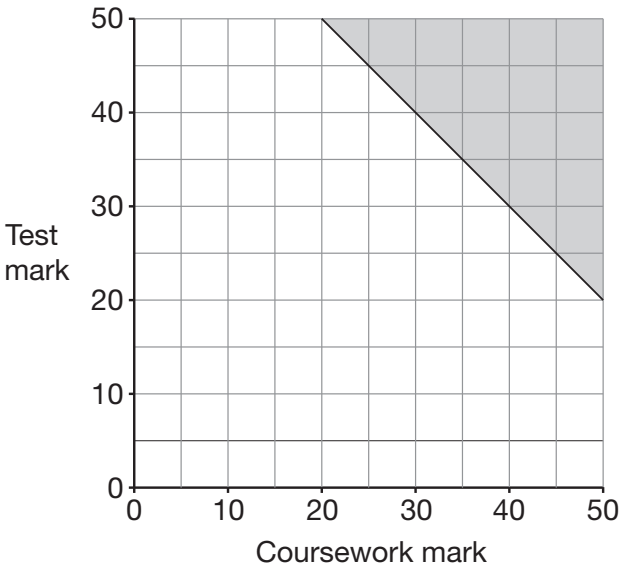
The range of coursework marks was greater than the range of test marks.

☐ True ☐ False

Explain your answer.

1 mark

(c) Pupils with total marks in the shaded region on the graph win a prize.



What is the **smallest total mark** needed to win a prize?

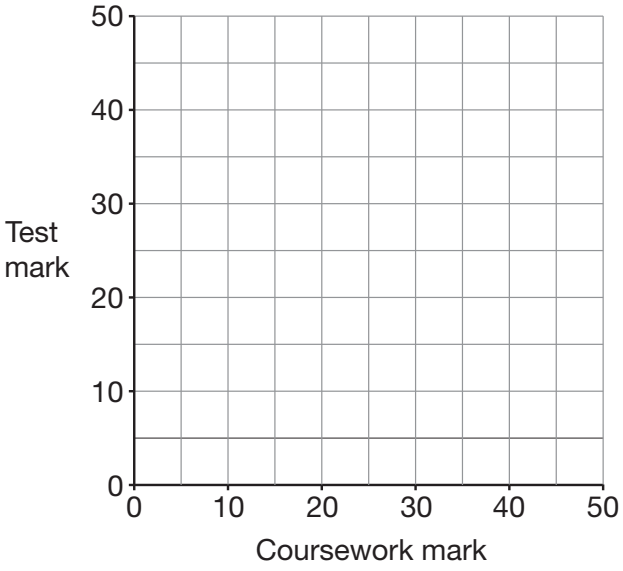
_____

1 mark

(d) Another school has a different rule for pupils to win a prize.

Rule: The coursework mark must be 25 or more, and
the test mark must be 25 or more, and
the total mark must be 65 or more.

On the graph below, shade the region of total marks for which pupils would win a prize.



2 marks

15. Work out

$$\frac{1}{4} + \frac{1}{3} =$$

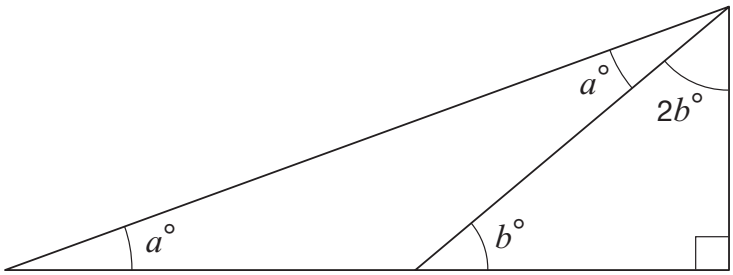
1 mark

1 mark

$$\frac{3}{5} - \frac{1}{15} =$$

1 mark

16. Look at the triangle.



Not drawn accurately

Work out the value of a

$a =$ _____

3 marks

17. Write the missing numbers in these multiplication grids.

×	8	
9	72	
−6		30

×	0.2	
3		1.2
		6

3 marks

18. A teacher asked 21 pupils to estimate the height of a building in metres.

The stem-and-leaf diagram shows **all 21** results.

6 | 5 represents 6.5 m

6	5	9				
7	0	2	6	8	8	
8	3	3	5	7	7	9
9	0	5	5	5		
10	4	8				
11	2	7				

(a) Show that the **range** of estimated heights was **5.2 m**.

1 mark

(b) What was the **median** estimated height?

m

1 mark

(c) The height of the building was **9.2 m**.

What **percentage** of the pupils **over-estimated** the height?

_____ %

1 mark

19. In a quiz game two people each answer **100 questions**.

They score one point for each correct answer.

The quiz game has not yet finished.

Each person has answered **90 questions**.

The table shows the results so far.

Person A	Person B
60% of the first 90 questions correct	50% of the first 90 questions correct

Can person B win the quiz game?

Explain your answer.

Tick (✓) your answer.

B can win. ☐

B cannot win but can draw. ☐

B cannot win or draw. ☐

2 marks

20. Solve these simultaneous equations using an algebraic method.

$$3x + 7y = 18$$
$$x + 2y = 5$$

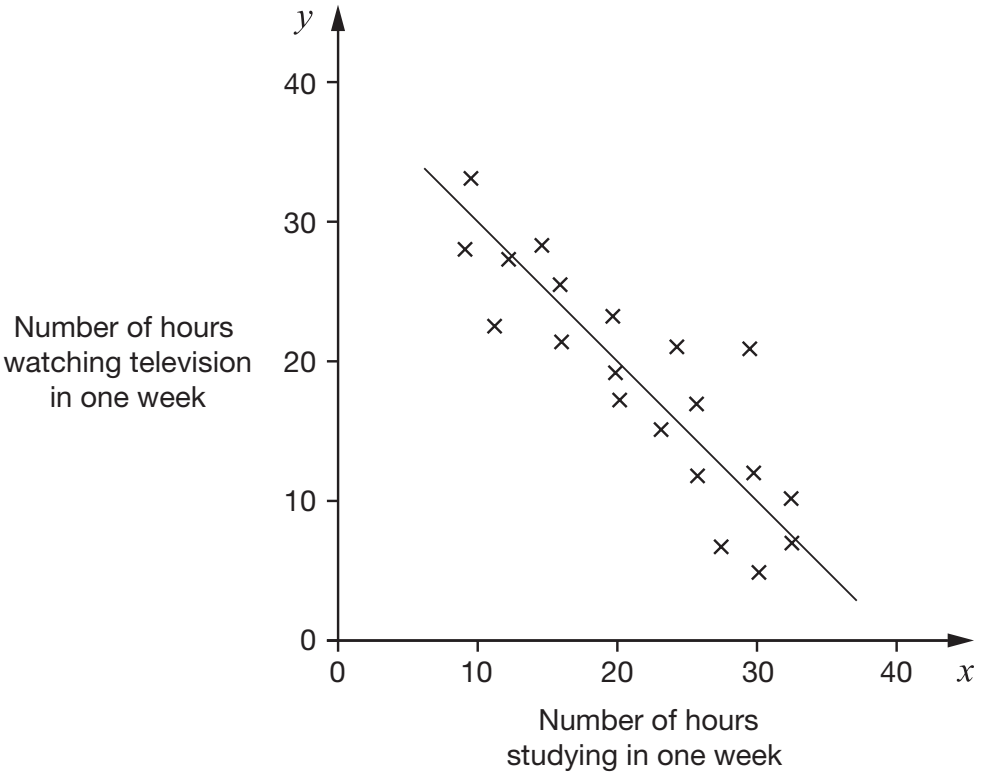
You **must** show your working.

$x =$ _____ $y =$ _____

3 marks

21. A pupil investigated whether students who study more watch less television.

The scatter graph shows his results. The line of best fit is also shown.



(a) What type of correlation does the graph show?

_____

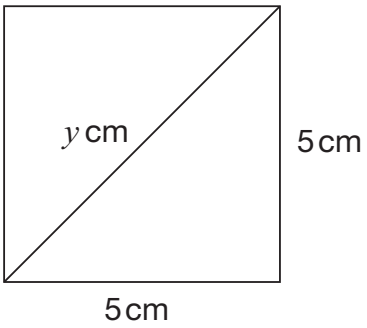
1 mark

(b) The pupil says the equation of the line of best fit is $y = x + 40$

Explain how you can tell that this equation is **wrong**.

1 mark

22. The diagram shows a square with side length 5 cm.



Not drawn accurately

The length of the diagonal is y cm.

Show that the value of y is $\sqrt{50}$

1 mark

END OF TEST

END OF TEST

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