



Year 9 Entrance Examination

Mathematics

Time allowed: 1 hour

Sample Test Paper

Calculators are not allowed.

Answer as many questions as you can.

Show all necessary workings in the space below each question.

Name:

1. Calculations

Work out the following.

$$1706 + 185$$



1 mark

$$576 - 83$$



1 mark

$$65 \times 9$$



1 mark

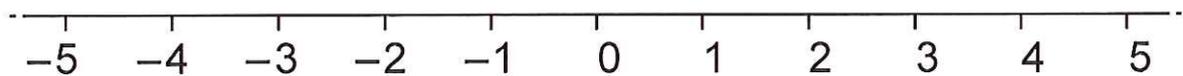
$$154 \div 7$$



1 mark

2. Number line

Here is a number line.



It can help you work out the answers to the calculations below.

The first one is done for you.

$$-3 + 1 = \dots\dots -2 \dots\dots$$

 $-4 + 1 = \dots\dots\dots$

1 mark

 $-2 + 5 = \dots\dots\dots$

1 mark

 $3 - 5 = \dots\dots\dots$

1 mark

3. **Eight times**

Write the missing numbers in the boxes.

 $8 \times \square = 800$

1 mark

 $0.8 \times \square = 8$

1 mark

4. **Adding**

Look at the calculation below.

Write the correct digits in the boxes.



4	3	□
---	---	---

 +

2	□	8
---	---	---

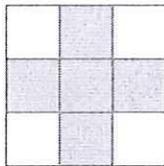
 =

□	7	5
---	---	---

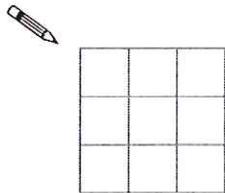
2 marks

5. **Grid patterns**

On the square grid below, some squares are shaded to make a pattern with exactly **4 lines** of symmetry.

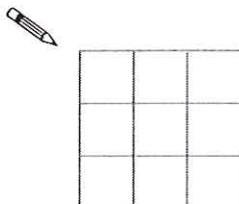


(a) On the square grid below, shade some squares to make a pattern with exactly **2 lines** of symmetry.



1 mark

(b) On the square grid below, shade some squares to make a pattern with exactly **1 line** of symmetry.



1 mark

6. Think of a number

(a) Henry thinks of a number **between 1 and 20**

He thinks of the number **12**

For each question below, tick (✓) Yes or No for Henry's number.

	Yes	No
 Is it an even number?		
Is it a multiple of 3 ?		
Is it a factor of 18 ?		

1 mark

(b) Ashraf also thinks of a number **between 1 and 20**

The table shows information about his number.

	Yes	No
Is it an even number?		✓
Is it a multiple of 3 ?	✓	
Is it a factor of 18 ?		✓

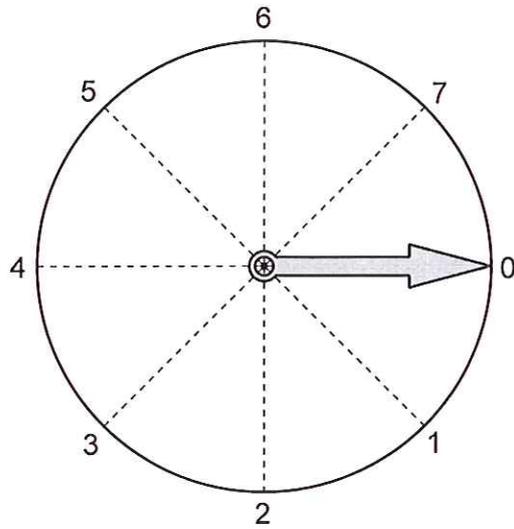
What is Ashraf's number?



1 mark

7. Dial

Look at the dial.



The pointer starts at 0 and turns **clockwise** around the centre.

- (a) Which number does it point to after turning clockwise through **90°**?



1 mark

- (b) The pointer turns clockwise from **3 to 6**
Through how many degrees does it turn?



1 mark

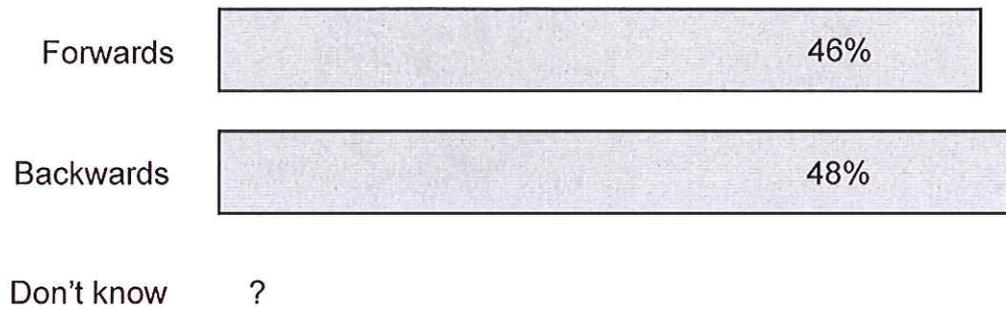
8. Time machine

Here is a question from a survey.

In a time machine, would you like to go forwards or backwards in time?

People said 'Forwards', 'Backwards' or 'Don't know'.

Results:



The bar for 'Don't know' has not been drawn.

What percentage of people said 'Don't know'?



..... %

2 marks

9. Sleep

Some people use this rule to work out how many hours' sleep each night young children need.

**Subtract the child's age in years from 30,
then divide the result by 2**

(a) Sanjay is **8** years old.

Use the rule to work out how many hours' sleep he needs.

 hours

1 mark

(b) Lisa is **6** years old.

She wakes up every morning at **7am**.

Use the rule to work out what time she needs to go to sleep.



.....

2 marks

10. Making ten

Write two numbers that add to 10

One of the numbers must be **positive**.

The other number must be **negative**.

 + = 10

1 mark

11. Shopping

Some people in a supermarket are shopping for food.

- (a) **100g** of cheese costs **46p**.

Peter buys **250g** of the cheese.

How much does he pay?



1 mark

- (b) Tins of beans cost **36p each**.

What is the largest number of these tins John can buy with **£2**?



1 mark

12. Rectangles

A rectangle has an **area of 24 cm^2**

How long could the sides of the rectangle be?

Give three **different** examples.

 cm and cm

 cm and cm

 cm and cm

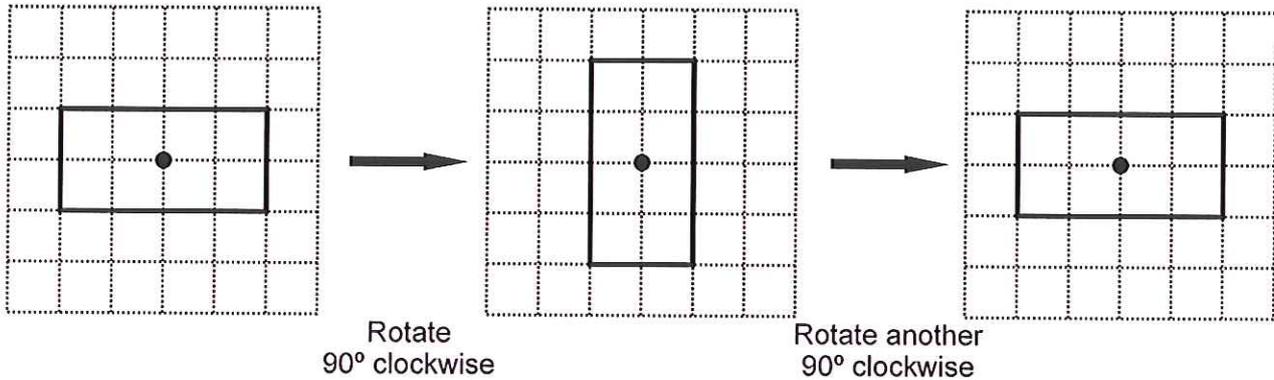
2 marks

13. Rotating

The shapes below are drawn on square grids.

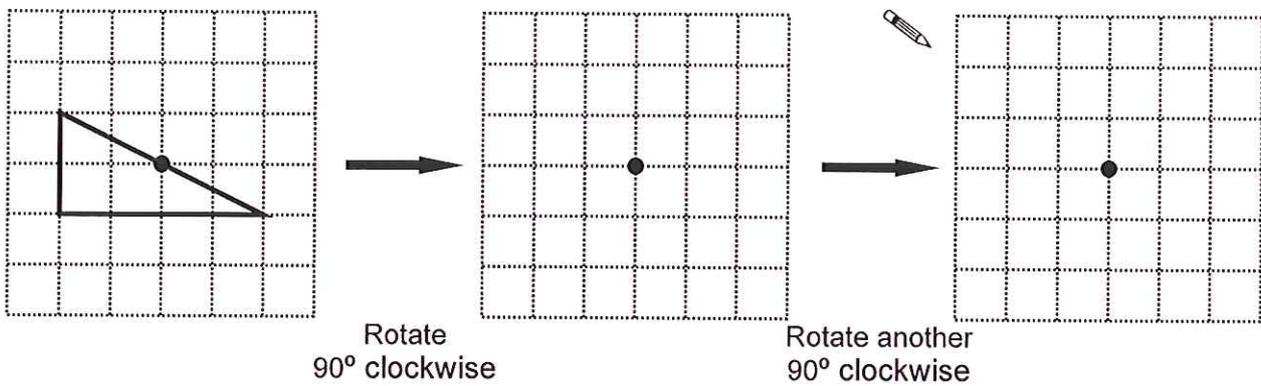
The diagrams show a rectangle that is rotated, then rotated again.

The centre of rotation is marked ●



Complete the diagrams below to show the triangle when it is rotated, then rotated again.

The centre of rotation is marked ●

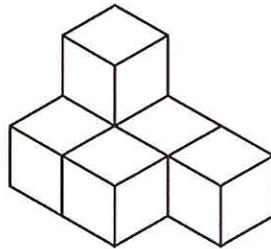


2 marks

14. **Six cubes**

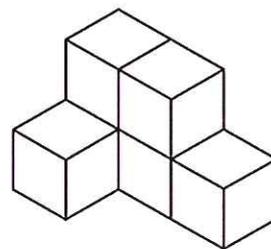
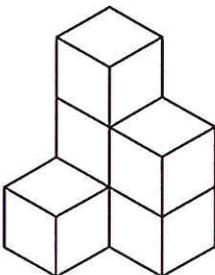
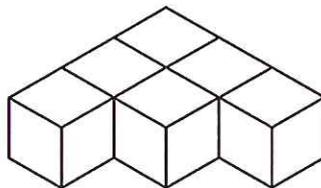
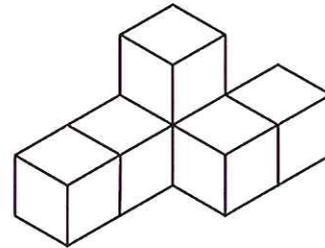
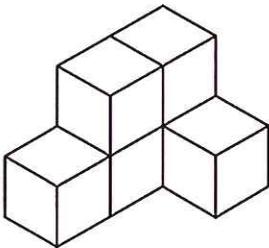
Each shape in this question is made from **six cubes**.

Look at this shape.



Which **two** of the diagrams below show the **same** shape?

Tick (✓) them both.



2 marks

15. Walking to school

The table shows whether pupils in a class walk to school.

	Walk to school	Do not walk to school
Boys	2	8
Girls	5	10

(a) What percentage of the **boys** walk to school?

 %

1 mark

(b) What percentage of the **pupils** in this class walk to school?



..... %

2 marks

16. Matching expressions

Match each statement to the correct expression.

The first one is done for you.

Add 2 to a

2

$2 - a$



Subtract 2 from a

$a + 2$

Multiply a by 2

$2a$

Divide a by 2

$a - 2$

Multiply a by itself

$\frac{2}{a}$

a^2

$\frac{a}{2}$

2 marks

17. Sweets

Fred has a bag of sweets.

Contents
3 yellow sweets
5 green sweets
7 red sweets
4 purple sweets
1 black sweet

He is going to take a sweet from the bag at random.

- (a) What is the **probability** that Fred will get a **black** sweet?



1 mark

- (b) Write the missing **colour** in the sentence below.



The probability that Fred will get a sweet is $\frac{1}{4}$

1 mark

18. Percentages

- (a) Write the missing numbers.



50% of 80 =

5% of 80 =

1% of 80 =

2 marks

- (b) Work out 56% of 80

You can use part (a) to help you.



.....

1 mark

19. Solving

Find the values of x

$$5x - 3 = 12$$

 $x = \dots\dots\dots$

1 mark

$$13 + 2x = 3$$

 $x = \dots\dots\dots$

1 mark

20. Triangles

(a) A triangle has **three equal sides**.

Write the sizes of the **angles** in this triangle.

 $\dots\dots\dots^\circ$, $\dots\dots\dots^\circ$, $\dots\dots\dots^\circ$

1 mark

(b) A **right-angled triangle** has **two equal sides**.

Write the sizes of the **angles** in this triangle.

 $\dots\dots\dots^\circ$, $\dots\dots\dots^\circ$, $\dots\dots\dots^\circ$

1 mark

21. Positive and negative

Look at this equation.

$y = 2x + 10$

(a) When $x = 4$, what is the value of y ?



1 mark

(b) When $x = -4$, what is the value of y ?



1 mark

(c) Which equation below gives the **same** value of y for both $x = 4$ and $x = -4$?

Put a ring round the correct equation.

 $y = 2x$ $y = 2 + x$ $y = x^2$ $y = \frac{x}{2}$

1 mark

(d) What is $2 \times 3 + 3 \times 4 + 4 \times 5$



1 mark

(e) How many minutes are there in a week?

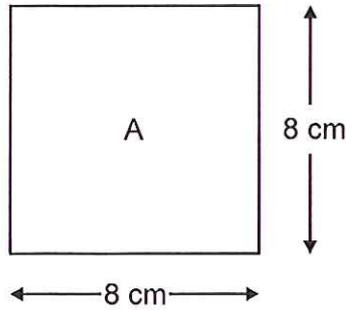


2 marks

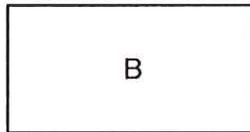
22. Paper

(a) I have a square piece of paper.

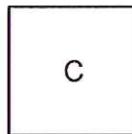
The diagram shows information about this square labelled A.



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



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



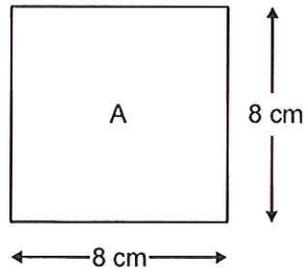
Complete the table below to show the area and perimeter of each shape.



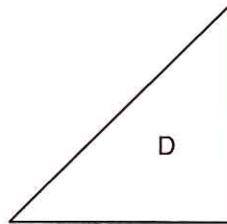
	Area	Perimeter
Square A	cm ²	cm
Rectangle B	cm ²	cm
Square C	cm ²	cm

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

23. Triangular numbers

To find the n th triangular number, you can use this rule.

$$n\text{th triangular number} = \frac{n}{2}(n + 1)$$

$$\begin{aligned} \text{Example: 3rd triangular number} &= \frac{3}{2}(3 + 1) \\ &= 6 \end{aligned}$$

(a) Work out the **10th** triangular number.



1 mark

(b) Now work out the **100th** triangular number.



1 mark

24. Cancelling

Work out

 $\frac{1 \times 2 \times 3 \times 4 \times 5}{1 \times 2 \times 3} = \dots\dots\dots$

1 mark

 $\frac{(1 \times 2 \times 3 \times 4 \times 5)^2}{(1 \times 2 \times 3)^2} = \dots\dots\dots$

1 mark

25. Special offer

A shop has this special offer.

Reduction of 10% when your bill is between £50 and £100
Reduction of 20% when your bill is more than £100

Before the reductions, Marie's bill is **£96** and Richard's bill is **£108**

After the reductions, who paid more?

You **must** show working to explain your answer.



Tick (✓) the correct answer.



Marie

Richard

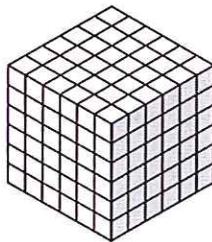
Both paid the same

2 marks

26. Cubes

Kaylee has some 1cm cubes.

She makes a solid cube with side length **6cm** out of the cubes.



Not drawn accurately

Then she uses all these cubes to make some cubes with side length **2cm**.

How many of these **2cm** cubes can Kaylee make?



.....

2 marks

27. Concorde

Concorde could travel **1 mile every 3 seconds**.

How many miles per hour (mph) is that?

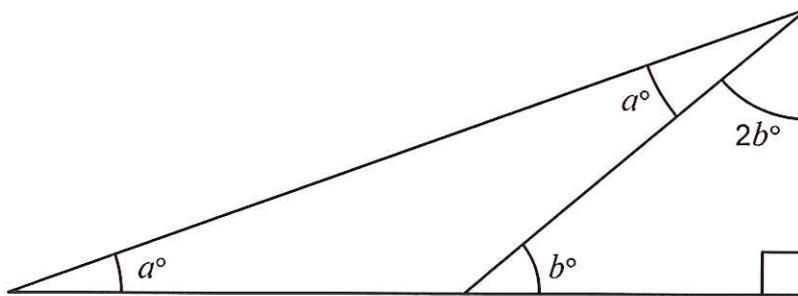


..... mph

2 marks

28. Triangle

Look at the triangle.



Not drawn accurately

Work out the value of a



$a =$

3 marks