

Ma

YEAR
8

LEVELS
5–7

PAPER
1

Year 8 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 details in the spaces below.

First name _____

Last name _____

Class _____

Date _____

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, ruler, a pair of compasses and tracing paper (optional).
- 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 marking
use only

Total marks

--

Instructions

Answers



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

Calculators

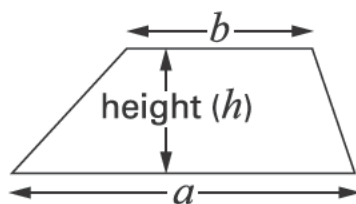


You **must not** use a calculator to answer any question in this test.

Formulae

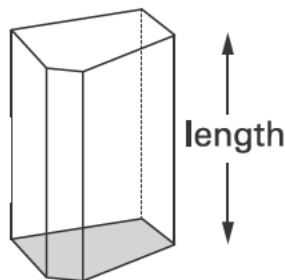
You might need to use these formulae.

Trapezium



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

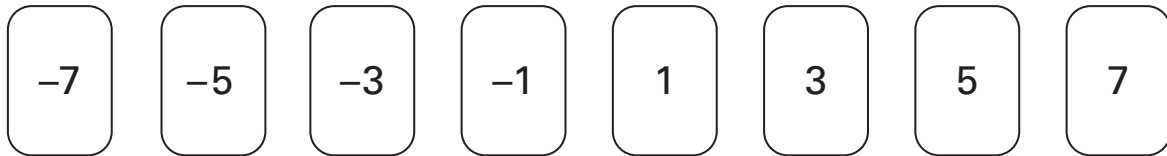
Prism



$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

1

Look at these number cards.

(a) Choose any two of the number cards that **add to 2**

$$\boxed{} + \boxed{} = 2$$

1 mark

(b) Choose any three of the number cards that **add to -5**

$$\boxed{} + \boxed{} + \boxed{} = -5$$

1 mark

(c) Choose any four of the number cards that **add to 0**

$$\boxed{} + \boxed{} + \boxed{} + \boxed{} = 0$$

1 mark



2 Dave and Steve are in a high jump competition.

Dave jumps $1\frac{1}{4}$ metres.

Steve jumps 1.4 metres.



Who jumps higher? Tick (✓) Dave or Steve.



Dave

Steve

How much higher does he jump?

Give your answer in metres.



metres

.....

2 marks

3 Fill in the gaps to show what the units measure.

The first one is done for you.

centimetres measure *length*



kilograms measure

litres measure

square metres measure

.....
.....
2 marks

4 When n is 5, work out the value of $2(n + 1)$



.....

1 mark



5 (a) Here are three numbers.

4	8	9
---	---	---

Show that the **mean** of these three numbers is **7**



1 mark

(b) The **mean** of three numbers is **5**

One of these numbers is 2

What could the other numbers be?

Write them on the cards below.

2			
---	--	--	--

1 mark

What else could the numbers be?

Use **different numbers** from your answer above.

Write them on the cards below.

2			
---	--	--	--

1 mark

- 6 (a) Use a **ruler** and **compasses** to draw a triangle that has these side lengths:

5cm, 5cm, 8cm



.....

.....
2 marks

- (b) Sally says it is possible to draw a triangle with these side lengths:

5cm, 5cm, 12cm

Is she correct? Tick (✓) Yes or No.



Yes

No

Explain how you know.



.....
1 mark



7

A petrol station shows this information:

$$10 \text{ litres} = 2.2 \text{ gallons}$$

How many gallons is **50 litres**?



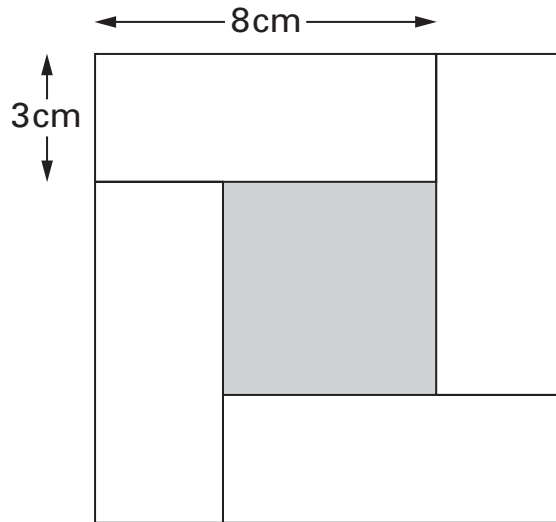
..... gallons

.....

.....
2 marks

8

The diagram shows four identical white rectangles around a shaded square.



Not drawn accurately

What is the area of the shaded square?



.....

3 marks



9

I think of a number.

4% of my number is 42

(a) What is 40% of my number?



.....

1 mark

(b) What is my number?



.....

1 mark

10 (a) Write the missing **decimal** so that each pair **adds to 1**

The first one is done for you.

fraction		decimal			
↓		↓			
$\frac{1}{4}$	+	0.75	=	1	

	$\frac{3}{10}$	+		=	1	
--	----------------	---	--	---	---	--

1 mark

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

1 mark

(b) Write the missing **fraction** so that the pair below **adds to 1**

Write the fraction as simply as possible.



fraction		decimal			
↓		↓			
	+	0.72	=	1	

2 marks

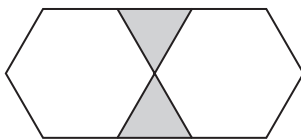


- 11 Here is a sequence of patterns made from hexagons and triangles.

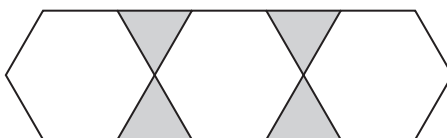
pattern number 1



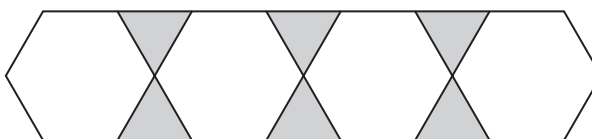
pattern number 2



pattern number 3



pattern number 4



The sequence of patterns continues.

- (a) In **pattern number 90**, how many hexagons and how many triangles will there be?



..... hexagons triangles

.....
.....
2 marks

- (b) In which pattern will there be **100 triangles**?



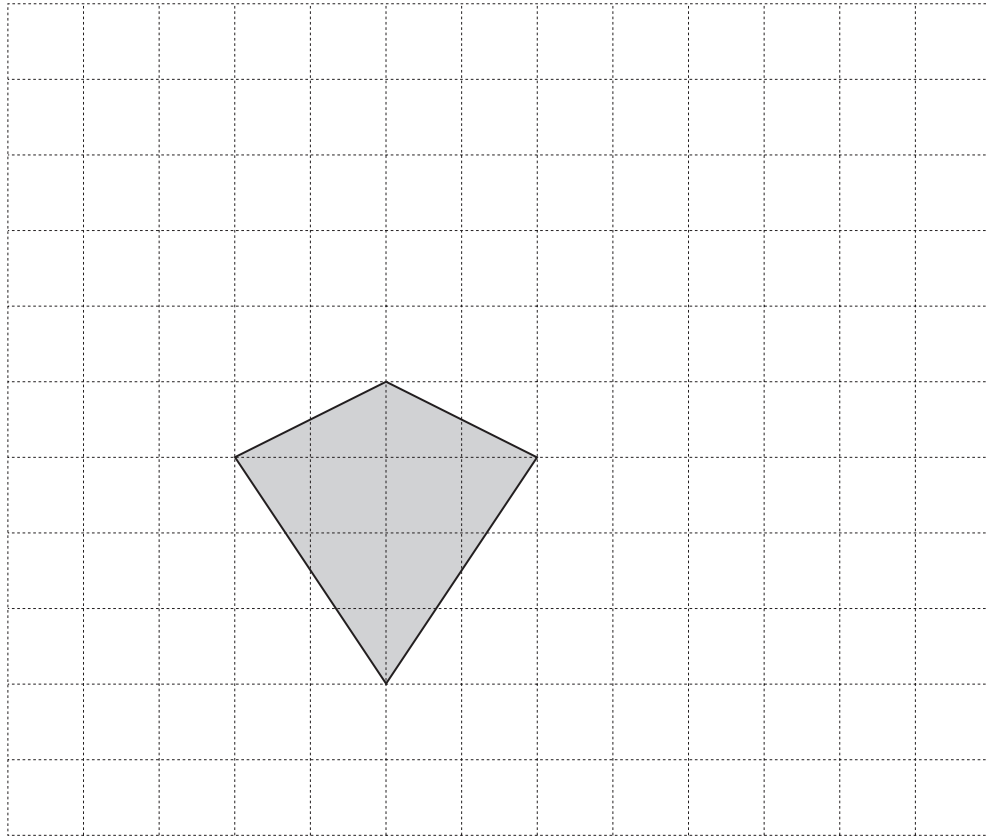
pattern number

.....
1 mark

12

The diagram shows a kite drawn on a square grid.

Draw **five more** of these kites to show how they tessellate.



2 marks



- 13 Use the expressions on cards P, Q, R, S and T to answer the questions below.

$$3a + 1$$

card P

$$2(a - 1)$$

card Q

$$a^2 - 2$$

card R

$$(a + 1)^2$$

card S

$$6 - a$$

card T

- (a) When $a = 3$, which card has the **highest value**?



card

1 mark

- (b) When $a = -3$, which card has the **highest value**?



card

1 mark

- (c) Which card's value is **never negative** whatever the value of a ?



card

1 mark


14

Look at the information in the box.

$$\frac{16}{80} = 20\%$$

The information can help you work out other number facts.

Fill in the missing numbers below.


$$\frac{32}{160} = \square \%$$

1 mark

$$\frac{16}{40} = \square \%$$

1 mark

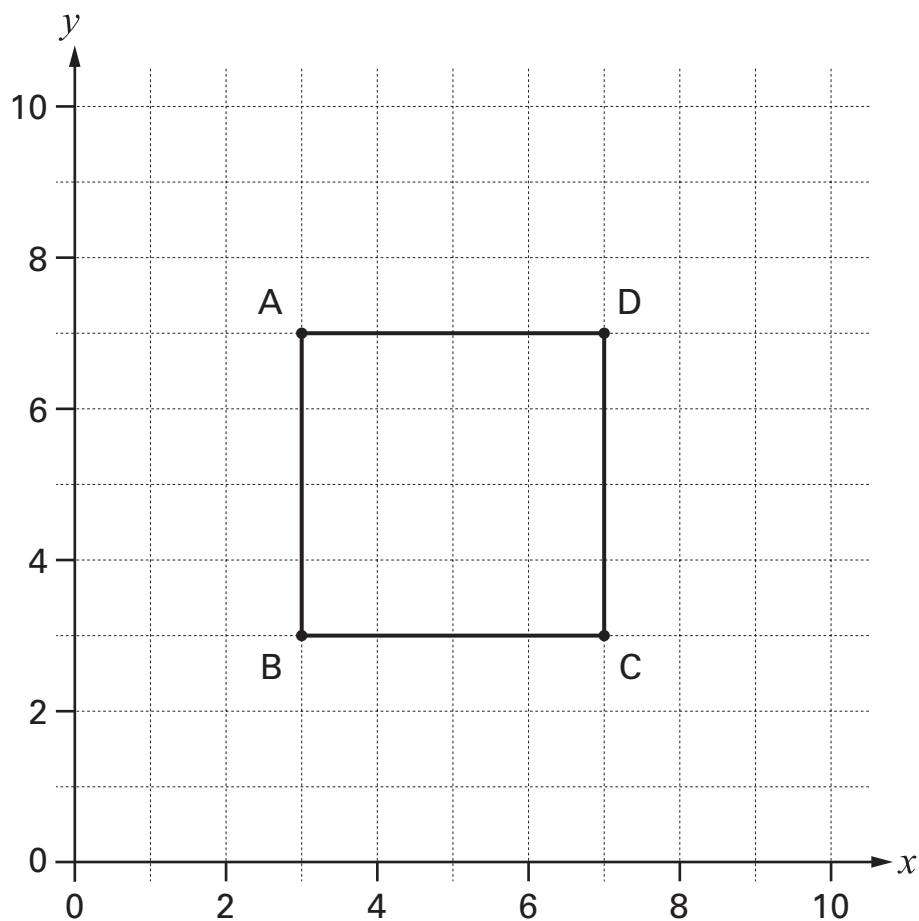
$$\frac{\square}{80} = 60 \%$$

1 mark



15

The graph shows square ABCD.



The equation of the straight line through **C** and **D** is $x = 7$

(a) What is the equation of the straight line through **B** and **C**?



.....

1 mark

(b) What is the equation of the straight line through **B** and **D**?



.....

1 mark

- 16 The pupils in a class recorded the length of time they took to do their maths homework.

The stem-and-leaf diagram shows the results, in minutes.

There are **25 pupils** in the class.

1	8	9								
2	1	2	3	3	6	6	6	6	7	
3	0	2	3	5	8	9				
4	0	2	4	5	5	7				
5	0	4								

1	8	means 18 minutes
---	---	------------------

- (a) The **shortest** time was **18** minutes.
What was the **longest** time?



..... minutes

1 mark

- (b) What length of time was the **mode**?



..... minutes

1 mark

- (c) What length of time was the **median**?



..... minutes

1 mark



17

Fill in the missing powers.

The first one is done for you.

$$8 \times 7 \times 7 = 8 \times 7^{\boxed{2}}$$



$$6.3 \times 15^2 \times 15^3 = 6.3 \times 15^{\boxed{}}$$

1 mark



$$\frac{3 \times 12^6}{12^2} = 3 \times 12^{\boxed{}}$$

1 mark

18 A triangle has three sides that are **13 cm**, **$y + 8$ cm** and **$3y + 1$ cm** long.
The triangle is **isosceles**.

What could the lengths of the sides be?

There are three different answers.

Write all three answers.



First answer: cm cm cm

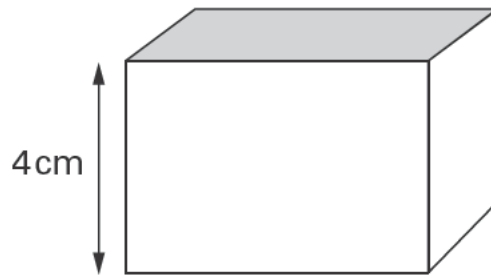
Second answer: cm cm cm

Third answer: cm cm cm

.....
.....
.....
3 marks



19 (a) The height of a cuboid is **4cm**.



Not drawn accurately

The volume of the cuboid is **100cm³**

What is the area of the shaded face?



..... cm²

1 mark

(b) The volume of another cuboid is **100cm³**

None of its dimensions is 4cm.

What could the dimensions of this cuboid be?

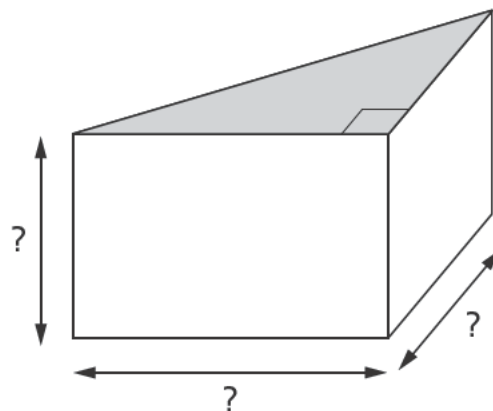


..... cm by cm by cm

1 mark

(c) A prism has a cross-section that is a right-angled triangle.

Its volume is **100cm³**



Not drawn accurately

What could the dimensions of this prism be?



..... cm by cm by cm

1 mark

20

A teacher tells her pupils:

Think of a whole number between 1 and 10

Multiply your number by 9, then

add the digits together, then

subtract 5

Use the code $A = 1$, $B = 2$, etc. to change your answer to a letter.

Think of a country beginning with your letter.

The teacher tells the pupils that they are thinking of Denmark and they are amazed.

Give a **mathematical reason** to show why this trick works.

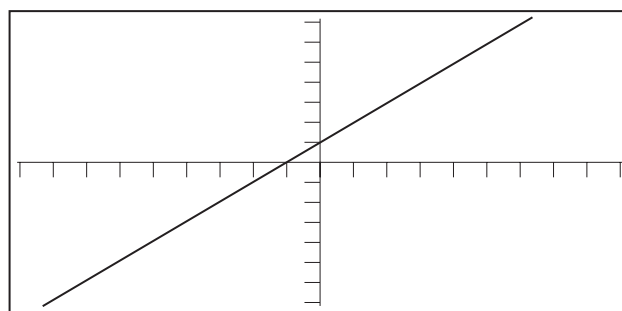


.....
.....
2 marks



21

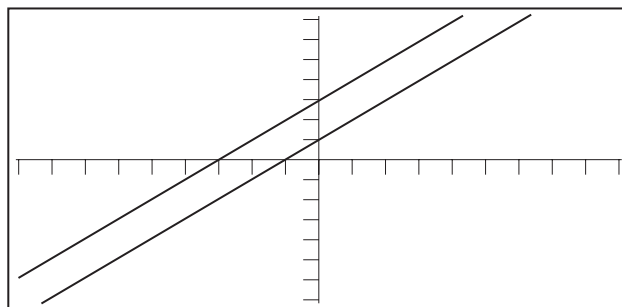
Asha uses a graphic calculator to draw the graph of $y = x + 1$



$$y = x + 1$$

Then she enters the equation of another line.

This new line is **parallel** to the line $y = x + 1$



- (a) Which equation below is the equation of the new line?

Put a ring round the correct answer.



$$y = 3x + 1$$

$$y = x + 3$$

$$3y = x + 1$$

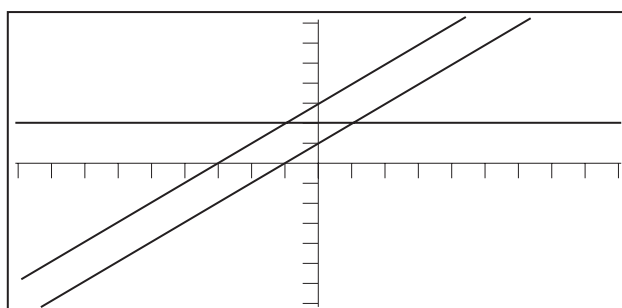
$$y = 3x + 3$$

1 mark

- (b) Then Asha enters the equation of a different line.

This line is **parallel** to the x -axis.

What is the equation of this line?



1 mark

22 Two travel agents offer a week in Spain for the same original price.

'Sun' travel agent
Week in Spain
Book early and get 20% off original price

'Relax' travel agent
Week in Spain
Book early and get 25% off original price

Jane and Rosa both **book early** for this holiday.

Jane uses 'Sun' travel agent. Rosa uses 'Relax' travel agent.

Jane pays **£16 more** than Rosa.

What was the original price of the holiday?



£

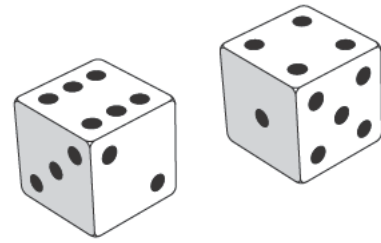
.....
2 marks



23

I have two fair dice, each numbered 1 to 6

I am going to throw the two dice.



What is the probability that the **sum** of the numbers on the dice will be a **square number**?



. . . .

2 marks

24 (a) Look at this inequality.

$$y + 2 < 3$$

Which values of y below make the inequality true?

Tick (✓) all correct values.



-2

-1

0

1

2

1 mark

(b) Now look at this inequality.

$$y + 2 < 3y$$

Which values of y below make the inequality true?

Tick (✓) all correct values.



-2

-1

0

1

2

1 mark

(c) James says:

'I can think of a value of y that makes both inequalities true.'

Show that James is **wrong**.



1 mark



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