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.
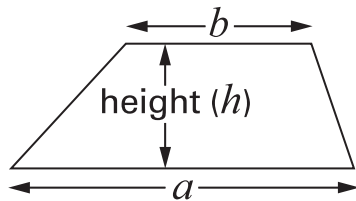
Calculators

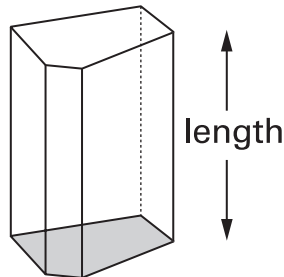You **must not** use a calculator to answer any question in this test.

Formulae
You might need to use these formulae.
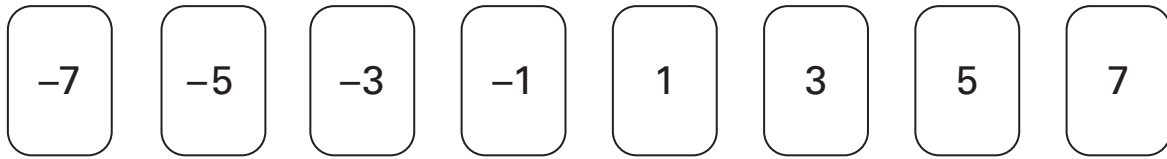
Trapezium

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

Prism

length

Volume = area of cross-section × length

1 Look at these number cards.

| −7 | −5 | −3 | −1 | 1 | 3 | 5 | 7 |

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

□ + □ = 2

1 mark

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

□ + □ + □ = −5

1 mark

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

□ + □ + □ + □ = 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

4

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

5 (a) Here are three numbers.

$$\boxed{4} \quad \boxed{8} \quad \boxed{9}$$

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

(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.

$$\boxed{2} \quad \boxed{} \quad \boxed{}$$

What else could the numbers be?

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

Write them on the cards below.

$$\boxed{2} \quad \boxed{} \quad \boxed{}$$

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

> 5 cm, 5 cm, 8 cm

2 marks

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

> 5 cm, 5 cm, 12 cm

Is she correct? Tick (✓) Yes or No.

☐ Yes   ☐ No

Explain how you know.

1 mark

7 A petrol station shows this information:

10 litres = 2.2 gallons
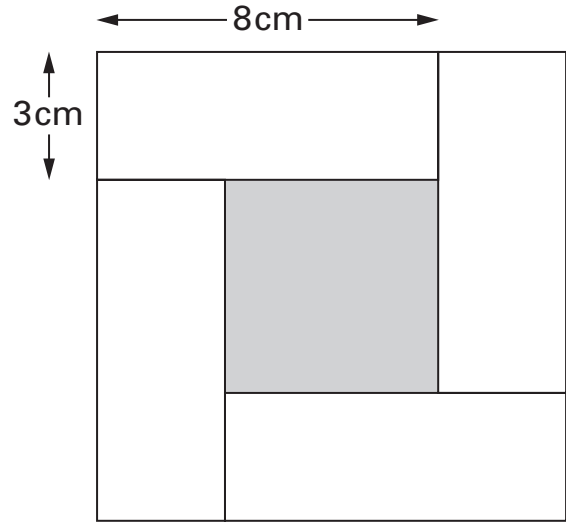
How many gallons is **50 litres**?

. . . . gallons

2 marks

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

8cm

3cm

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

$\dfrac{1}{4}$ + 0.75 = 1

$\dfrac{3}{10}$ + ☐ = 1

1 mark

$\dfrac{3}{5}$ + ☐ = 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
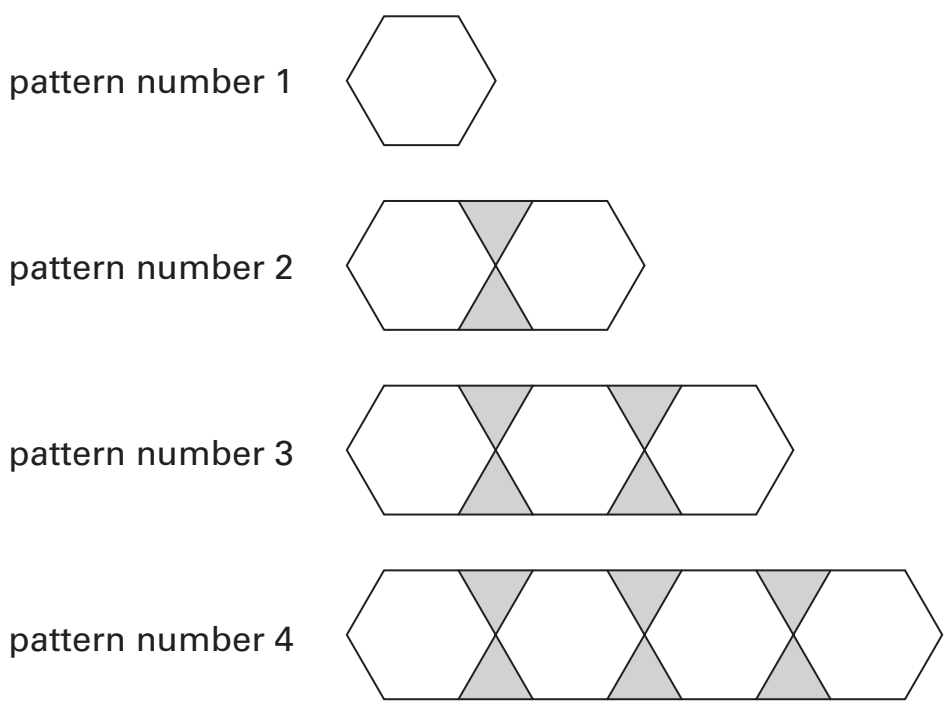
pattern number 4

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 ....
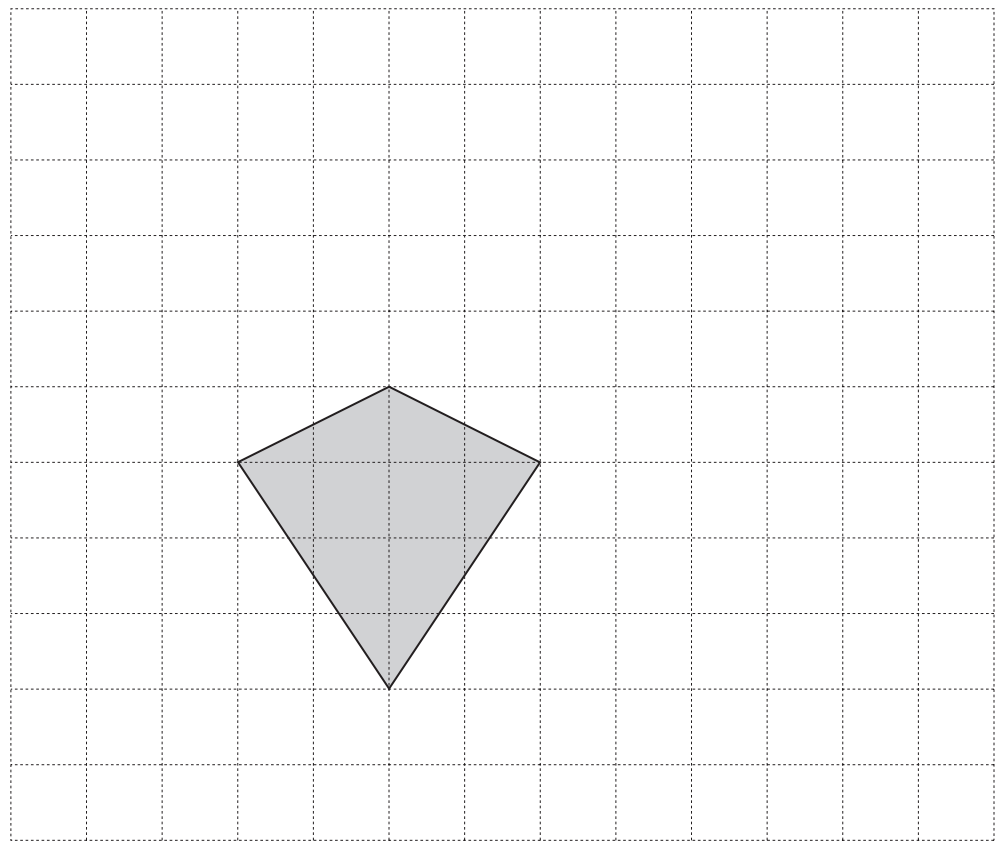
1 mark

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.

$3a + 1$	$2(a - 1)$	$a^2 - 2$	$(a + 1)^2$	$6 - a$
card P	card Q	card R	card S	card T

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

card ....

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

card ....

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

card ....

14 Look at the information in the box.

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

The information can help you work out other number facts.

Fill in the missing numbers below.

$$\frac{32}{160} \quad = \quad \boxed{}\%$$

1 mark

$$\frac{16}{40} \quad = \quad \boxed{}\%$$
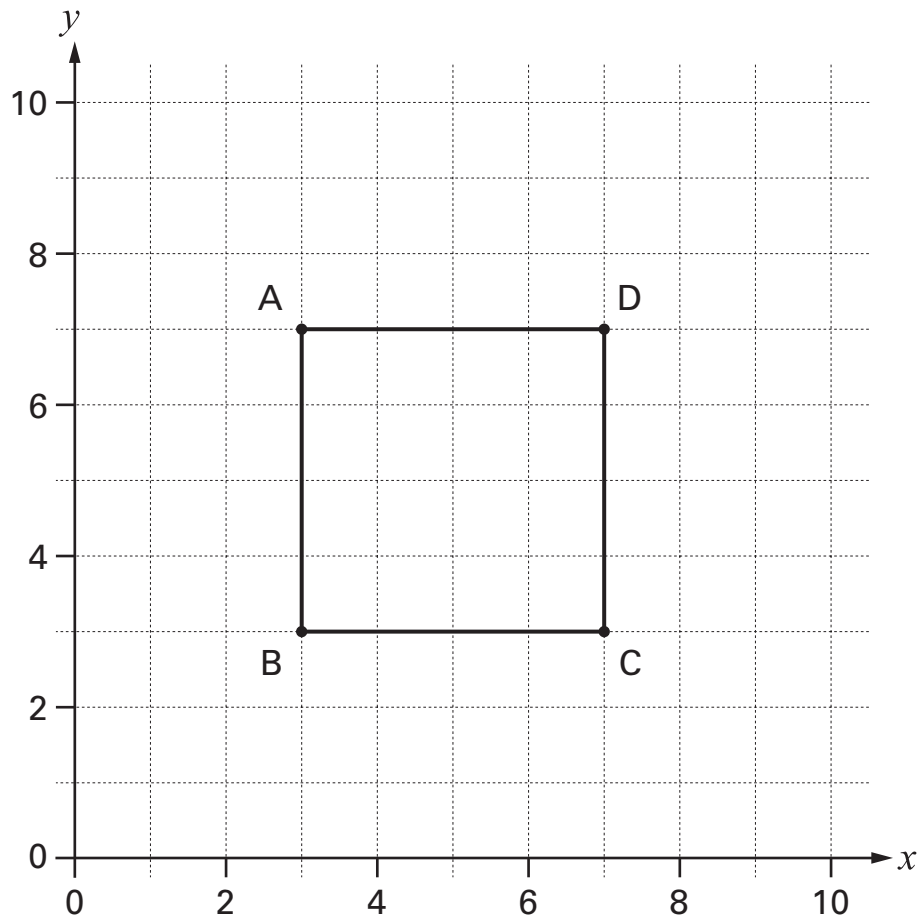
1 mark

$$\frac{\boxed{}}{80} \quad = \quad 60 \quad \%$$

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.

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

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

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

18   A triangle has three sides that are **13 cm**, *y* **+ 8 cm** and **3*y* + 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 **4 cm**.

4 cm
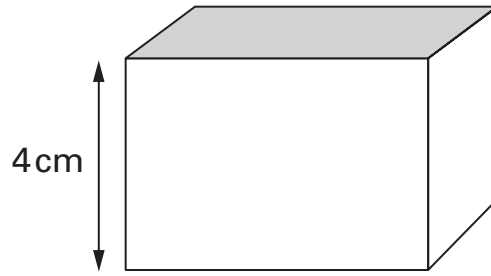
Not drawn
accurately

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

What is the area of the shaded face?
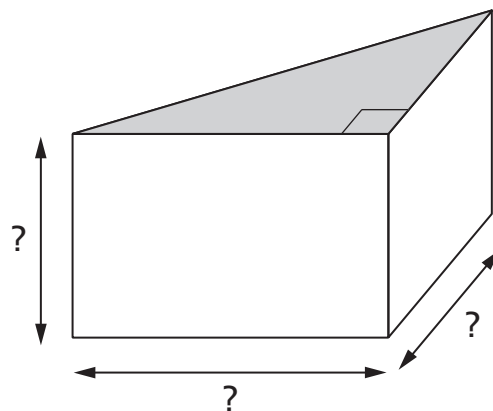
.... cm²

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

None of its dimensions is 4 cm.

What could the dimensions of this cuboid be?

.... cm by .... cm by .... cm

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

Its volume is **100 cm³**

?

?

?

Not drawn
accurately

What could the dimensions of this prism be?

.... cm by .... cm by .... cm

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.

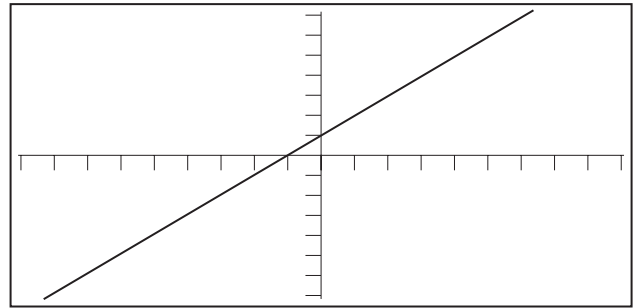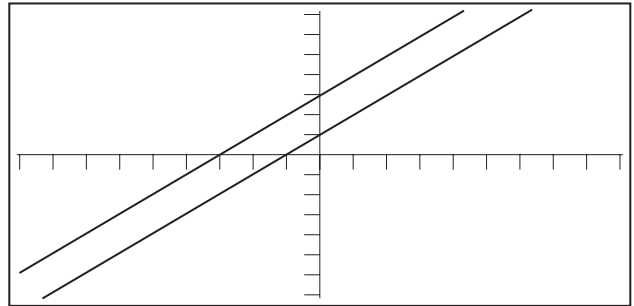Give a **mathematical reason** to show why this trick works.

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.

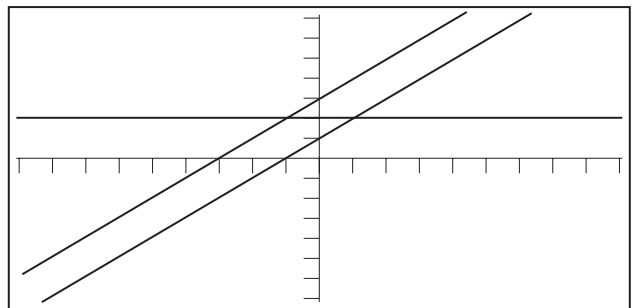$y = 3x + 1$ $y = x + 3$ $3y = x + 1$ $y = 3x + 3$

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	**'Relax'** travel agent
Week in Spain	Week in Spain
Book early and get **20% off** original price	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.

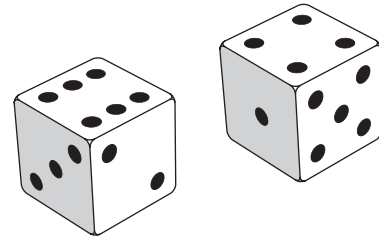What was the original price of the holiday?

£

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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