

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

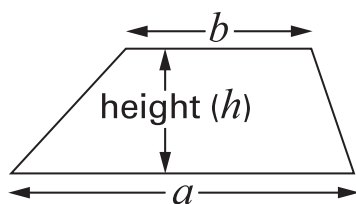


You **must not** use a calculator to answer any question in this test.

Formulae

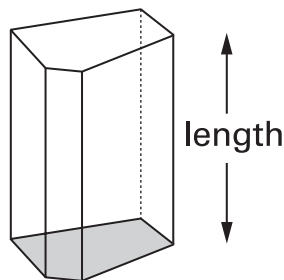
You might need to use these formulae.

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 litres = 2.2 gallons

How many gallons is **50 litres**?



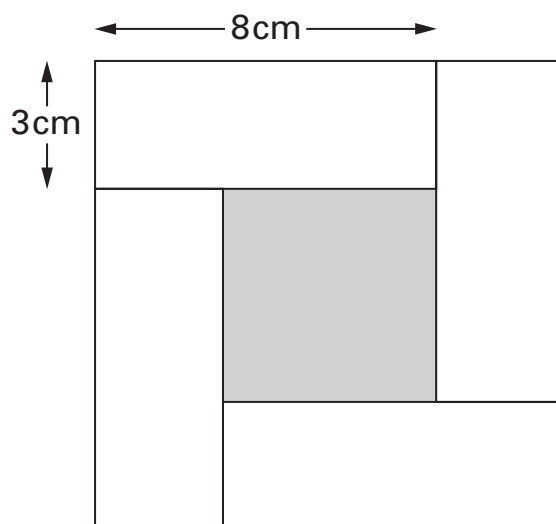
..... gallons

.....

.....

2 marks

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



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			
↓		↓			
<div style="border: 1px solid black; padding: 5px; display: inline-block;">$\frac{1}{4}$</div>	+	<div style="border: 1px solid black; padding: 5px; display: inline-block;">0.75</div>	=	1	

<div style="border: 1px solid black; padding: 5px; display: inline-block;">$\frac{3}{10}$</div>	+	<div style="border: 1px solid black; width: 60px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div>	=	1	

1 mark

<div style="border: 1px solid black; padding: 5px; display: inline-block;">$\frac{3}{5}$</div>	+	<div style="border: 1px solid black; width: 60px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div>	=	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			
↓		↓			
<div style="border: 1px solid black; width: 60px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div>	+	<div style="border: 1px solid black; padding: 5px; display: inline-block;">0.72</div>	=	1	

...

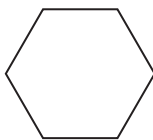
2 marks



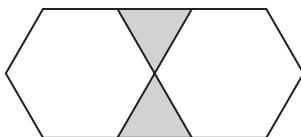
11

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

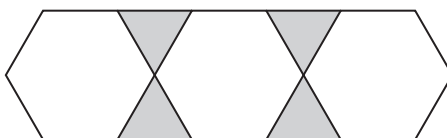
pattern number 1



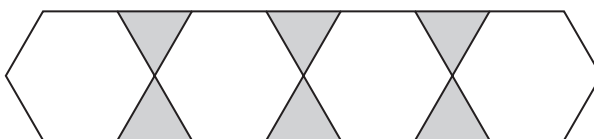
pattern number 2



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**?



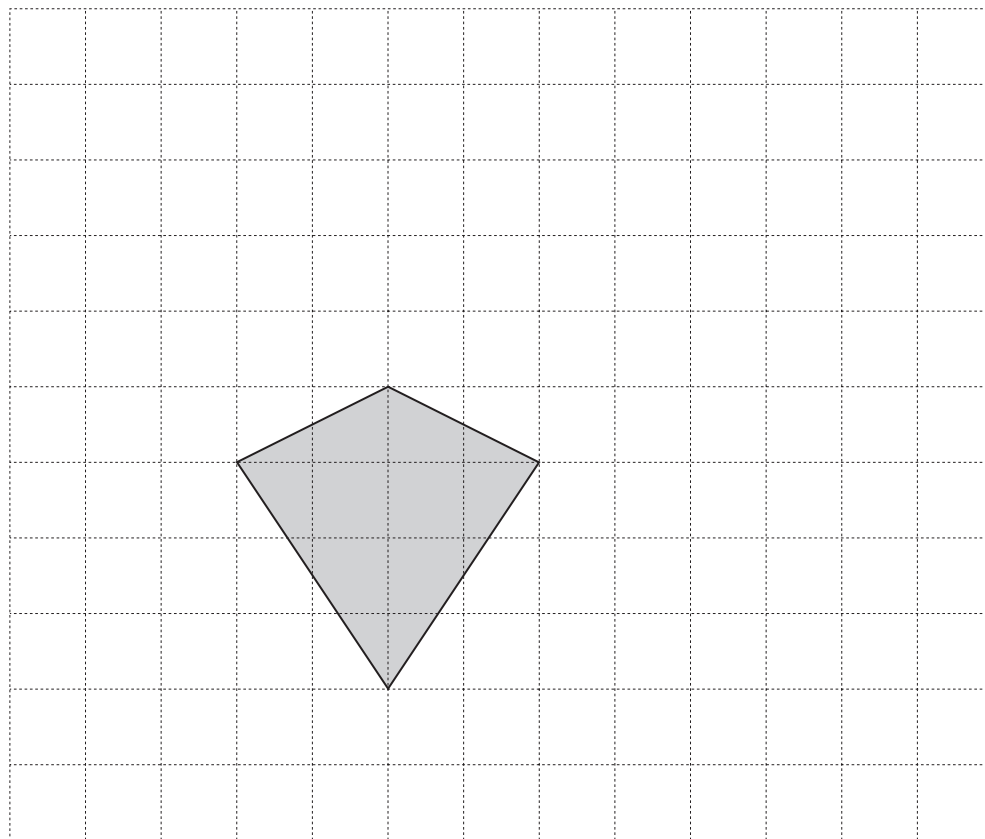
pattern number

.....
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.


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

1 mark

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

1 mark

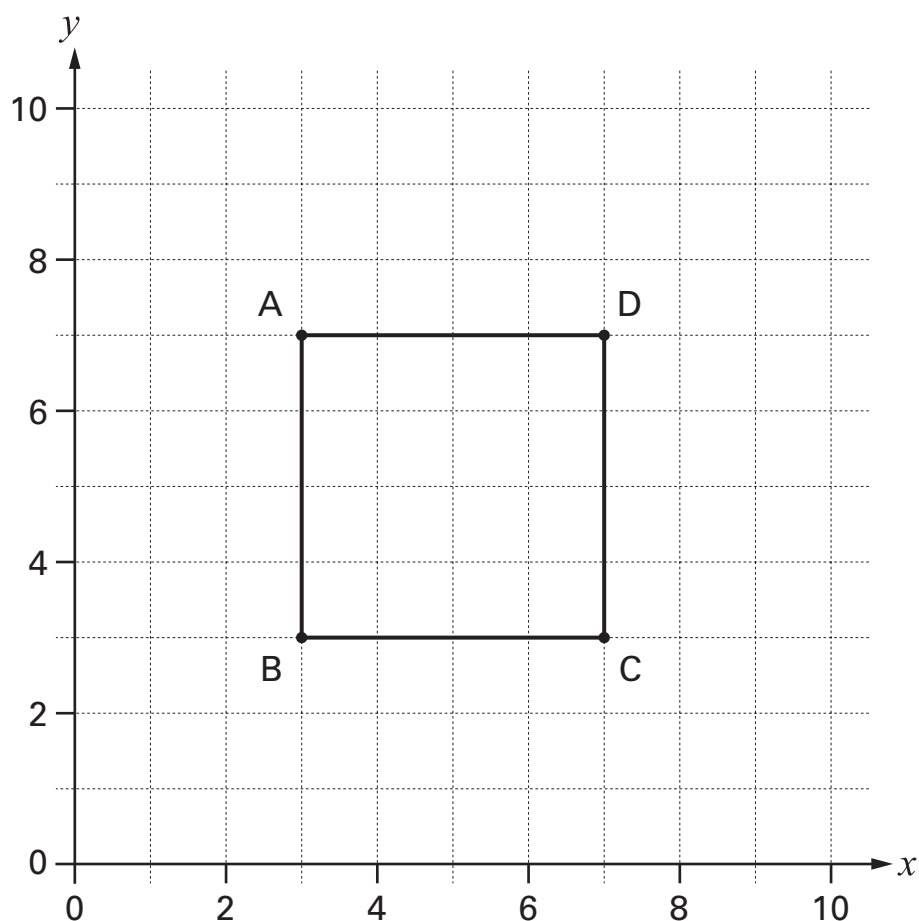
$$\frac{\boxed{}}{80} = 60 \%$$

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

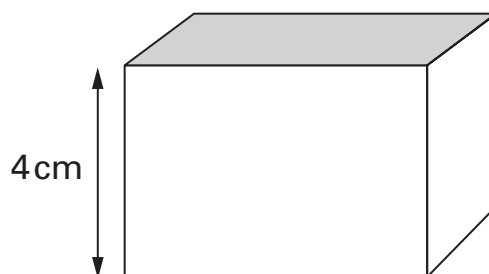
Second answer: cm cm cm

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 **100cm^3**

What is the area of the shaded face?



..... cm^2

1 mark

- (b) The volume of another cuboid is **100cm^3**

None of its dimensions is 4cm.

What could the dimensions of this cuboid be?

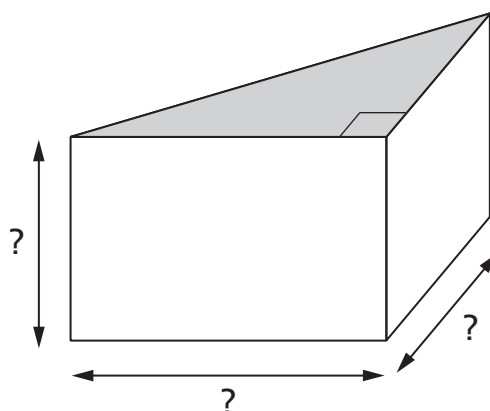


..... cm by cm by cm

1 mark

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

Its volume is **100cm^3**



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.

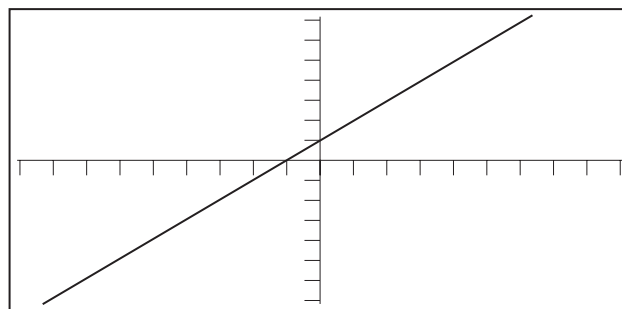


.....
.....
2 marks



21

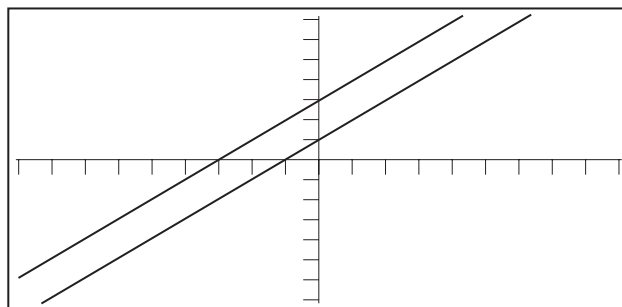
Asha uses a graphic calculator to draw the graph of $y = x + 1$



$$y = x + 1$$

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.



$$y = 3x + 1$$

$$y = x + 3$$

$$3y = x + 1$$

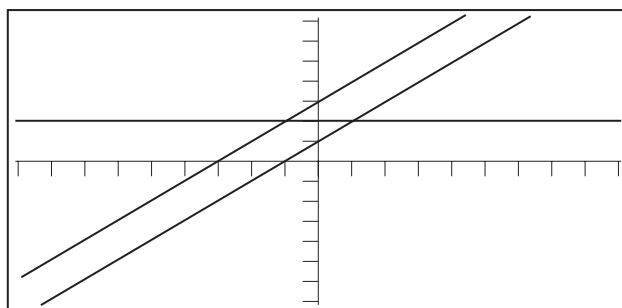
$$y = 3x + 3$$

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?



£

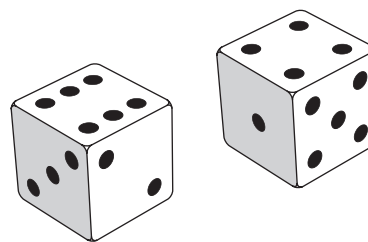
.....
2 marks



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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