Year 8
Maths Booklet

Name:

Level:

Target:

Year 8 Homework

Level 4

1. Simplify

(a) 3a + 4a

(b) 6b + 6b + 3b

(c) 3x - x

(d) 5y + 3x + 3y + 2x

Level 5

2. (a) When **x = 5**, work out the values of the expressions below.

$$2x + 13 = \text{.........................}$$

$$5x - 5 = \text{.........................}$$

$$3 + 6x = \text{.........................}$$

(b) When $2y + 11 = 17$, work out the value of y
Show your working.

$y = \text{......................}$

Level 6

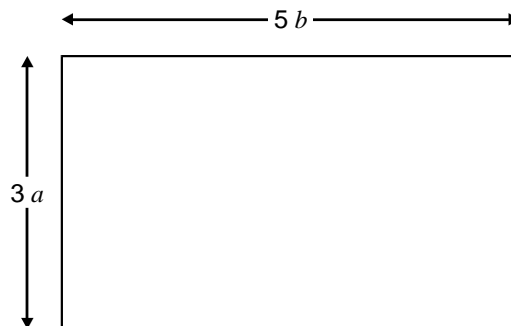**3.** Here are two algebra cards.
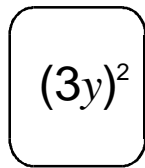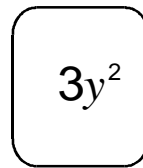
$$(3y)^2$$

Card A

$$3y^2$$

Card B

When **y = 9**, the value of card A is 729

When **y = 9**, the value of card B is **not** 729

What is the value of card B when $y = 9$?

✎ . . . .

4. (a) The diagram shows a rectangle. Its dimensions are 3*a* by 5*b*

$$\longleftarrow 5\,b \longrightarrow$$

$3\,a$

Write **simplified expressions** for the area and the perimeter of this rectangle.

✎

Area: ....

Perimeter: ....

(b) A different rectangle has **area 12a^2** and **perimeter 14a.**
What are the dimensions of this rectangle?

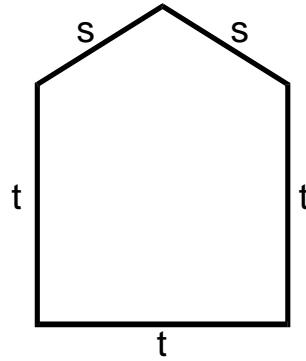✎ Dimensions: .... by ....

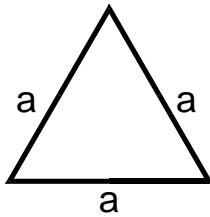## Year 8 Unit Assessment – Algebra 2
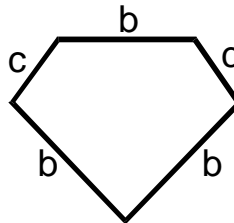
Level 4

1.

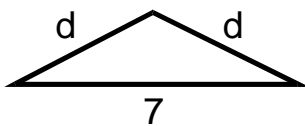The perimeter of this shape is 3t + 2s.

p = 3t + 2s

Write an expression for the perimeters of each of these shapes.
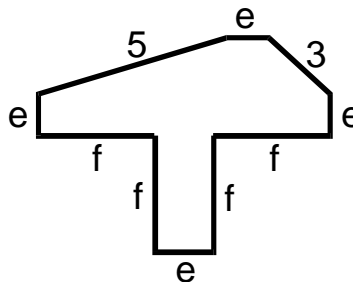Write each expression in its simplest form.

p =

p =

p =

p =

2.   Simplify

4r +5r + 3r − 2r = …………………….

Level 5

3.   Match each expression with the correct number when **x = 6**

Expression	Number
	5
	6
	7
x	9
$x - 1$	10
$2(x - 1)$	11
x^2	12
	14
	25
	36
	66

4.   Simplify these expressions.
The first one is done for you.

$$n + 1 + 2 \longrightarrow n + 3$$

$$2n + 3n \longrightarrow \boxed{}$$

$$3n + 5 + 4n - 2 \longrightarrow \boxed{}$$

Level 6

5. Write each expression in its simplest form.
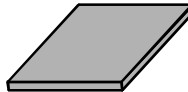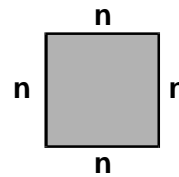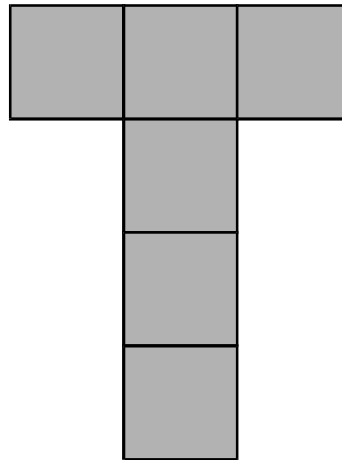
$$(3d + 5) + (d - 2)$$

…………………

$$3m - (-m)$$

…………………

6. This is a **square tile**.

The edge of the tile is **n** centimetres long.
The **perimeter** of the tile is **4n** centimetres.

n

n **n**

n

This **T-shape** is made with **6 square tiles**.

(a) Write an **expression** for the **perimeter** of the **T-shape.**
The expression should be a **number multiplied by n.**

....

(b) The perimeter of the T-shape is **28** centimetres**.**

Use your expression from part (a) to write an **equation** involving **n**.
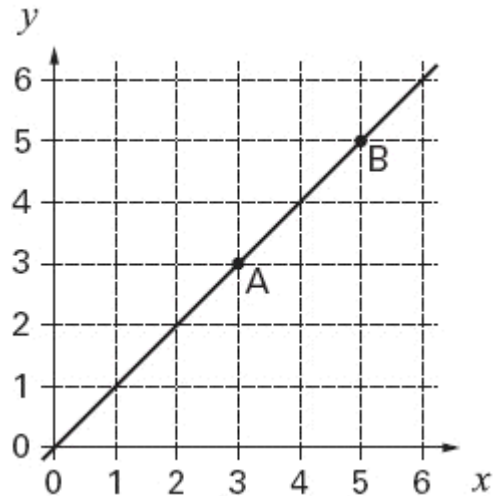
Solve your equation to find the **value** of **n.**

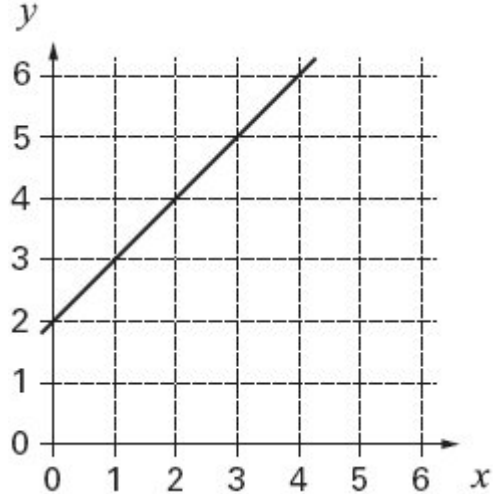**n** = ...

Level 4

1. Here is a line on a square grid.
Points A and B are on the line.

(a) The coordinates of point A are (3 , 3)
What are the coordinates of point B?

✎ (.............. , ...)

(b) Here is a different line on the square grid.

Write the coordinates of three points on this line.

✎ (.............. , ...)

(.............. , ...)

(.............. , ...)

Level 5

2. A company sells books using the internet.
The graph shows their delivery charges.

✎

(a) Use the graph to fill in the values in this table.

Number of books	Delivery charge (£)
8	
9	

(b) For every extra book you buy, how much more must you pay for delivery?

✎ .... p
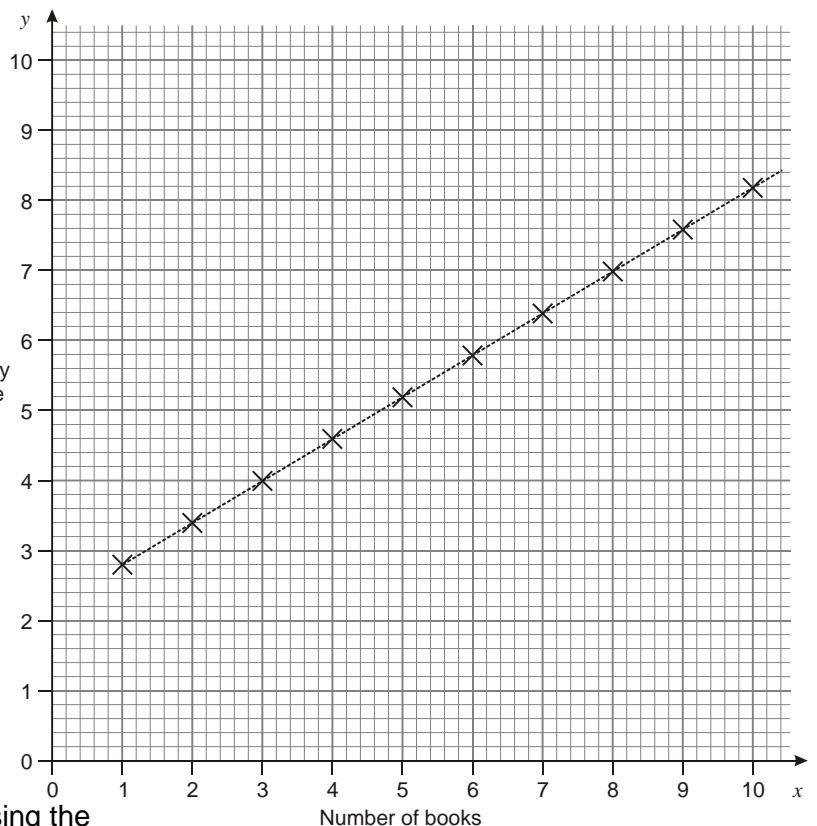
(c) A second company sells books using the

internet. Its delivery charge is £1.00 per book. On the graph opposite, draw a line to show this information.

(d)   Complete the sentence.

Delivery is cheaper with the first company if you buy at least ………………… books.

Level 6

3.   The graph shows a straight line.
         The equation of the line is $y = 3x$

Does the point (25, 75) lie on the straight line $y = 3x$?
Tick (✓) Yes or No.

Yes ☐   No ☐

Explain how you know.
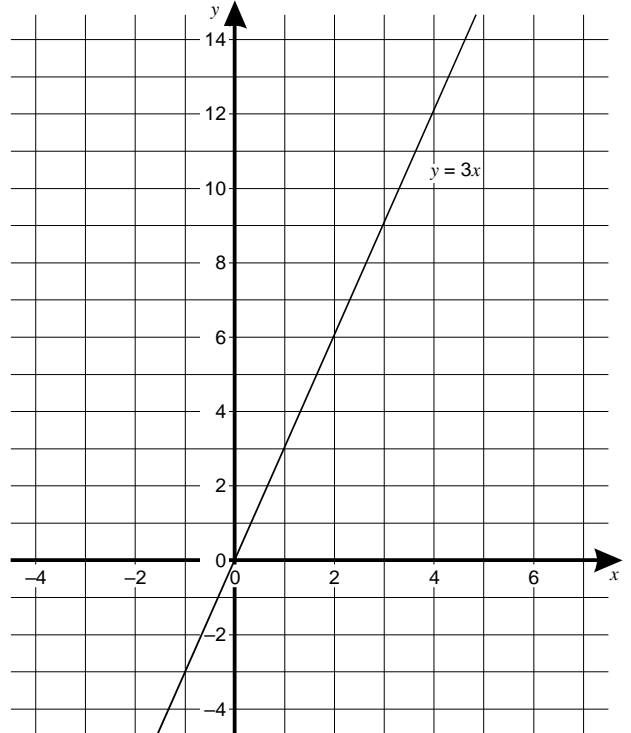
4.   The graph shows a straight line.

(a)   Fill in the table for some of the points on the line.

(x, y)	(,)	(,)	(,)
x + y			

(b)   Write an equation of the straight line.

……………….........................

(c)   On the graph, draw the straight line that has the equation $x + y = 6$

Level 4

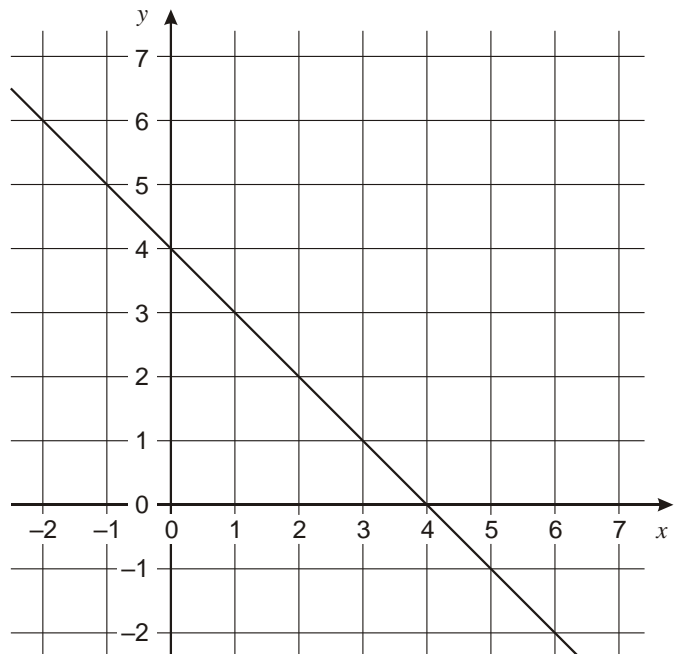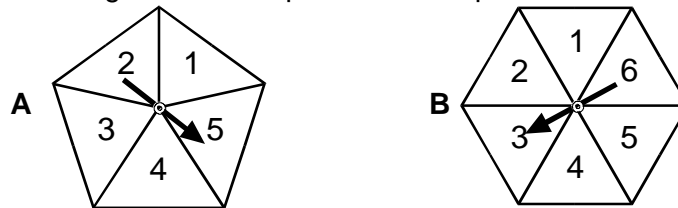**1.**   (a)   The diagram shows spinner A and spinner B.

Which spinner gives you the best chance to get 1?
Tick (✓) your answer.

spinner A ☐   spinner B ☐   doesn't matter ☐

Explain why you chose that answer.

(b)   Here are two different spinners.
The spinners are the same shape but different sizes.
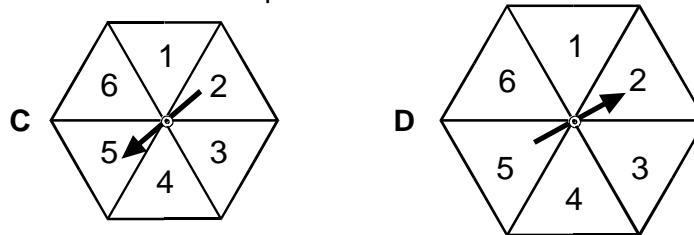
Which spinner gives you the best chance to get 3?
Tick (✓) your answer.

spinner C ☐   spinner D ☐   doesn't matter ☐

Explain why you chose that answer

(c)   Each section of spinner E is the same size.
Fill in numbers on spinner E so that both of these statements are true.
It is equally likely that you will spin 3 or 2
It is more likely that you will spin 4 than 2
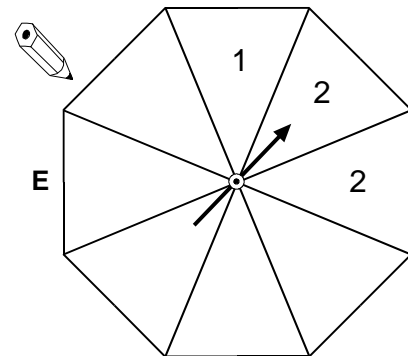
Level 5

2.   (a)   A different spinner has eight equal sections.

What is the probability of scoring 4 on the spinner?

What is the probability of scoring an even number on the spinner?

(b)   Another different spinner has six equal sections and six numbers.

On this spinner, the probability of scoring an even number is $\frac{2}{3}$

The probability of scoring 4 is $\frac{1}{3}$
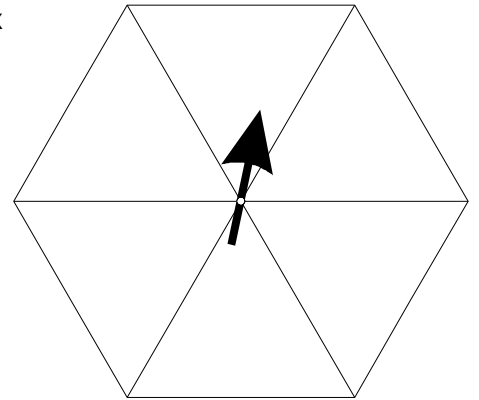
Write what numbers could be on this spinner.

Level 6

3.   I have two fair dice.
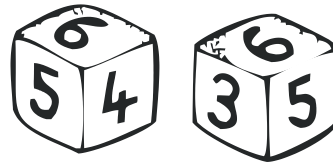
Each of the dice is numbered 1 to 6.

(a)   The probability that I will throw double 6 (both dice showing number 6) is
$$\frac{1}{36}$$
What is the probability that I will not throw double 6?
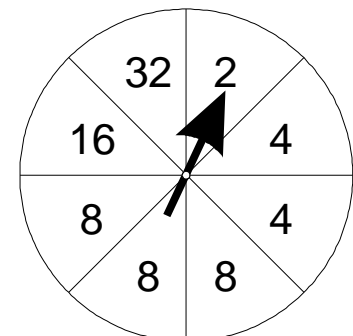
…………………………..

(b)   I throw both dice and get double 6. Then I throw the dice again.
Tick the box that describes the probability that I will throw double 6 this time.

less than $\frac{1}{36}$ ☐

$\frac{1}{36}$ ☐

more than $\frac{1}{36}$ ☐

Explain your answer.

            I start again and throw both dice.
(c)   What is the probability that I will throw double 3 (both dice showing 3)?

…………………………..

(d)   What is the probability that I will throw a double?
            (It could be double 1 or double 2 or any other double.)

…………………………..

Level 4

1. (a) Joe has these cards:

| 8 △ | 3 ■ | 9 △ | 4 ■ | 5 △ | 2 △ | 7 ■ | 9 ■ |

Sara takes a card without looking.
Joe says:
Explain why Joe is **wrong**.

On Sara's card, ■ is **more likely** than △

Here are some words and phrases:

| impossible | not likely | certain | likely |

Choose a word or a phrase to fill in the gaps below.

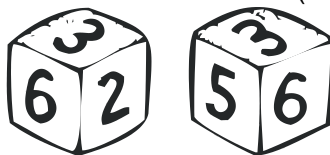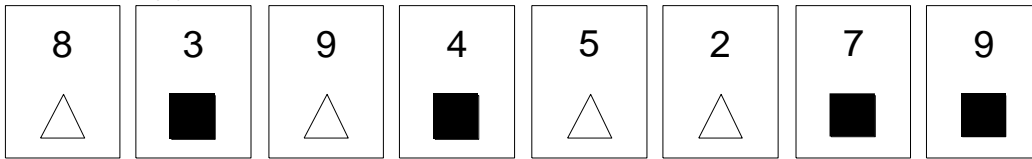It is .... that the number on Sara's card will be **smaller than 10.**

It is .... that the number on Sara's card will be an **odd number.**

(b) Joe still has these cards:

| 8 △ | 3 ■ | 9 △ | 4 ■ | 5 △ | 2 △ | 7 ■ | 9 ■ |
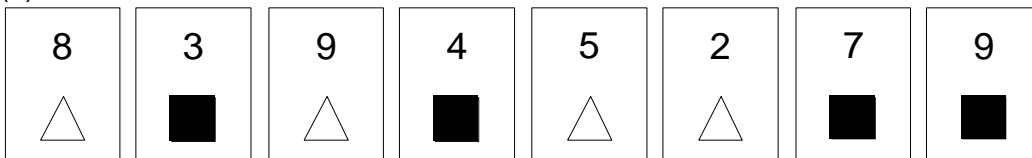
Joe mixes them up and puts them face down on the table.
Then he turns the first card over, like this:

| 5 △ | | | | | | |

Joe is going to turn the next card over.
Complete this sentence:

On the next card, ... is **less likely** than ....

The number on the next card could be higher than 5 or lower than 5.
Which is **more likely**? Tick the correct box.

☐ higher than 5   ☐ lower than 5   ☐ cannot tell

Explain your answer.

Level 5

2. A machine sells sweets in five different colours:
red, green, orange, yellow, purple.

You cannot choose which colour you get.
There are the same number of each colour in the machine.
Two boys want to buy a sweet each.

Ken says:

> I **don't** like **yellow** ones or **orange** ones.

Colin says:

> I like **all** of them.
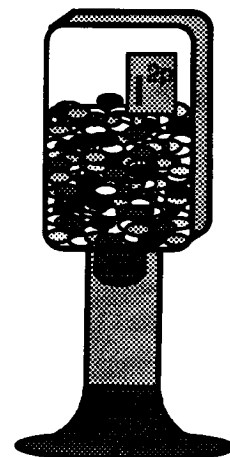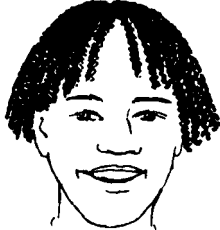
(a)   What is the probability that Ken will get a sweet that he likes?

(b)   What is the probability that Colin will get a sweet that he likes?

(c)   Draw an arrow on the scale to show the probability that Ken will get a sweet that he likes.

0   1
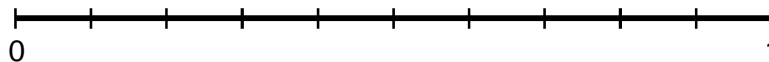
(d)   Draw an arrow on the scale to show the probability that Colin will get a sweet that he likes.

0   1
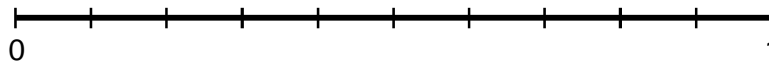
(e)   Mandy buys one sweet.
The arrow on this scale shows the probability that Mandy gets a sweet that she likes.

Mandy

0   1
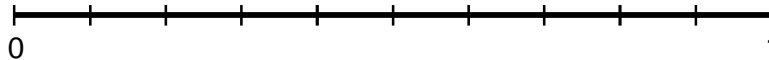
Write a sentence that could describe which sweets Mandy likes.

Level 6

3.   I have two bags of counters.

first bag

two counters,
1 blue, 1 red

second bag

three counters,
1 blue, 1 red, 1 yellow

I am going to take a counter at random from both bags.

(a)   Complete the table to show what colours they might be.
        The first one is done for you.
        You will not need to use all the rows.

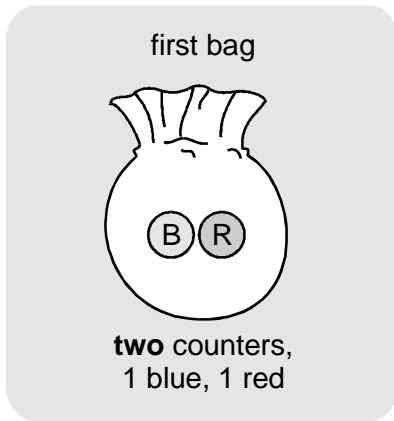| first bag	second bag
B	B

(b)   What is the probability that both counters will be the same colour?

4.   A spinner has the numbers 1 to 4 on it.

The probability of spinning a number 4 is **0.1**
The probability of spinning a number 1 is **0.6**
The probability of spinning a number 2 is the same as
the probability of spinning a number 3

Calculate the probability of spinning a number 3

1.   Mark did a survey.

He asked pupils in his school:

'Do you like the colour of the school uniform?'

The table shows his results.

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	Yes	No	Don't know
Year 7	35	17	2
Year 8	20	24	5
Year 9	19	17	6

(a) How many pupils from **year 7** took part in the survey?

....

1 mark

(b) Altogether, more pupils said **'Yes'** than said **'No'**.
How many more?

....

1 mark

(c) Mark asked the same question to **40 pupils** in **year 11**
25% said 'Yes'. **50%** said 'No'. The rest said 'Don't know'.

Complete the table to show how many pupils from year 11 gave each answer.

	Yes	No	Don't know
Year 11			

2 marks

(d)   Anna does a different survey with pupils in year 9
She wants to know if more boys than girls have pets.

She asks:

'Do you have a pet?'

What labels should Anna use on her results table?
Fill in the missing labels.

	✎	✎ ....
✎		
✎		

1 mark

2.   **Nepal**

There are high mountains in Nepal.
At different heights, the temperature is different.
The graph shows information about temperatures in one month.

Range in temperature (minimum to maximum)

For example:

At 1000 metres, the maximum temperature is 30°C.

(a)   At **3000** metres, what is the **minimum** temperature?

✎ ....°C

1 mark

(b)   At **5000** metres, the minimum temperature is **–3°C**.

The **range** in temperature is **15°C**.
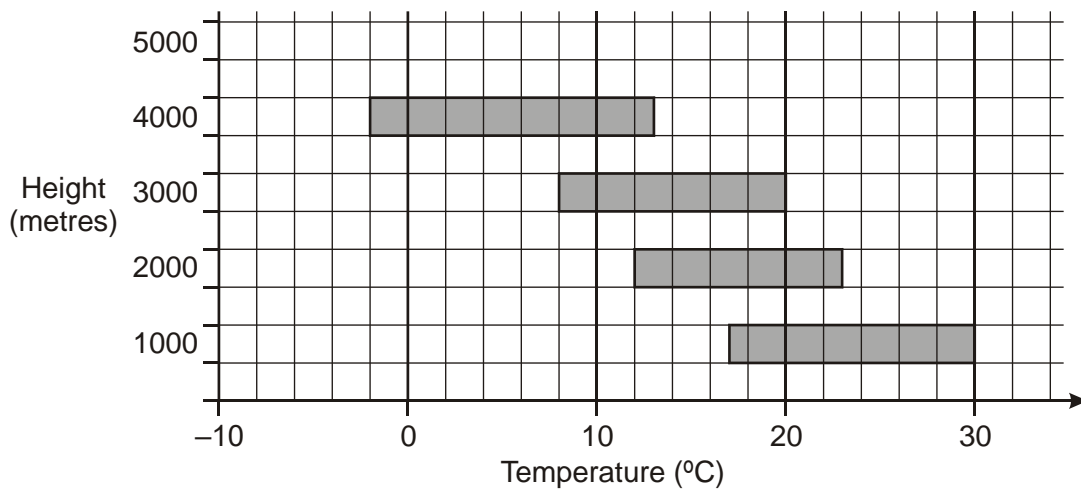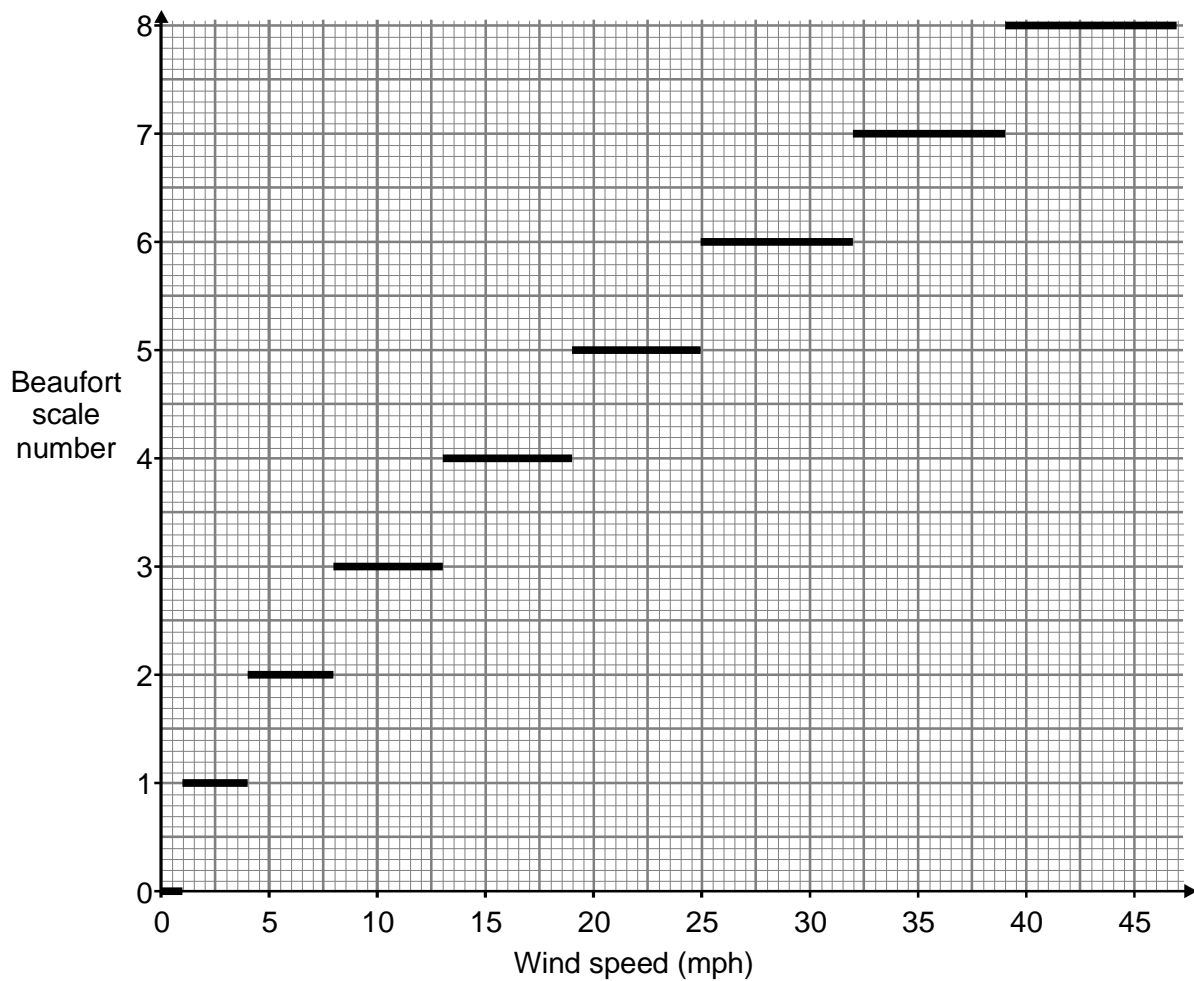
On the graph above, draw a bar to show this information.

2 marks

3.   Beaufort scale

Wind speed is described using the Beaufort scale.

The graph shows information about part of this scale.

(a)   At **20 mph,** the Beaufort scale number is **5**.

Complete this sentence:

✏ At **40 mph**, the Beaufort scale number is . . . . . .

1 mark

(b)   You cannot tell from this graph what the beaufort scale number is when the wind speed is **25 mph.**

Explain why not.

✎

<div align="right">1 mark</div>

4.   Mice

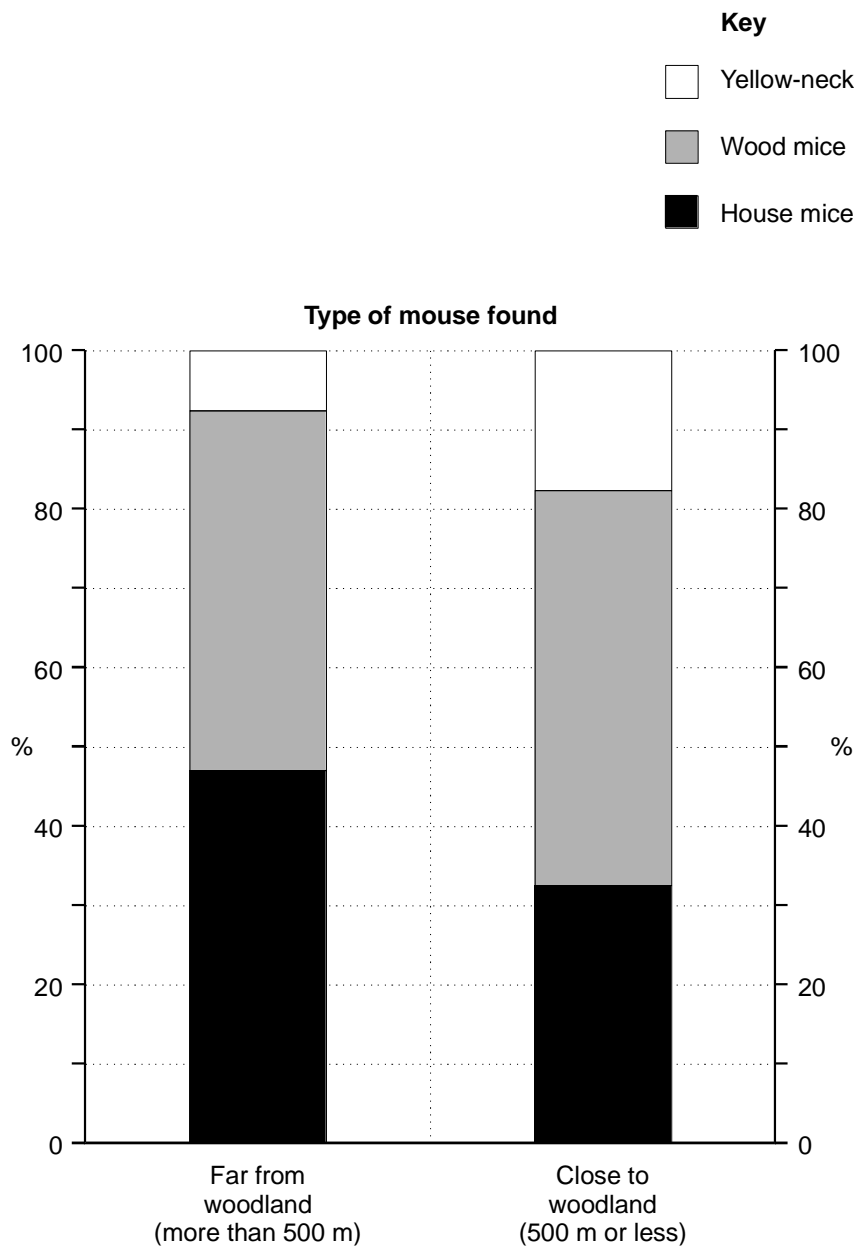Three types of mice might come into our homes.

Some mice are more likely to be found in homes far from woodland. Others are more likely to be found in homes close to woodland.

The bar charts show the **percentages of mice** that are of each type.

Key

☐ Yellow-necked mice

▨ Wood mice

■ House mice

Type of mouse found

| | Far from woodland (more than 500 m) | Close to woodland (500 m or less) |

Use the bar charts to answer these questions.

(a) About what percentage of mice in homes **close to woodland** are **wood mice**?

.... %

1 mark

(b) About what percentage of mice in homes **far from woodland** are **not** wood mice?

.... %

1 mark

(c) The **black** bars show the percentages for house mice. One of the black bars is taller than the other.

Does that mean there **must be more** house mice in homes far from woodland than in homes close to woodland?

Tick (✔) Yes or No.

Yes ☐   No ☐

Explain your answer.

1 mark

5. Speed bumps

Bumps are built on a road to slow cars down.

The stem-and-leaf diagrams show the speed of **15 cars** before and after the bumps were built.

Key:

2 | 3   means 23 mph
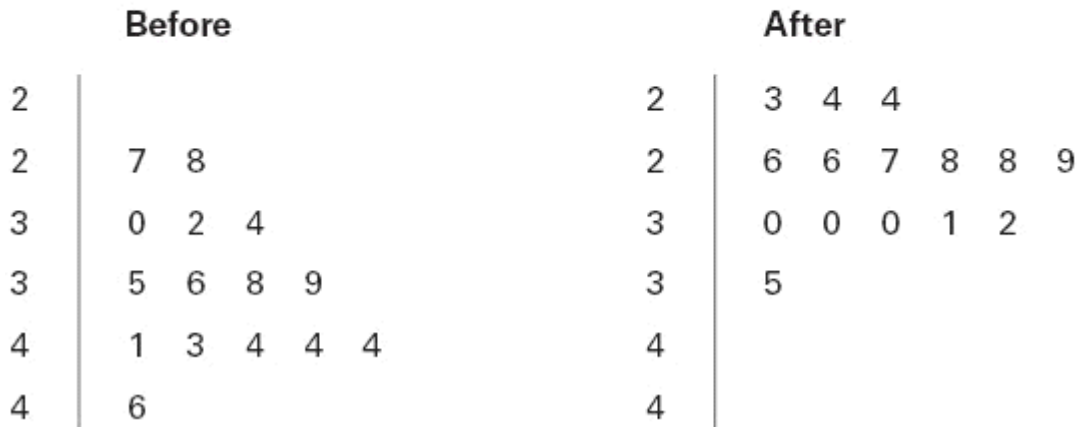
Before						
2						
2	7	8				
3	0	2	4			
3	5	6	8	9		
4	1	3	4	4	4	
4	6					

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

Use the diagrams to write the missing **numbers** in these sentences.

Before the bumps:

The maximum speed was ………………… mph, and

…………………… cars went at more than 30mph.

After the bumps:

The maximum speed was ………………… mph, and

………………… cars went at more than 30mph.

2 marks

Level 4

1.   Write one number at the end of each equation to make it correct.
Example

$$26 + 34 = 16 + 44$$

(a)   38 + 17 = 28 + …………..……….……..

(b)   38 – 17 = 28 – …………..……….……..

(c) 40 × 10 = 4 × …………..……….………..

(d) 7000 ÷ 100 = 700 ÷ …………..………….……..

Level 5

2. (a) Complete the sentences.

.... out of 10 is the same as 80%

15 out of 20 is the same as .... %

(b) Complete the sentence.

.... out of ……………. is the same as 5%

Now complete the sentence using different numbers.

.... out of ……………. is the same as 5%
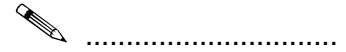
Level 6

3.

> There are **20 questions** in a quiz.
>
> A **correct** answer scores **2 points**. An **incorrect** answer **loses 1 point**.
> A question not answered scores 0 points. A negative total is possible.

(a) What are the maximum and minimum points you could get on the quiz?

maximum ……………… minimum ………………

(b) A pupil answers 10 of the 20 questions.
8 are correct.
How many points does he score?
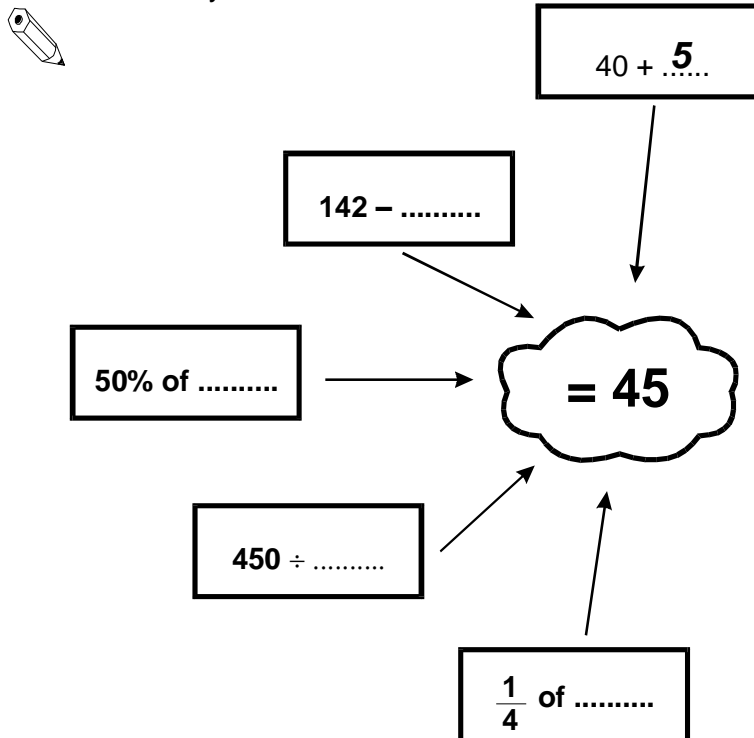
✏ ....

(c)   Complete the table to show 3 different ways to score 24 points.

Number of answers that are correct	Number of answers that are incorrect	Number of questions that are not answered
12	0	8

Level 4

1.   (a)   Fill in the missing numbers so that the answer is **always 45.**
The first one is done for you.

40 + ..**5**..

142 – ....

50% of ....

= 45

450 ÷ ....

$\frac{1}{4}$ of ....

(b)   Fill in the gaps below to make the answer 45.
You may use any of these signs: +   −   ×   ÷

28   2   31   =   45

Level 5

2.   What is twenty per cent of eighty pounds?

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. . . .

3. (a) What is **30%** of **250**?

. . . .
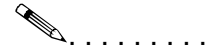
(b) I'm thinking of a number.

| **10%** of my number is **84** |
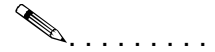
Show calculations and explain how you can work out that **15%** of my number is **126**
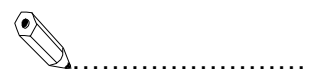
What is **12½%** of my number?

. . . .

4. How many thirds are there in two?

. . . .

Level 6

5. The table shows the land area of each of the World's continents.

continent	land area (in 1 000 km^2)
Africa	30 264
Antarctica	13 209
Asia	44 250
Europe	9 907
North America	24 398
Oceania	8 534
South America	17 793
World	**148 355**

(a) Which continent is approximately 12% of the World's land area?

. . . .

(b) What percentage of the World's land area is **Antarctica**? Show your working.

.... %

(c)   About **30%** of the World's area is **land**. The rest is water.

The amount of **land** in the World is about **150 million km^2.**

Work out the approximate **total area** (land and water) of the World.

Show your working.

.... million km^2

....

Level 4

1.   Here is some information about a school.

> There are **3 classes** in **year 8**. Each class has **27 pupils.**
>
> There are **4 classes** in **year 9**. Each class has **25 pupils.**

(a)   Use the information to match each question with the correct calculation.

The first one is done for you.

Question	**Calculation**

3 + 4

How many **classes** are there altogether in years 8 and 9?

3 – 4

4 – 3

There are more **classes** in year 9 than in year 8. How many more?

(3 × 27) + (4 × 25)

(3 + 27) + (4 + 25)

How many **pupils** are there altogether in years 8 and 9?

(3 × 27) – (4 × 25)

(4 + 25) – (3 + 27)

There are more **pupils** in year 9 than in year 8. How many more?

(4 × 25) – (3 × 27)

(b)   Use the information about the school to write what the missing question could be.

Question		Calculation
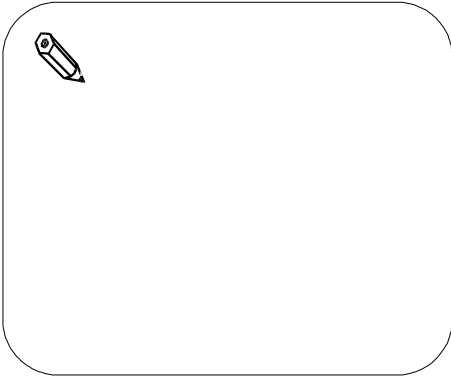
4×25

Level 5

1. (a) The table shows the lengths of some rivers to the nearest km.
Write their lengths rounded to the nearest 100km and to the nearest 10km.

River	Length in km to the nearest km	Length in km to the nearest 100 km	Length in km to the nearest 10 km
Severn	354	400	350
Thames	346		
Trent	297		

(b) There is another river which is not on the list.
It has a length of 200km to the nearest 100km,
and a length of 150km to the nearest 10km.
Complete this sentence to give one possible length of the river to the nearest km.

The length of the river could be ……………….. km.

(c) Two more rivers have different lengths to the nearest km.
They both have a length of 250km to the nearest 10km,
but their lengths to the nearest 100km are different.
Complete this sentence to give a possible length of each river to the nearest km.

The lengths of the rivers could be …………… km   and   …………… km.

Level 6

2. Round two point six nine four to one decimal place.

3. A drink from a machine costs 55p
The table shows the coins that were put into the machine one day.

Drinks

55p

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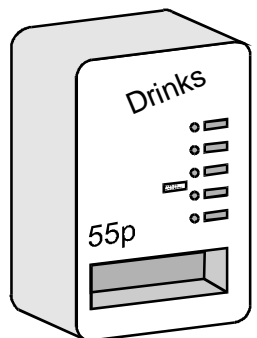
Coins	Number of coins
50 p	31
20 p	22
10 p	41
5 p	59

How many cans of drink were sold that day?
Show your working.

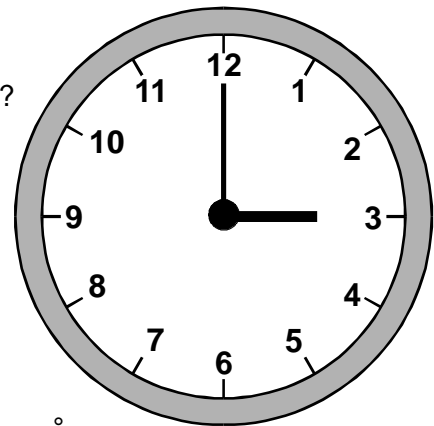..cans

Level 4

1. (a) The time on this clock is 3 o'clock.

What is the size of the angle between the hands?

.....................°

(b) What is the size of the angle between the
hands at 2 o'clock?

.....................°

(c) What is the size of the angle between the hands at 8 o'clock?

......................… °

(d) How long does it take for the minute hand to move 360°?

Level 5

2. (a) A pupil measured the angles in a triangle.
She said:

The angles are 30°, 60° and 100°
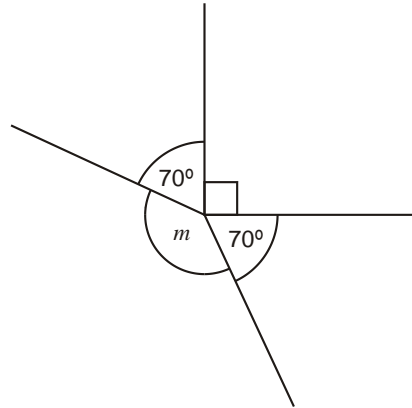
Could she be correct? Tick (✓) Yes or No.
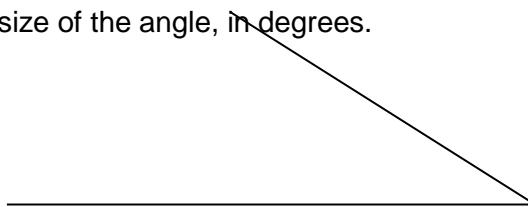
☐ Yes ☐ No

Explain your answer.

(b)   This diagram is not drawn accurately.
       Calculate the size of angle *m*
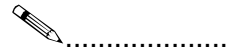
       Show your working.

70°

m 70°

....................°

3.   Estimate the size of the angle, in degrees.

Level 6

4.   What is the sum of the angles in a rhombus?
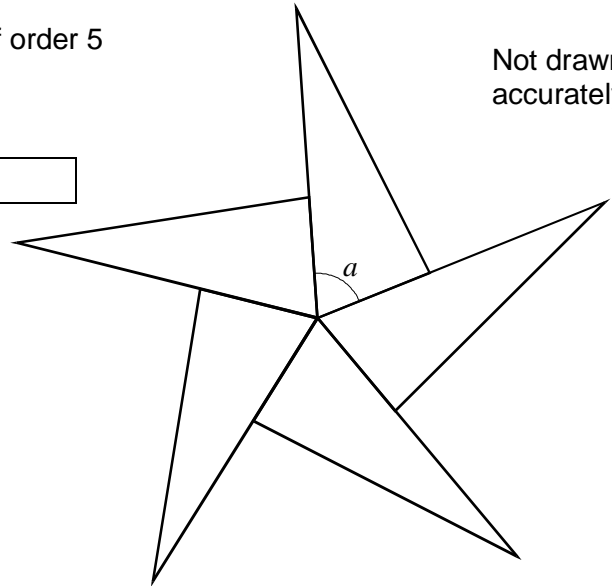
....

5.   This star-shape has rotation symmetry of order 5
         It is made from five congruent triangles.
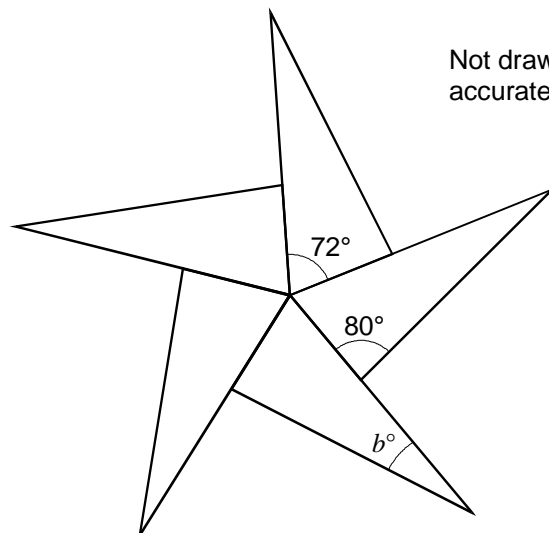
         Not drawn
         accurately

(a)   Jenny said:

       | Angle *a* must be 72° |

       Without measuring, explain how you
       know she is correct.

a

(b)   Work out the size of angle *b*   Not drawn
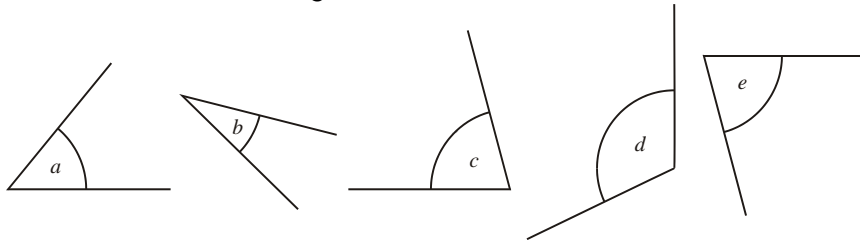Show your working.   accurately

$72°$

$80°$

$b°$

angle *b* =. . . . . ^o

Level 4

1. The hands of a clock are a right angles.
The minute hand is pointing to twelve.
What could the hour hand be pointing to?
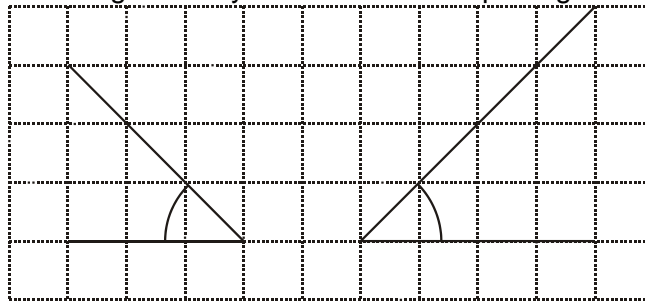There are two answers. Write them both.

2. (a) Look at these angles.

Write the letter of the **smallest** angle.

angle …………………

(b) Now look at these angles. They are drawn on a square grid.

Ali says the angles are **not** the same size. Is he correct? Tick (✓) Yes or No.
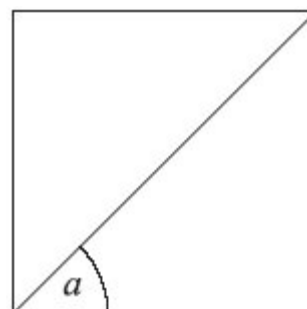
☐ Yes ☐ No

Explain your answer.
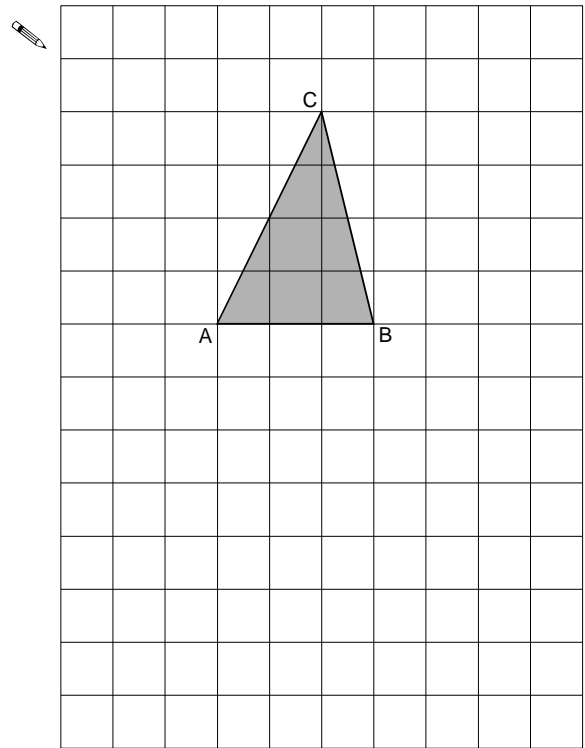
3. (a) How many degrees are there in a right angle?

.... degrees

(b) The diagram shows a square.

How many degrees is angle *a*?

.... degrees

Level 5

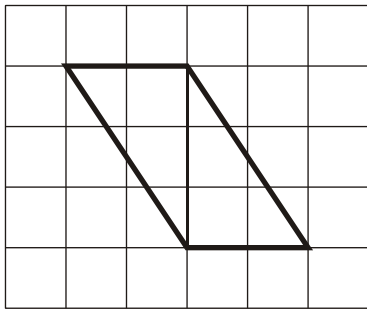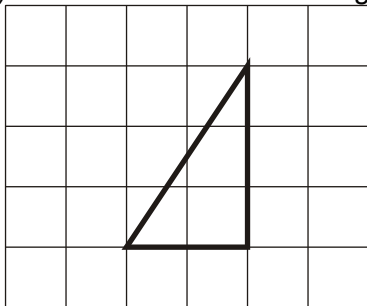**4.** Triangle ABC is drawn on a square grid. On the grid, draw a rectangle that has the same area as triangle ABC
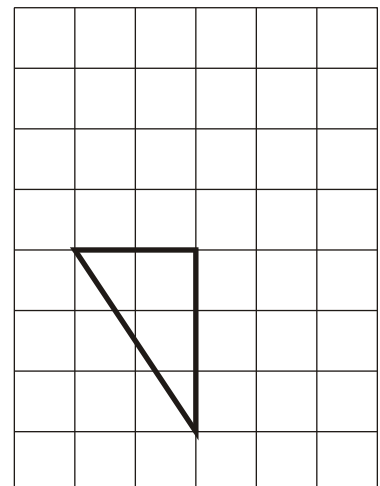

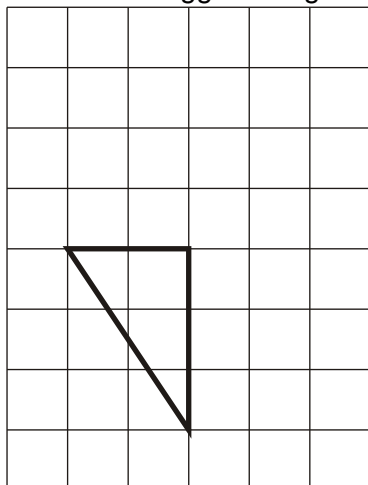**5.** These two congruent triangles make a parallelogram.

(a) Draw another congruent triangle to make a rectangle.

(b) Draw another congruent triangle to make a bigger triangle.

(c) Draw another congruent triangle to make a different bigger triangle.

Level 6

6.   Two of the angles in a triangle are sixty degrees and seventy degrees.
What is the size of the third angle?

7.   This shape has been made from two congruent isosceles triangles.

What is the size of angle *p*?

35°

p

35°

p = ...°
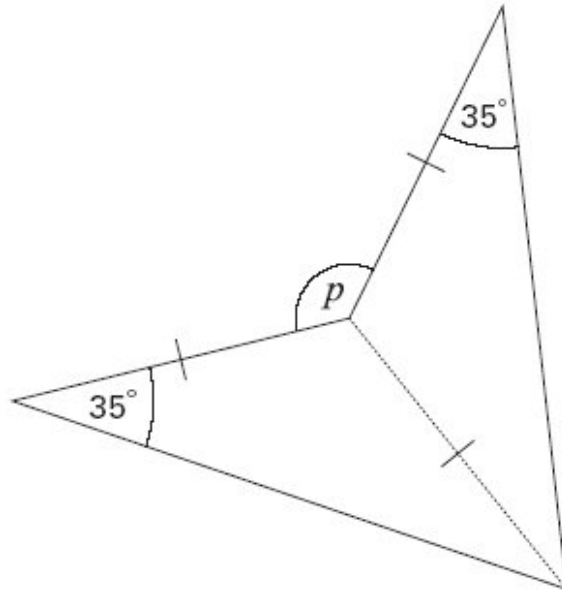
8.   The diagram shows a rectangle.

D   C

a

Not drawn accurately

65°

35°

A   K   B
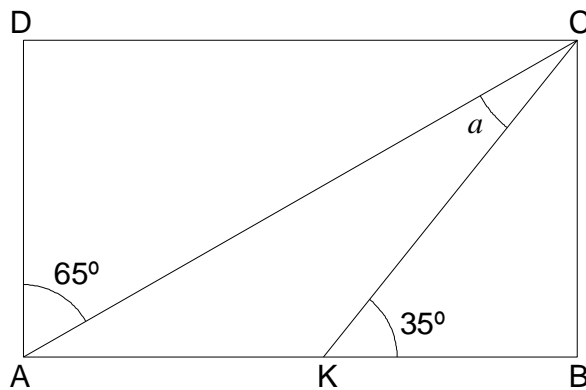
Work out the size of angle *a*. You must show your working.

a = ... °

Level 4

1.   The diagram shows three shapes drawn on a centimetre square grid.

The area of the rectangle is 8 cm^2

(a)   What is the area of the

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square?

✎ .... cm^2

(b)   What is the area of the triangle?

✎ .... cm^2

2.   Here is a triangle.

(a)   Measure the length of the longest side.
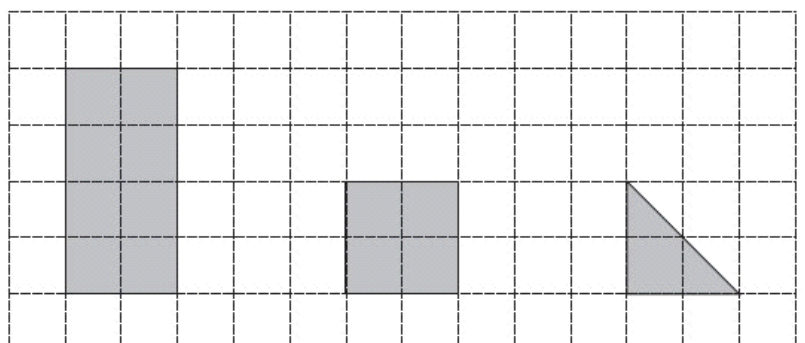
✎ | **cm** |

(b)   What is the perimeter of this triangle?

✎ | **cm** |

4.5 cm   6 cm

?
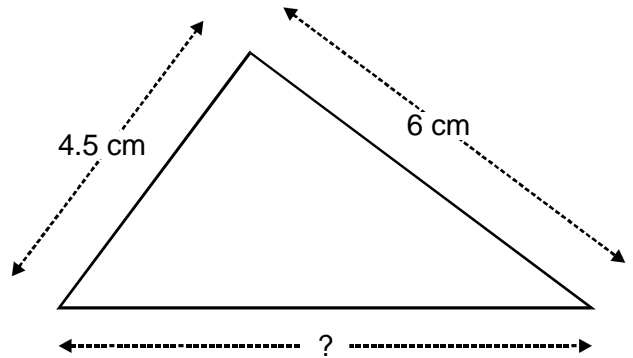
Level 5

3.   A scale measures in grams and in ounces.

Use the scale to answer these questions.
(a)   About how many ounces is 400 grams?

✎ .... ounces

(b)   About how many grams is 8 ounces?

✎ .... grams

(c)   About how many ounces is 1 kilogram?
Explain your answer.

✎

.... ounces

16
400
12
300
8
200
4
100
0   0
grams   ounces
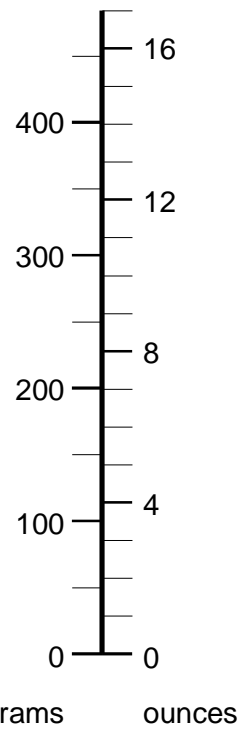
Level 6

4.   What is the volume of a cuboid measuring five centimetres by six centimetres by seven centimetres?

✎ ....

5.   Gustav says:

There are 100 square centimetres in a square metre.

Gustav is wrong. How many square centimetres are there in a square metre?

✎ . . . . cm²

6. (a) Arrange these lengths in order of size.

[10 kilometres] [10 metres] [10 miles] [10 centimetres]

✎ . . . . Shortest

. . . .

. . . .

. . . . Longest
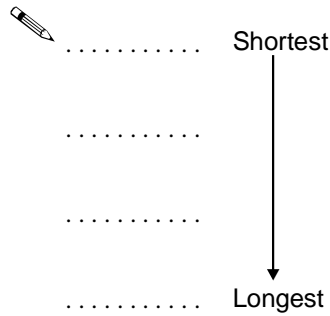
(b) Arrange these masses in order of size.

[10 grams] [10 kilograms] [10 milligrams] [10 pounds]

✎ . . . . Lightest

. . . .

. . . .

. . . . Heaviest
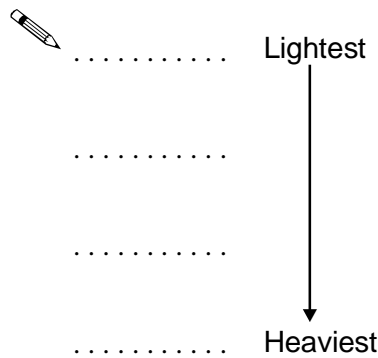
Level 5

1. (a) When $x = 5$, work out the values of the expressions below.

$2x + 13 = $ ....

$5x - 5 = $ ....

$3 + 6x = $ ....

(b) When $2y + 11 = 17$, work out the value of y
Show your working.

$y =$ ....

Level 6

2.   Here are two algebra cards.
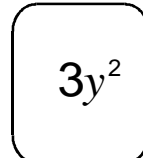
$(3y)^2$ $3y^2$

Card A   Card B

When **y = 9**, the value of card A is 729
When **y = 9**, the value of card B is **not** 729
What is the value of card B when $y = 9$?

✎ . . . .

3.   (a)   The diagram shows a rectangle. Its dimensions are 3*a* by 5*b*
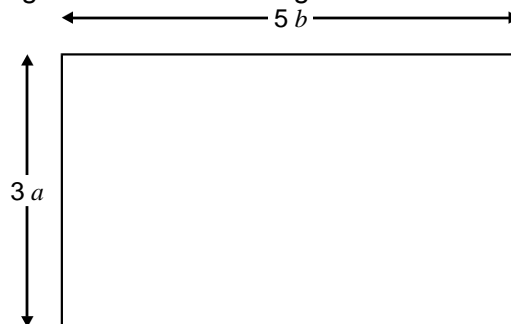
← — — — — 5 *b* — — — — →

3 *a*

Write **simplified expressions** for the area and the perimeter of this rectangle.

✎

Area: ....

Perimeter: ....

(b)   A different rectangle has **area 12a^2** and **perimeter 14a.**
What are the dimensions of this rectangle?

✎   Dimensions: .... by ....

Level 7

4.   Write these expressions as simply as possible.

✎

$$9 - 3k + 5k \; = \; ....$$

$$k^2 + 2k + 4k = \; ....$$

$$3k + 2k = \; ....$$

$$\frac{9k^2}{3k} \; = \; ....$$

Level 5

1.   (a)   A spinner has eight equal sections.

What is the probability of scoring 4 on the spinner?
✎
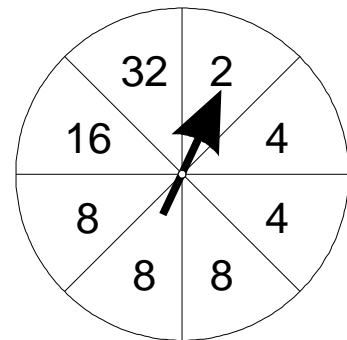
What is the probability of scoring an even number on the spinner?
✎

(b)   A different spinner has six equal sections and six numbers.

On this spinner, the probability of scoring an even number is $\frac{2}{3}$

The probability of scoring 4 is $\frac{1}{3}$

Write what numbers could be on this spinner.

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33

Level 6

2.   I have two fair dice.

Each of the dice is numbered 1 to 6.

(a)   The probability that I will throw double 6 (both dice showing number 6) is

$$\frac{1}{36}$$

What is the probability that I will not throw double 6?
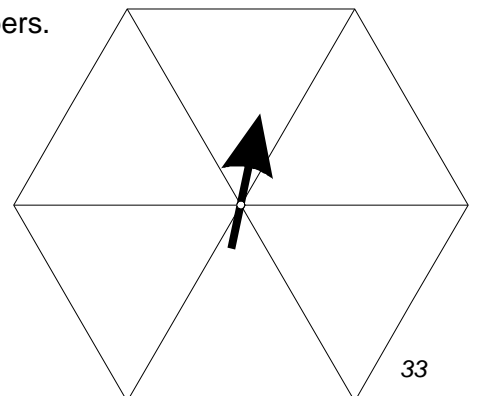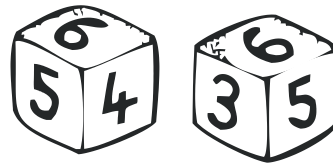
.………………………..

(b)   I throw both dice and get double 6. Then I throw the dice again.
Tick the box that describes the probability that I will throw double 6 this time.

less than $\frac{1}{36}$ ☐

$\frac{1}{36}$ ☐

more than $\frac{1}{36}$ ☐

Explain your answer.

I start again and throw both dice.
(c)   What is the probability that I will throw double 3 (both dice showing 3)?

.………………………..

(d)   What is the probability that I will throw a double?
(It could be double 1 or double 2 or any other double.)

.………………………..

Level 7

3.   Barry is doing an experiment. He drops 20 matchsticks at random onto a grid of parallel lines. Barry does the experiment 10 times and records his results. He wants to work out an estimate of probability.

Number of the 20 matchsticks that have fallen across a line

| 5 | 7 | 6 | 4 | 6 | 8 | 5 | 3 | 5 | 7 |

(a)   Use Barry's data to work out the probability that a single matchstick when dropped will fall across one of the lines.
Show your working.

....

(b)   Barry continues the experiment until he has dropped the 20 matchsticks 60 times. About how many matchsticks in total would you expect to fall across one of the lines?
Show your working.

.... matchsticks

Level 5

1.   (a)   Complete the sentences.

.... out of 10 is the same as 80%

15 out of 20 is the same as .... %

(b)   Complete the sentence.

.... out of ……………. is the same as 5%

Now complete the sentence using different numbers.

✏ .... out of ………….. is the same as 5%

Level 6

2.

> There are **20 questions** in a quiz.
>
> A **correct** answer scores **2 points**. An **incorrect** answer **loses 1 point**.
> A question not answered scores 0 points. A negative total is possible.

(a)   What are the maximum and minimum points you could get on the quiz?

✏ maximum ……………….   minimum ……………….

(b)   A pupil answers 10 of the 20 questions.
8 are correct.
How many points does he score?

✏ ....

(c)   Complete the table to show 3 different ways to score 24 points.

Number of answers that are correct	Number of answers that are incorrect	Number of questions that are not answered
12	0	8

Level 7

3.   (a)   One calculation below gives the answer to the question

What is 70 increased by 9%?

Tick (✓) the correct one.

(70 × 0.9)   (70 × 1.9)   (70 × 0.09)   (70 × 1.09)

Choose one of the other calculations.

Write a question about percentages that this calculation represents.

calculation chosen: ....

question it represents: ....

Now do the same for one of the remaining two calculations.

calculation chosen: ....

question it represents: ....

(b) Fill in the missing decimal number.

To decrease by 14%, multiply by ....

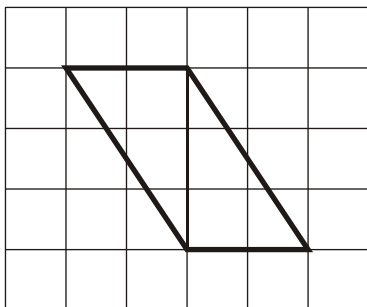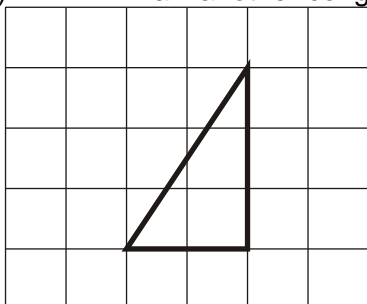## Level 5

1. Triangle ABC is drawn on a square grid. On the grid, draw a rectangle that has the same area as triangle ABC
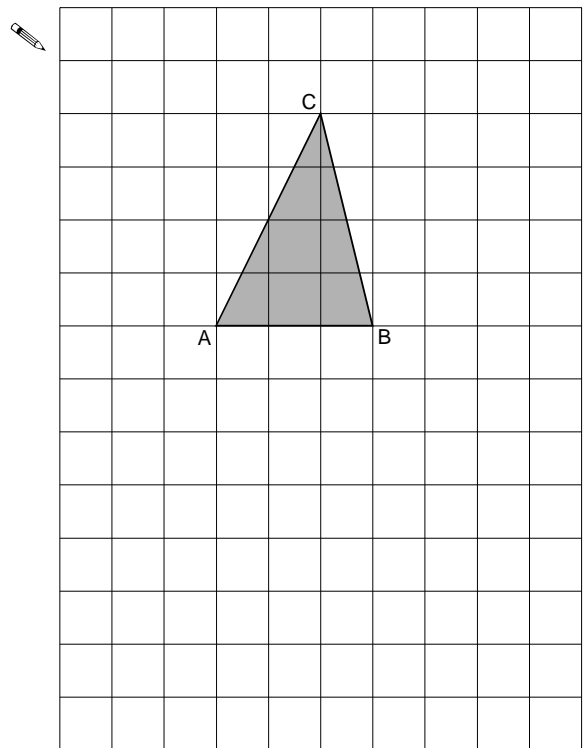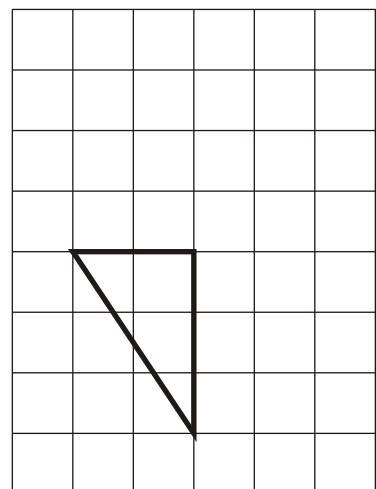
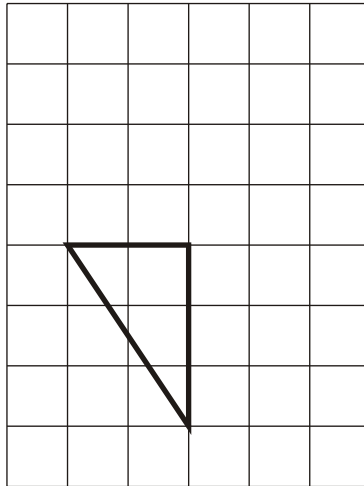**2.** These two congruent triangles make a parallelogram.

(a) Draw another congruent triangle to make a rectangle.

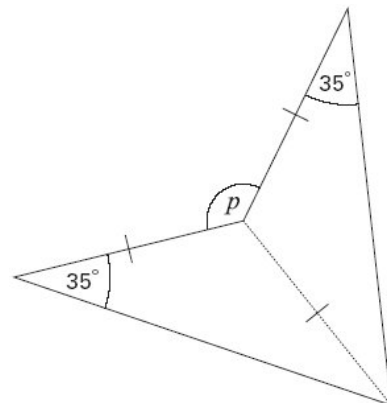(b) Draw another congruent triangle to make a bigger triangle.

(c)   Draw another congruent triangle
       to make a different bigger triangle.

Level 6

3.   Two of the angles in a triangle are sixty degrees and seventy degrees.
         What is the size of the third angle?

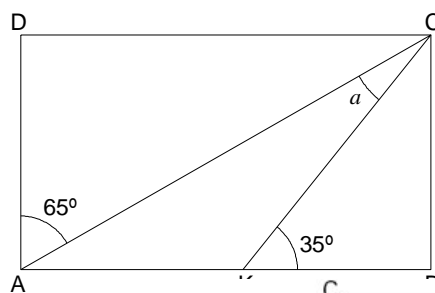**4.**   This shape has been made from two congruent isosceles triangles.

         What is the size of angle *p*?

         $35°$

         p

         $35°$

         p = ...°

5.   The diagram shows a rectangle.   D _____ C

Work out the size of angle *a*
You must show your working.   Not drawn accurately

         a

         $65°$

         $35°$

         A   C   B
                                         $60°$

a = ... °

Level 7

6.   ABCD is a **parallelogram**.

         h

         $80°$

         Work out the sizes of angles *h* and *j*

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         j

         D   A
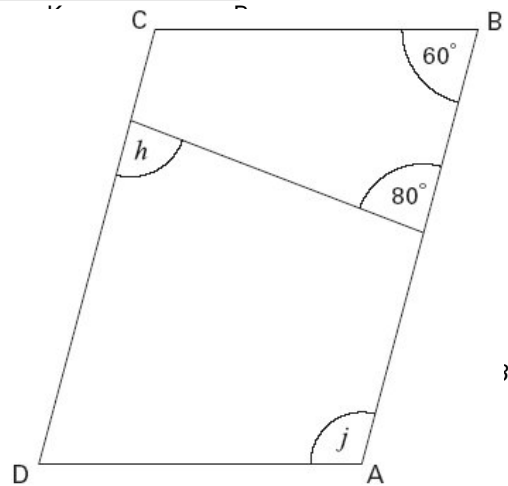
Give reasons for your answers.

h = ...° because

j = ...° because

7. A solid pyramid has seven faces. What shape is its base?

8. The angles in a triangle are k, k plus ten and k plus twenty. What is the value of k?

2. Operations

Look at these number cards.

| 0.2 | 2 | 10 | 0.1 | 0.05 | 1 |

(a) Choose two of the cards to give the **lowest possible answer**.
Fill in the cards below and work out the answer.

☐ **×** ☐ **=** ....

2 marks

(b) Choose two of the cards to give the answer **100**

☐ **÷** ☐ **=** 100

1 mark

Total 3 marks

Level 7

1.   Powers

(a)   Write the values of k and m.

$$64 = 8^2 = 4^k = 2^m$$

k = ...……………...
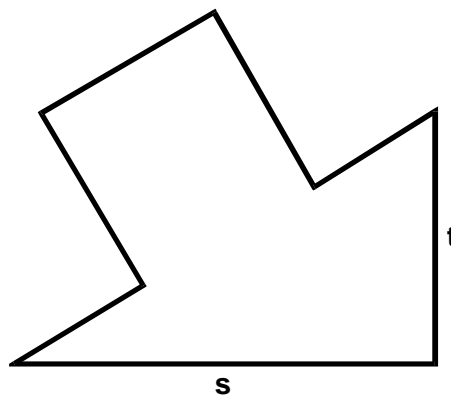
m = ...…………….

2 marks
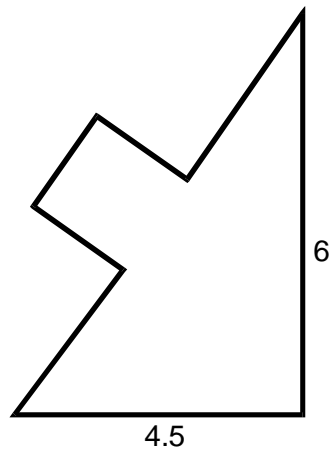
2.   Bryn wants to use the formulae

$$P = s + t + \frac{5\sqrt{s^2 + t^2}}{3} \qquad \text{and} \qquad A = \frac{1}{2}st + \frac{\left(s^2 + t^2\right)}{9}$$

to work out the perimeter (P) and area (A) of shapes like this:

t

s

For this shape, Bryan substitutes s = 4.5 and t = 6 into the formulae.

6

4.5

(a)   Work out the values of:

$$4.5 + 6 + \frac{5 \times \sqrt{4.5^2 + 6^2}}{3}$$

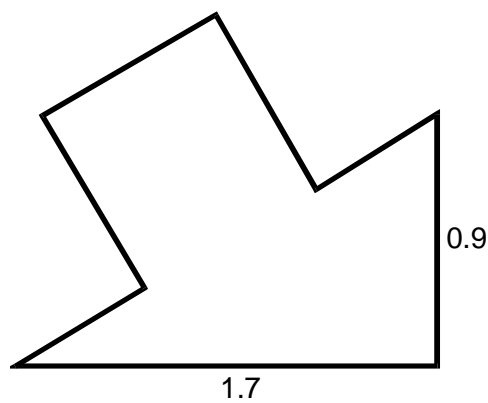
....

1 mark

$$\frac{1}{2} \times 4.5 \times 6 + \frac{\left(4.5^2 + 6^2\right)}{9}$$

....

1 mark

For this shape, Bryn substitutes s = 1.7 and t = 0.9 into the formulae.

0.9

1.7

(b)   Work out the values of:

$$1.7 + 0.9 + \frac{5 \times \sqrt{1.7^2 + 0.9^2}}{3}$$

....

1 mark

$$\frac{1}{2} \times 1.7 \times 0.9 + \frac{\sqrt{1.7^2 + 0.9^2}}{9}$$

....

1 mark

Level 8

3.   Russian dolls

The heights of Russian dolls are in the ratio **4 : 6 : 7**

(a)   In a set of dolls, the height of the **middle** doll is **9 cm**.

What are the heights of the other dolls?

……………… cm   *9*   ……………… cm
smallest   .... cm
                      middle

tallest

1 mark

(b)   In another set of dolls, the height of the **tallest** doll is **9 cm**.

What are the heights of the other dolls?

Show your working, and give your answers to **1 decimal place**.

……………… cm   ……………… cm   *9*
        ……………………… cm

     smallest   middle   tallest

2 marks

2. A shop had a sale. All prices were reduced by 15%

┌─────────────┐
│   *Sale*   │
│   15% off   │
└─────────────┘

A pair of shoes cost **£38.25** in the sale.

What price were the shoes before the sale?
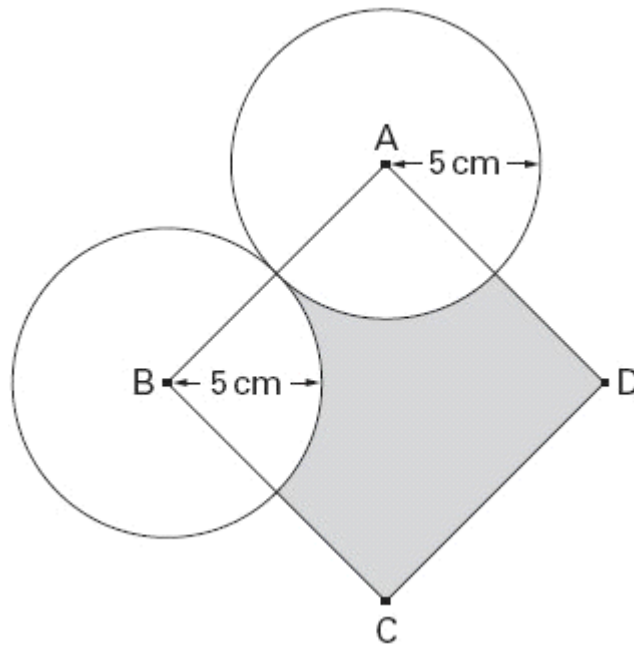
Show your working.

………………

2 marks

Level 7

1. Area

The diagram shows two circles and a square, ABCD.

A and B are the centres of the circles.

The radius of each circle is **5 cm**.

Not drawn accurately

Calculate the area of the **shaded part** of the square.

🖎
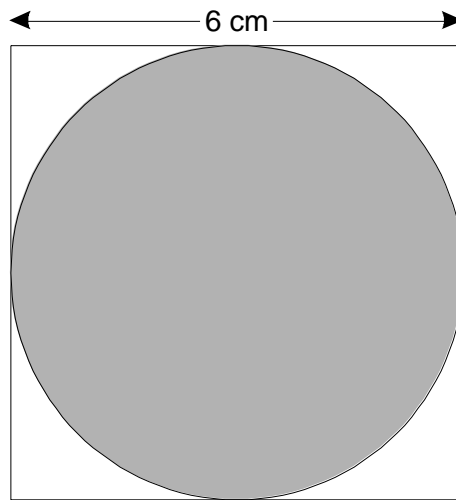
………………………

2 marks

1 mark

2. **Circling**

The diagram shows a square and a circle.

The circle touches the edges of the square.

6 cm

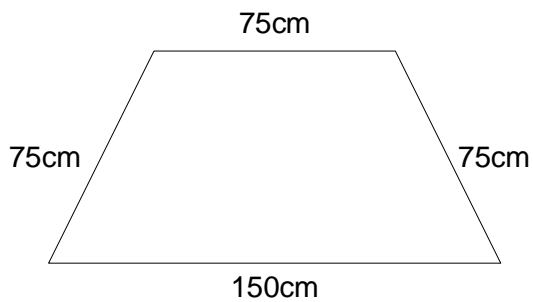What **percentage** of the diagram is shaded?

Show your working.

.................%

3 marks

Level 8

1. **Trapezium**

   A table top is in the shape of a trapezium.

   75cm

   75cm   75cm

   150cm   NOT TO SCALE

   Calculate the **area** of the table top.

Show your working.

...........……………....... cm^2

3 marks

2. Two right-angled triangles are joined together to make a larger triangle ACD.

C

12 cm

A   B   5 cm   D

28.8 cm

Not drawn accurately
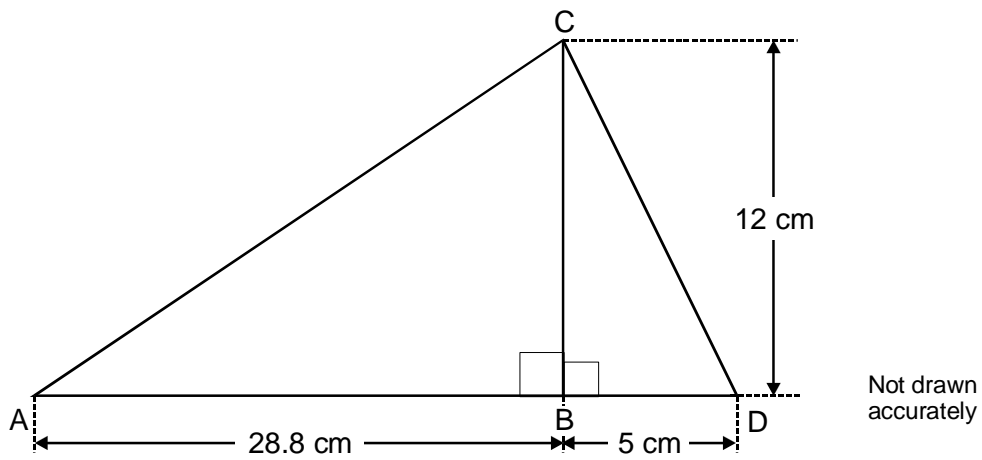
(a)   Show that the perimeter of triangle ACD is 78 cm.

2 marks

(b)   Show that triangle ACD is also a right-angled triangle.

2 marks