

1(a).

Machine A makes enough lollipops to fill 400 packs.

There are 8 lollipops in each pack.

Show that 3200 lollipops are made by machine A.

[1]

(b). Machine B can make 4800 lollipops in the same time it took machine A to make 3200 lollipops.

Machine B makes lollipops one at a time and at a constant rate.

What fraction of the time is saved if machine B is used rather than machine A?
Give your answer in its simplest form.

[3]

2(a). Shop A and shop B have special offers on the same cupcakes.

Shop A	Shop B
 £1.35 each or get 4 for the price of 3	 £1.50 each or get 3 for the price of 2

Show that the special offer cost of 6 cupcakes from Shop A is £6.75.

[1]

(b). Riley wants 25 cupcakes for a party.

Which shop will be cheapest and by how much?
Show how you decide.

Shop byp [5]

3. Kobe invests £ x at a rate of 1.5% per year simple interest for 6 years.
Shanti also invests £ x but at a rate of 1.1% per year simple interest for 7 years.

Kobe earns £156 more interest than Shanti.

Work out the value of x .
You must show your working.

$x =$ [6]

4. 100 students vote in a school election.

1 vote is spoiled and is not counted.

The remaining votes are for Darcie or Ivan and are in the ratio 4 : 7.

How many **more** votes does Ivan have than Darcie?

..... [3]

5. These are the ingredients for making some scones.

Flour	350 g
Butter	80 g
Sugar	55 g
Milk	160 ml

10 ml of milk weighs 10.4 g.

Work out the **total** weight of all the ingredients.

..... g [3]

6. At the start of 2020, the value of a particular house was £125 000.
The value of the house then decreased by 8% each year.

Calculate the **total loss in value** of the house at the end of 3 years.

£ [4]

7. A recipe for cookies uses only butter, flour and sugar in the ratio 2 : 3 : 2.
Using this recipe, 180 g of sugar is needed to make 10 cookies.

Using this recipe, work out how much **flour** is needed to make 35 cookies.

..... g [3]

8. Hugo pays £38.88 for 27 litres of diesel.
Jane puts 80 litres of the same diesel into her car.
Jane has £115 with which to pay for her diesel.

Does Jane have enough money to pay for her diesel?
Show how you decide.

..... because

[4]

9. Write 12 : 30 as a ratio in its simplest form.

..... [2]

10. Kai invests some money in a savings account that pays 5% simple interest per year. After 4 years the total interest that Kai's investment has earned is £360.

Find the total value of Kai's investment after 4 years.

You must show your working.

£ [5]

11(a). When Heidi walks to school she always takes 32 minutes. When Heidi cycles to school her speed is double her walking speed.

One day Heidi leaves home at 08 10 and cycles to school.

Find the time that Heidi arrives at school.

..... [2]

(b). Heidi cycles half-way to school. She walks the rest of the way at her normal walking speed.

Find how many minutes Heidi takes to get to school on this day.

..... minutes [3]

12. This table shows the weight of each ingredient used to make 6.5 kg of concrete.

Complete this table to show the weight of each ingredient used to make 52 kg of the same concrete.

Ingredient	Weight (kg)	Weight (kg)
Cement	1	8
Gravel	3.5	
Sand	2	
Total weight	6.5	52

[2]

13. A watch costs £189.60.

The exchange rate is 1 dollar (\$) = £0.79.

Calculate the price of the watch in dollars (\$).

\$ [2]

14(a). Yoshi and Layla share £18 in the ratio 3 : 1.

Write down the letter of the correct calculation to work out **Yoshi's** share.

A: $\frac{1}{3} \times 18$

B: $\frac{3}{1} \times 18$

C: $\frac{3}{4} \times 18$

D: $\frac{4}{3} \times 18$

..... [1]

(b). Work out **Layla's** share.

£ [2]

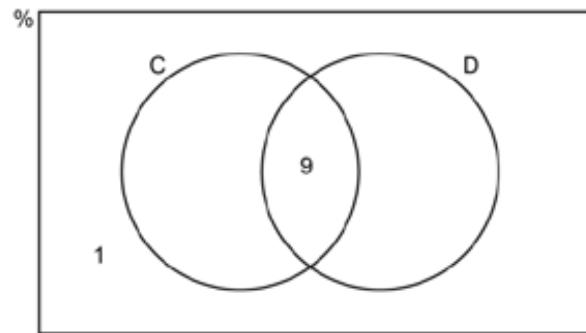
15. Ryan invests £20 000 at a rate of 2% per year compound interest.

Show that the total amount of interest Ryan will have received after 2 years is £808.

[4]

16. In a survey, 40 people were asked whether they have a cat (C) or a dog (D).

The Venn diagram shows some of the results.



The ratio of those that **only** have a cat to those that **only** have a dog is 3 : 2.

One of the 40 people is chosen at random.

Find the probability that they have a **dog**.

You must show your working.

..... [5]

17. A bag only contains red counters and blue counters.

$\frac{4}{9}$ of the counters are red.

There are 30 blue counters.

Complete the table to show the fraction of the counters that are blue and the number of red counters.

	red	blue
fraction	$\frac{4}{9}$
number	30

..... [3]

18.

Write the ratio 28 : 21 in its simplest form.

..... [1]

19. A machine makes 11 boxes in 12 minutes.
The machine works continuously.

Work out how many boxes are made by this machine in 8 hours.

..... [4]

20. A sports team scored 600 points.

The defenders scored $\frac{1}{10}$ of the points.

The midfielders and the forwards scored the remainder of the points in the ratio 1 : 5.

Find the percentage of the 600 points that were scored by the forwards.
You must show your working.

..... % [5]

21(a). Machine A makes enough lollipops to fill 300 packs.

There are 8 lollipops in each pack.

Show that 2400 lollipops are made by machine A.

[1]

(b). Machine B can make 3600 lollipops in the same time it took machine A to make 2400 lollipops.

Machine B makes lollipops one at a time and at a constant rate.

What fraction of the time is saved if machine B is used rather than machine A?
Give your answer in its simplest form.

..... [3]

22(a). Shop A and shop B have special offers on the same cupcakes.

Shop A	Shop B
	
£1.25 each or get 4 for the price of 3	£1.40 each or get 3 for the price of 2

Show that the special offer cost of 6 cupcakes from Shop A is £6.25.

[1]

(b). Gabi wants 25 cupcakes for a party.

Which shop will be cheapest and by how much?

Show how you decide.

Shop by p [5]

23. Darcie invests £ x at a rate of 1.5% per year simple interest for 5 years.
Ivan also invests £ x but at a rate of 1.1% per year simple interest for 6 years.

Darcie earns £108 more interest than Ivan.

Work out the value of x .

You must show your working.

$x = \dots$ [6]

24. These are the ingredients for making some scones.

Flour	360 g
Butter	90 g
Sugar	45 g
Milk	180 ml

10 ml of milk weighs 10.4 g.

Work out the **total** weight of all the ingredients.

\dots g [3]

25. 100 students vote in a school election.

1 vote is spoiled and is not counted.

The remaining votes are for Jamal or Layla and are in the ratio 3 : 8.

How many **more** votes does Layla have than Jamal?

\dots [3]

26. At the start of 2020, the value of a particular caravan was £25000. The value of the caravan then decreased by 12% each year.

Calculate the **total loss in value** of the caravan at the end of 3 years.

£ [4]

27. A recipe for cookies uses only butter, flour and sugar in the ratio 2 : 4 : 1. Using this recipe, 160 g of butter is needed to make 10 cookies.

Using this recipe, work out how much **flour** is needed to make 25 cookies.

..... g [3]

28. Leo pays £44.98 for 26 litres of diesel.
Mia puts 60 litres of the same diesel into her car.
Mia has £103 with which to pay for her diesel.

Does Mia have enough money to pay for her diesel?
Show how you decide.

..... because

[4]

29. Write 24 : 60 as a ratio in its simplest form.

..... [2]

30. Dev invests £760 at a simple interest rate of 2% per year.
Emma invests £760 at a compound interest rate of 2% per year.

Work out the difference in value between the two investments at the end of 5 years.
You must show your working.

£ [6]

31(a). Write this ratio in its simplest form.

12 millimetres : 6 centimetres

..... : [2]

(b). The ratio 4 : 7 can be written in the form 1 : n .

Find the value of n .

$n =$ [1]

32(a). Nina and Kareem share some money in the ratio 3 : 4.

Nina says

$\frac{3}{4}$
I get $\frac{3}{4}$ of the money.

What mistake has Nina made?

Give the fraction of the money Nina actually receives.

The fraction of the money Nina receives is [2]

(b). Nina receives £90.

Work out how much money Nina and Kareem shared between them.

£ [3]

33(a). Five pears cost £1.60.

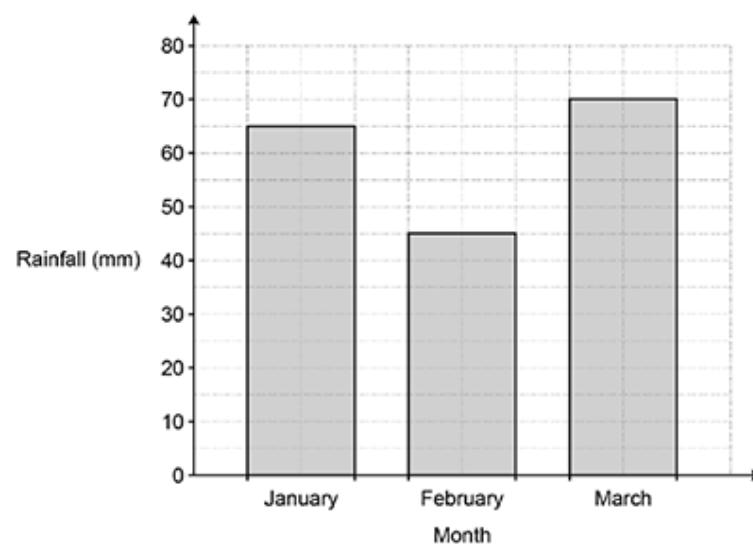
Find the cost of four of these pears.

£ [2]

(b). By rounding each value to **one** significant figure, estimate the cost of 7.3 kg of potatoes at 62p per kg.
Give your answer in pounds.

£ [3]

34. The bar chart shows the rainfall, in millimetres (mm), for a town in the first three months of the year.



Write in its simplest form the ratio
amount of rainfall in February : amount of rainfall in March.

..... : [2]

35. A painter mixes blue paint and red paint in the ratio 3 : 5.
They make a total of 1.6 litres of paint.

Work out how much blue paint they use.
Give your answer in millilitres.

..... ml [3]

36. Alex and Emma compete in the same motorcycle race.

Alex completes the race in 5 hours.

Alex's average speed was 40 miles per hour.

Emma's average speed was 32 miles per hour.

Calculate how long it took Emma to complete the race.

Give your answer in hours and minutes.

..... hours minutes [4]

37(a). Heidi and Yoshi use this recipe to make scones.

The recipe shows the ingredients needed to make **20** scones.

Ingredients to make 20 scones	
500 g	flour
60 g	sugar
125 g	butter
100 g	sultanas
90 ml	milk
2	eggs

Heidi makes **30** scones.

She uses a tablespoon to measure the amount of milk she needs.

The size of a tablespoon is 15 ml.

How many tablespoons of milk should Heidi use to make **30** scones?

..... [3]

(b). Yoshi has 1.2 kg of flour and 250 g of sultanas.
He has lots of all of the other ingredients.

Work out the maximum number of scones that Yoshi can make.
You must show your working.

..... [4]

38. Riley invests some money in a savings account that pays 4% simple interest per year.
After 5 years the total interest that Riley's investment has earned is £360.

Find the total value of Riley's investment after 5 years.
You must show your working.

£ [5]

39. A watch costs £207.50.
The exchange rate is 1 dollar (\$) = £0.83.

Calculate the price of the watch in dollars (\$).

\$ [2]

40(a). Finley and Gabi share £14 in the ratio 1 : 3.

Write down the letter of the correct calculation to work out **Gabi's** share.

A: $\frac{1}{3} \times 14$ B: $\frac{3}{1} \times 14$ C: $\frac{3}{4} \times 14$ D: $\frac{4}{3} \times 14$

..... [1]

(b). Work out **Finley's** share.

£ [2]

41(a). When Layla walks to school she always takes 28 minutes.
When Layla cycles to school her speed is double her walking speed.

One day Layla leaves home at 08 20 and cycles to school.

Find the time that Layla arrives at school.

..... [2]

(b). Layla cycles half-way to school.
She walks the rest of the way at her normal walking speed.

Find how many minutes Layla takes to get to school on this day.

..... minutes [3]

42. This table shows the weight of each ingredient used to make 5.5 kg of concrete.

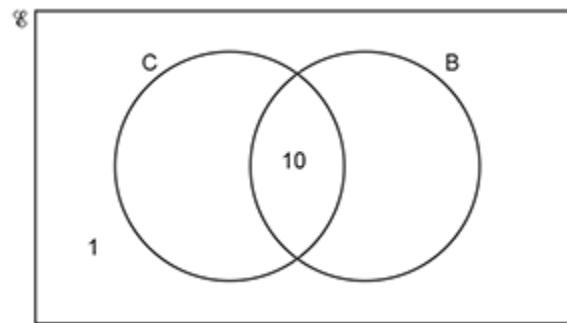
Complete this table to show the weight of each ingredient used to make 44 kg of the same concrete.

Ingredient	Weight (kg)	Weight (kg)
Cement	1	8
Gravel	3	
Sand	1.5	
Total weight	5.5	44

[2]

43. In a survey, 50 people were asked whether they have a car (C) or a bicycle (B).

The Venn diagram shows some of the results.



The ratio of those that **only** have a car to those that **only** have a bicycle is 2 : 1.

One of the 50 people is chosen at random.

Find the probability that they have a **bicycle**.

You must show your working.

..... [5]

44. Charlie invests £1200 at a rate of 5% per year compound interest.

Show that the total amount of interest Charlie will have received after 2 years is £123.

[4]

45. A machine makes 15 boxes in 12 minutes.

The machine works continuously.

Work out how many boxes are made by this machine in 7 hours.

[4]

46. A sports team scored 400 points.

The defenders scored $\frac{1}{10}$ of the points.

The midfielders and the forwards scored the remainder of the points in the ratio 1 : 5.

Find the percentage of the 400 points that were scored by the forwards.

You must show your working.

..... % [5]

47. A bag only contains red counters and blue counters.

$\frac{3}{7}$ of the counters are red.

There are 20 blue counters.

Complete the table to show the fraction of the counters that are blue and the number of red counters.

	red	blue
fraction	<input type="text"/>
number	20

[3]

48. Write the ratio 14 : 35 in its simplest form.

..... [1]

49(a). All of the loaves in a baker's shop cost the same price.

Darcy buys 4 loaves and pays £5.24.

Taylor buys 7 loaves.

Work out how much Taylor pays.

£ [3]

(b). Frankie and Dan travel the same distance to school.

Frankie walks to school in 18 minutes.

Dan runs to school at three times the speed that Frankie walks.

Find how many minutes it takes Dan to run to school.

..... min [2]

50(a). Write $32 : 80$ as a ratio in its simplest form.

..... : [2]

(b). A plan has a scale of 16 centimetres represents 1 metre.
The scale can be written as a ratio in the form $1 : n$.

Find the value of n .

$n = \dots$ [2]

51. Azmi invests £400 at a simple interest rate of $r\%$ each year.
After 3 years, Azmi's investment is worth £460.

Find the value of r .

$r = \dots$ [4]

52. Jamal has £8 to spend on vegetables.

The table shows the prices.

Cauliflower (each)	£1.30
Potatoes (for 1 kilogram)	85p
Mushrooms (for a 400 g pack)	£1.20

Jamal buys 3 cauliflowers and 2 kilograms of potatoes.

Jamal spends the remaining money on mushrooms.

Work out the **mass, in grams**, of mushrooms that Jamal buys.

You must show your working.

..... g [6]

53. Clara is counting the photos on her phone.

The ratio of the number of photos of her family to photos of her friends is 5 : 7.

She has 550 photos of her family.

60% of the photos of her friends include Dan.

Work out how many of the photos of her friends include Dan.

[4]

54. Ellis invests £3000 at a rate of 4.5% per year compound interest.

Calculate the value of Rowan's investment after 6 years.

Give your answer correct to the **nearest penny**.

£ [3]

55. Eve changes £340 into euros.

£1 is worth 1.14 euros.

Eve says

$$340 \div 1.14 = 298.25$$

Therefore, £340 is worth 298.25 euros.

Is Eve correct or incorrect?

Give a reason for your decision.

Eve is _____ because _____

[1]

56. One afternoon Rowan records some vehicles that pass the school gate.

$\frac{5}{7}$ of the vehicles they record are cars.

For Rowan's results, write down the ratio of cars to not cars.
Give your answer in its simplest form.

..... : [1]

57(a).

Alex plans to share some money so that

- Riley gets $\frac{1}{2}$
- Zayn gets $\frac{1}{5}$
- Ling gets $\frac{2}{7}$.

Will Alex's plan work?

Give a reason and show working to support your decision.

because _____

[2]

(b). Alex gives Riley and Ling the fractions of the money that they planned.
Riley gets £280.

Work out how much money Ling gets.

£ [2]

58. New cars reduce in value once they have been bought.

Taylor buys a new car for £22 000.

They see this table in a magazine.

Year	Loss in value compared to the start of the year
Year 1	15%
Year 2	10%

Taylor says

According to this table, the value of my car will be £16 500 at the end of Year 2.

Show that Taylor is **not** correct.

[4]

59(a). Write 24 : 42 as a ratio in its simplest form.

..... : [2]

(b). In a bag of sweets $\frac{1}{7}$ of the sweets are green.

The rest of the sweets are red.

The ratio of the number of red sweets to the number of green sweets can be written in the form $n : 1$.

Find the value of n .

$n =$ [2]

(c). A factory has a large order for copper pipe.

The factory has many machines that make the copper pipe.

Each machine makes the same length of copper pipe in a day.

4 machines can make the copper pipe for this order in 20 days.

Find the number of machines needed to make this order in 16 days.

= [3]

60(a). Ling invests £400 at a rate of 3% per year simple interest.

Work out the interest Ling receives after one year.

£..... [2]

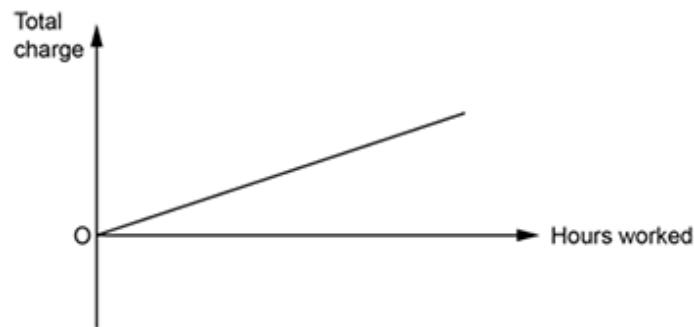
(b). Work out the value of Ling's investment after 5 years.

£..... [2]

61(a). Jack and Ling are both plumbers.

Jack **does not** charge to visit a house but charges a fixed rate per hour for the work needed.

This graph shows the relationship between the hours worked and the total charge made by Jack.



Explain how this graph shows that Jack's total charge is directly proportional to the hours worked.

[2]

(b). Ling **does** charge to visit a house but charges a smaller fixed rate per hour than Jack for the work needed.

On the axes above, draw a graph to show the relationship between the hours worked and the total charge made by Ling.

[2]

62. 350 g of rice costs £1.19.

Work out the cost of 1 kg of this rice.

£ [2]

63. Cookies are made using these ingredients.

Ingredients

Makes 12 cookies

120 g butter

180 g sugar

1 egg

120 g flour

85 g cranberries

50 g white chocolate

How many eggs are needed to make 36 cookies?

..... [1]

64. A farmer keeps goats in a rectangular field measuring 130 m by 190 m.

The farmer can keep up to 18 goats per hectare in the field.

1 hectare is 10 000 square metres.

Work out the maximum number of goats the farmer can keep in the field.

..... [4]

65(a). Cookies are made using these ingredients.

Ingredients

Makes 12 cookies

120 g butter

180 g sugar

1 egg

120 g flour

85 g cranberries

50 g white chocolate

How much sugar is needed to make 4 cookies?

.....g [1]

(b). Finley has 260 g of cranberries and plenty of the other ingredients.
Finley thinks this is enough to make at least 40 cookies.

Is Finley correct?

Show working to support your answer.

because _____

[3]

66. A sports club has 245 members.

Some of the members wish to change a club rule.

To change a club rule, at least 80% of **all** the members must vote 'yes'.

At a meeting of the sports club, 5 members were absent and did not vote.

The other members voted yes : no : don't know in the ratio 3 : 2 : 1.

Did enough members vote 'yes' to change the rule?

Show how you decide.

because

[5]

67(a). In a recipe, the ratio of the amount of butter needed to the amount of flour needed is $1 : 3$. Azmi mixes 1 g of butter with 3 kg of flour.

Explain what Azmi has done wrong.

[1]

$\frac{1}{5}$

(b). Ling gives $\frac{1}{5}$ of their earnings to charity and keeps the remainder.

For Ling's earnings, find the ratio of the amount they give to charity to the amount they keep.

Give your answer in its simplest form.

..... : [2]

68. Frankie invests £600 in a savings account that pays 4% simple interest per year.

Work out the **total** amount of interest Frankie will have earned at the end of the 6th year.

£ [2]

69. Sam goes on holiday.

They change £395 into euros (€) at a rate of £1 = €1.13.

They spend €281.29 of this money.

After the holiday, Sam changes the remaining euros back into pounds at a rate of £1 = €1.26.

Work out how many pounds Sam gets back.

£ [4]

70. A pattern is made out of blue tiles and yellow tiles.

$\frac{1}{4}$ of the tiles are blue.

There are 39 yellow tiles.

Work out the **total** number of tiles.

..... [3]

71. Ashley and Kai share some money in the ratio 3 : 7.

Kai receives £160 more than Ashley.

How much money does Ashley receive?

£ [3]

72. Write the ratio $3 : 4\frac{1}{2}$ in its simplest form.

..... : [2]

73. A village is putting on a fair.

30 child tickets are sold.

The ratio of the number of child tickets sold to the number of adult tickets sold is 3 : 5.

The cost of a child ticket is £1.50.

The cost of an adult ticket is £3.00.

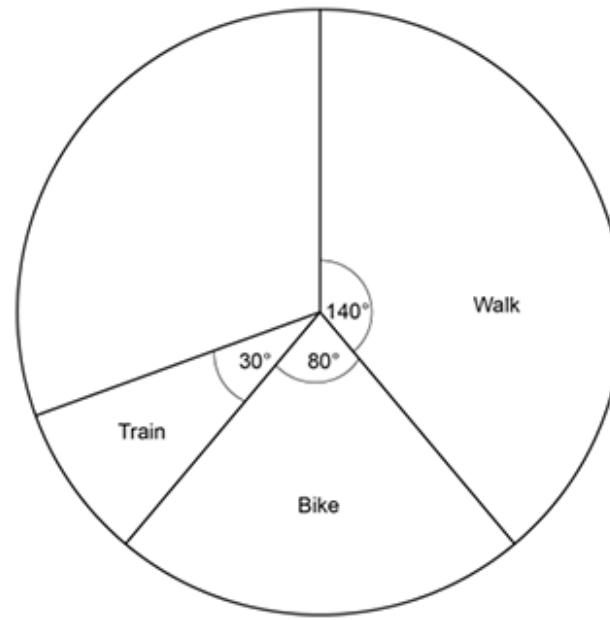
Work out the **total** amount paid for the tickets.

£ [4]

74(a). Some students were asked how they travel to school.

Each student gave one answer.

The pie chart shows the proportion who walk, or travel by bike, or train.



All of the remaining students travel to school either by bus or by car.

The ratio of the number who travel by bus to the number who travel by car is 3 : 2.

Complete the pie chart.

You must show your working.

[6]

(b). Which way of travelling to school is the mode?

..... [1]

75. y is inversely proportional to x .

$y = 10$ when $x = 8$.

Find the value of y when $x = 16$.

$y =$ [3]

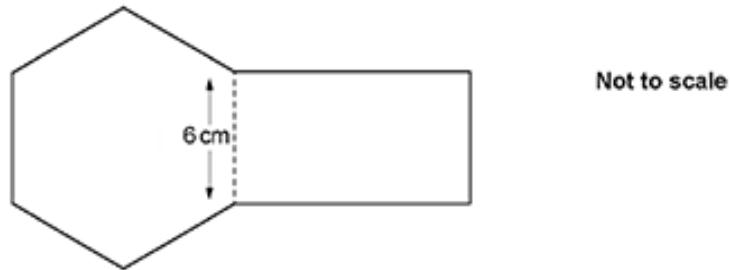
76. Apples cost 25p each.

How many apples can be bought for £3?

..... [2]

77. The shape below is formed by a rectangle of width 6 cm and a regular hexagon.

For the rectangle, the ratio of the width to the length is 3 : 5.



Work out the perimeter of the shape.

..... cm [4]

78(a). Blake and Rowan are making pancakes using the ingredients below.

Ingredients to make 20 pancakes
125 ml water
300 ml milk
160 g flour
80 g butter
4 eggs

The ratio of the amount of water to the amount of milk needed is 125 : 300.

Write this ratio in its simplest form.

..... : [2]

(b). Blake makes 30 pancakes.

Work out how much flour he needs.

..... g [2]

(c). Rowan has 220 g of butter and 12 eggs.
She has plenty of the other ingredients.

Work out the maximum number of pancakes that she can make.

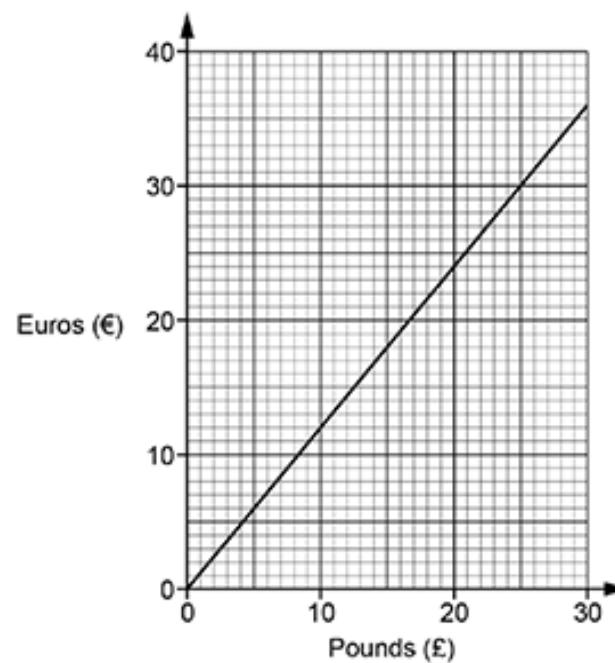
..... [4]

79. Taylor invests £8000 at a rate of 0.9% per year compound interest.

Calculate the total amount of **interest** Taylor will have earned after 6 years.
Give your answer correct to the **nearest penny**.

£ [4]

80(a). A conversion graph between pounds (£) and euros (€) is shown below.



Some trainers cost £180 in the UK.
The same trainers cost €195 in France.

Show that the trainers cost less in France.

[4]

(b). If the trainers are brought from France there is an extra charge for tax and delivery.

Kai wants to pay the lowest total amount for the trainers.

Write down the maximum extra charge for tax and delivery that Kai should be willing to pay.
Give your answer in euros.

€ [1]

81. A biased five-sided spinner is numbered 1, 2, 3, 4 and 5.

The table shows the probability of the spinner landing on 2, 4 and 5.

Number	1	2	3	4	5
Probability		0.30		0.20	0.30

The spinner is three times more likely to land on 1 than on 3.

Complete the table.

[4]

82(a). Beth says

My normal typing speed is 45 words per minute.

Therefore, I estimate that my normal typing speed is about 280 characters per minute.

Each letter, space and piece of punctuation counts as a character.

How many letters per word is Beth most likely to have used in making the estimate?

Show how you decide.

..... [3]

(b). Beth starts some homework at their normal typing speed of 45 words per minute.
Beth types 48 words in 1 minute 24 seconds.

What may be true about the length of the words that Beth has just typed?
Show how you decide.

[3]

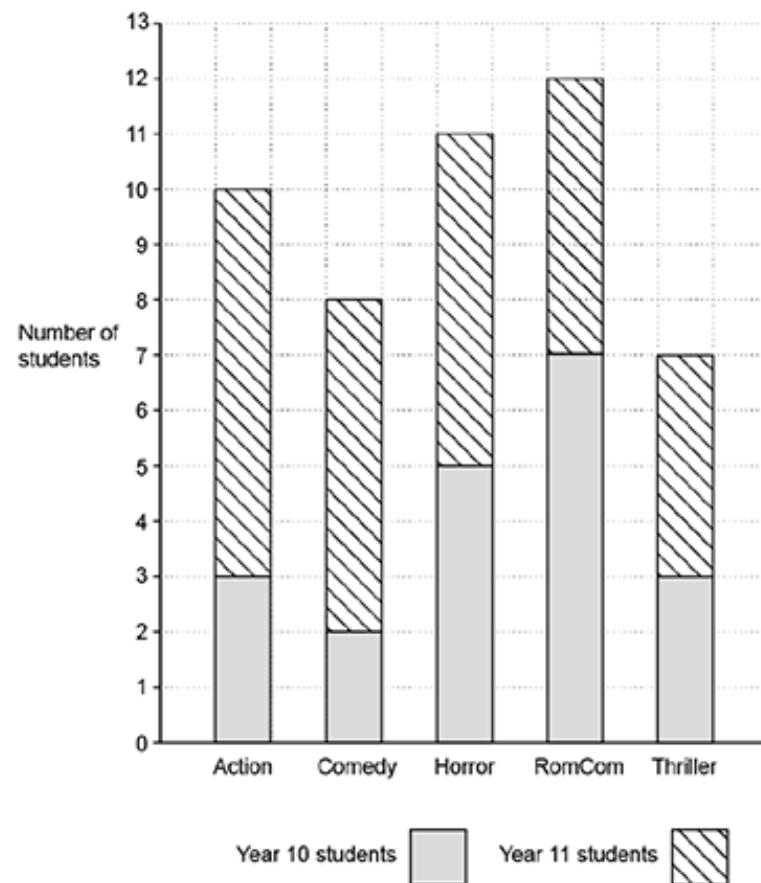
83. Callum's bath has a hot tap and a cold tap.
When turned on full, each tap on its own will fill the bath in 8 minutes.

Callum turns **both** taps on full.

How long will it take to fill the bath?

..... minutes [2]

84. In a survey, some students chose their favourite type of film from a list of five. The bar chart shows the results.



20 Year 10 students took part in the survey.

Write the ratio

number of Year 10 students taking part : number of Year 11 students taking part

in its simplest form.

[3]

85(a). Dev and Emma share some money in the ratio 2 : 3.

Dev says

$\frac{2}{3}$
I get $\frac{2}{3}$ of the money.

What mistake has Dev made?

Give the fraction of the money Dev actually receives.

The fraction of the money Dev receives is [2]

(b). Dev receives £100.

Work out how much money Dev and Emma shared between them.

£ [3]

86. Nina invests £540 at a simple interest rate of 2% per year.

Kareem invests £540 at a compound interest rate of 2% per year.

Work out the difference in value between the two investments at the end of 5 years.

You must show your working.

£ [6]

87(a). Write this ratio in its simplest form.

4 centimetres : 8 millimetres

..... : [2]

(b). The ratio 4 : 5 can be written in the form 1 : n .

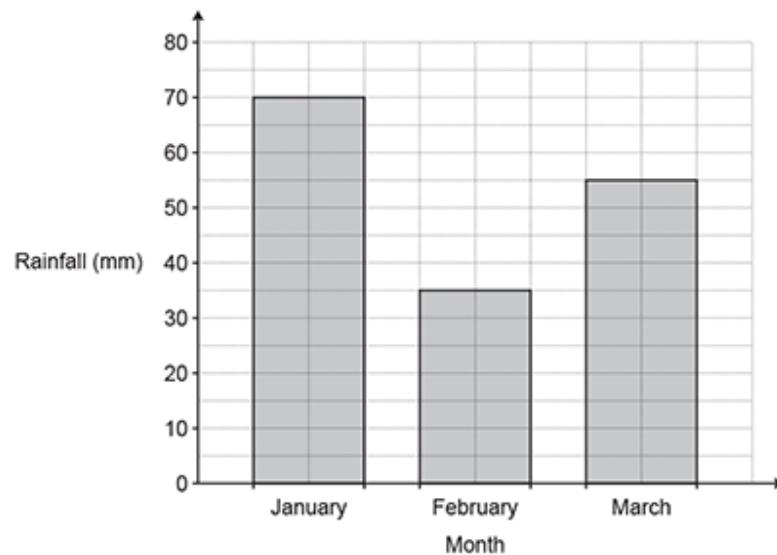
Find the value of n .

$n =$ [1]

88. By rounding each value to **one** significant figure, estimate the cost of 8.2 kg of bananas at 73p per kg. Give your answer in pounds.

£ [3]

89. The bar chart shows the rainfall, in millimetres (mm), for a city in the first three months of the year.



Write in its simplest form the ratio
amount of rainfall in February : amount of rainfall in March.

..... : [2]

90. Four apples cost £1.80.

Find the cost of five of these apples.

£ [2]

91. A painter mixes red paint and yellow paint in the ratio 2 : 3.
They make a total of 1.5 litres of paint.

Work out how much red paint they use.
Give your answer in millilitres.

..... ml [3]

92. Heidi and Yoshi compete in the same car race.
Heidi completes the race in 6 hours.
Heidi's average speed was 50 miles per hour.
Yoshi's average speed was 48 miles per hour.

Calculate how long it took Yoshi to complete the race.
Give your answer in hours and minutes.

..... hours minutes [4]

93(a). Alex and Emma use this recipe to make scones.
The recipe shows the ingredients needed to make **16** scones.

Ingredients to make 16 scones
400 g flour
50 g sugar
100 g butter
80 g sultanas
70 ml milk
2 eggs

Alex makes **24** scones.

He uses a tablespoon to measure the amount of milk he needs.
The size of a tablespoon is 15 ml.

How many tablespoons of milk should Alex use to make **24** scones?

..... [3]

(b). Emma has 1 kg of flour and 240 g of sultanas.
She has lots of all of the other ingredients.

Work out the maximum number of scones that Emma can make.
You must show your working.

..... [4]

94(a). Sundip plans to share some money so that

- Mia gets $\frac{1}{2}$
- Sara gets $\frac{2}{5}$
- Nina gets $\frac{1}{7}$

Will Sundip's plan work?

Give a reason and show working to support your decision.

because

[2]

(b). Sundip gives Mia and Sara the fractions of the money that she planned.

Mia gets £320.

Work out how much money Sara gets.

£ [2]

95. New cars reduce in value once they have been bought.

Zayn buys a new car for £17 000.

They see this table in a magazine.

Year	Loss in value compared to the start of the year
Year 1	15%
Year 2	10%

Zayn says

According to this table, the value of my car will be £12 750 at the end of Year 2.

Show that Zayn is **not** correct.

[4]

96(a). Write 18 : 42 as a ratio in its simplest form.

..... : [2]

(b). In a bag of sweets $\frac{1}{5}$ of the sweets are green.

The rest of the sweets are red.

The ratio of the number of green sweets to the number of red sweets can be written in the form 1 : n .

Find the value of n .

$n =$ [2]

(c). A factory has a large order for copper pipe.

The factory has many machines that make the copper pipe.

Each machine makes the same length of copper pipe in a day.

3 machines can make the copper pipe for this order in 25 days.

Find the number of machines needed to make this order in 15 days.

..... [3]

97(a). Azmi invests £700 at a rate of 2% per year simple interest.

Work out the interest Azmi receives after one year.

£ [2]

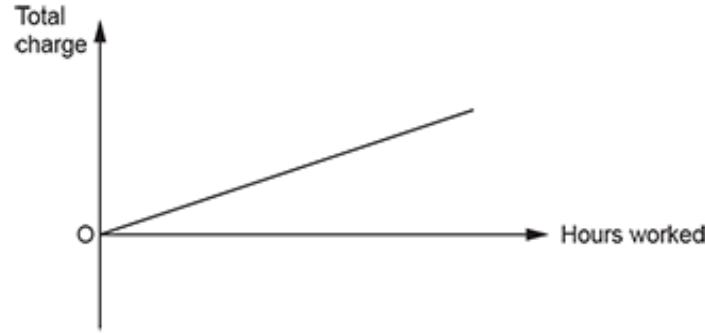
(b). Work out the value of Azmi's investment after 3 years.

£ [2]

98(a). Hiro and Taylor are both electricians.

Hiro **does not** charge to visit a house but charges a fixed rate per hour for the work needed.

This graph shows the relationship between the hours worked and the total charge made by Hiro.



Explain how this graph shows that Hiro's total charge is directly proportional to the hours worked.

[2]

(b). Taylor **does** charge to visit a house and charges the same fixed rate per hour as Hiro for the work needed.

On the axes above, draw a graph to show the relationship between the hours worked and the total charge made by Taylor.

[2]

99. 450 g of flour costs £1.44.

Work out the cost of 1 kg of this flour.

£ [2]

100. A farmer keeps sheep in a rectangular field measuring 120 m by 180 m.

The farmer can keep up to 20 sheep per hectare in the field.

1 hectare is 10 000 square metres.

Work out the maximum number of sheep the farmer can keep in the field.

..... [4]

101(a). Cookies are made using these ingredients.

Ingredients
Makes 24 cookies
240 g butter
360 g sugar
2 eggs
240 g flour
170 g cranberries
100 g white chocolate

How many eggs are needed to make 48 cookies?

..... [1]

(b). How much sugar is needed to make 6 cookies?

..... g [1]

(c). Ashley has 520 g of cranberries and plenty of the other ingredients.
Ashley thinks this is enough to make at least 80 cookies.

Is Ashley correct?
Show working to support your answer.

because

[3]

102(a).

All of the loaves in a baker's shop cost the same price.
Rowan buys 3 loaves and pays £3.78.
Azmi buys 5 loaves.

Work out how much Azmi pays.

£ [3]

(b). Alex and Ling travel the same distance to school.

Alex walks to school in 20 minutes.

Ling runs to school at twice the speed that Alex walks.

Find how many minutes it takes Ling to run to school.

..... min [2]

103(a). Write 28 : 70 as a ratio in its simplest form.

..... : [2]

(b). A map has a scale of 8 centimetres represents 1 metre.

The scale can be written as a ratio in the form 1 : n .

Find the value of n .

$n =$ [2]

104. Ashley has £7 to spend on fruit.
The table shows the prices.

Pineapple (each)	£1.15
Bananas (for 1 kilogram)	70p
Strawberries (for a 200 g pack)	£1.30

Ashley buys 2 pineapples and 3 kilograms of bananas.
Ashley spends the remaining money on strawberries.

Work out the **mass, in grams**, of strawberries that Ashley buys.
You must show your working.

..... g [6]

105. Kai invests £600 at a simple interest rate of $r\%$ each year.
After 5 years, Kai's investment is worth £690.

Find the value of r .

$r =$ [4]

106. Eve is counting the photos on her phone.

The ratio of the number of photos of her family to photos of her friends is 3 : 7.

She has 450 photos of her family

. 80% of the photos of her friends include Jack.

Work out how many of the photos of her friends include Jack.

..... [4]

107. Rowan invests £4000 at a rate of 3.5% per year compound interest.

Calculate the value of Rowan's investment after 5 years.

Give your answer correct to the **nearest penny**.

£ [3]

108. Blake changes £450 into dollars.
£1 is worth 1.34 dollars.

Blake says

$$450 \div 1.34 = 335.82$$

Therefore, £450 is worth 335.82 dollars.

Is Blake correct or incorrect?

Give a reason for your decision.

Blake is because

[1]

109. One afternoon Reece records some vehicles that pass the school gate.

$\frac{2}{5}$ of the vehicles they record are cars.

For Reece's results, write down the ratio of cars to not cars.
Give your answer in its simplest form.

..... : [1]

110. A pattern is made out of blue tiles and yellow tiles.

$\frac{1}{3}$ of the tiles are blue.

There are 36 yellow tiles.

Work out the **total** number of tiles.

..... [3]

111. Alex and Blake share some money in the ratio 2 : 5.
Blake receives £150 more than Alex.

How much money does Alex receive?

£ [3]

112. Mr Fox invests £400 in a savings account that pays 3% simple interest per year.

Work out the **total** amount of interest Mr Fox will have earned at the end of the 5th year.

£ [2]

113. Frankie goes on holiday.

They change £375 into euros (€) at a rate of £1 = €1.15.

They spend €217.49 of this money.

After the holiday, Frankie changes the remaining euros back into pounds at a rate of £1 = €1.28.

Work out how many pounds Frankie gets back.

£ [4]

114. A sports club has 250 members.

Some of the members wish to change a club rule.

To change a club rule, at least 70% of **all** the members must vote 'yes'.

At a meeting of the sports club, 10 members were absent and did not vote.

The other members voted yes : no : don't know in the ratio 11 : 3 : 1.

Did enough members vote 'yes' to change the rule?

Show how you decide.

_____ because _____

[5]

115(a).

In a recipe, the ratio of the amount of flour needed to the amount of butter needed is 4 : 1. Rowan mixes 4 kg of flour with 1 g of butter.

Explain what Rowan has done wrong.

[1]

(b). Azmi gives $\frac{1}{10}$ of their earnings to charity and keeps the remainder.

For Azmi's earnings, find the ratio of the amount they give to charity to the amount they keep.

Give your answer in its simplest form.

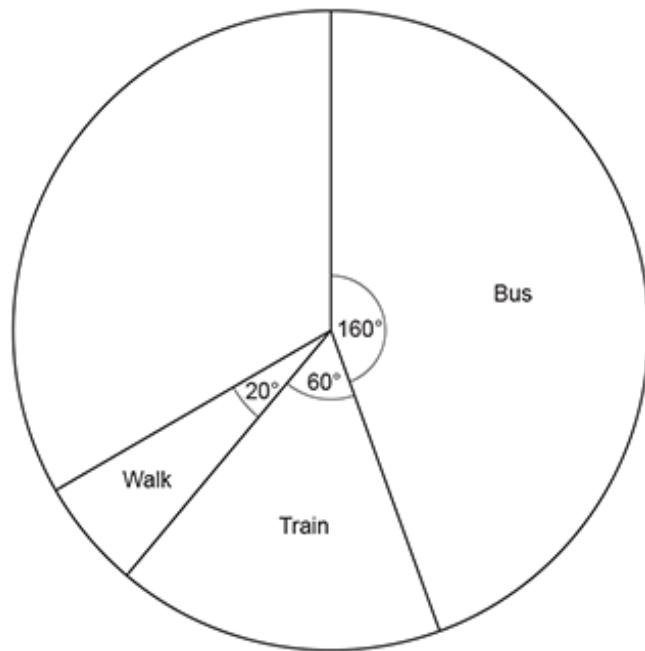
.....

[2]

116(a). Some students were asked how they travel to school.

Each student gave one answer.

The pie chart shows the proportion who travel by bus, by train or walk.



All of the remaining students travel to school either by bike or by car.

The ratio of the number who travel by bike to the number who travel by car is 2 : 3.

Complete the pie chart.

You must show your working.

[6]

(b). Which way of travelling to school is the mode?

..... [1]

117. y is inversely proportional to x .

$y = 20$ when $x = 3$.

Find the value of y when $x = 12$.

$y = \dots$ [3]

118. Bananas cost 25p each.

How many bananas can be bought for £2?

..... [2]

119. Write the ratio $5 : 7\frac{1}{2}$ in its simplest form.

..... : [2]

120. A local theatre is putting on a show.

50 child tickets are sold.

The ratio of the number of child tickets sold to the number of adult tickets sold is 5 : 2.

The cost of a child ticket is £2.50.

The cost of an adult ticket is £5.00.

Work out the **total** amount paid for the tickets.

£ [4]

121(a). Amit says

My normal typing speed is 40 words per minute.

Therefore, I estimate that my normal typing speed is about 210 characters per minute.

Each letter, space and piece of punctuation counts as a character.

How many letters per word is Amit most likely to have used in making the estimate?

Show how you decide.

..... [3]

(b). Amit starts some homework at their normal typing speed of 40 words per minute.

Amit types 52 words in 1 minute 12 seconds.

What may be true about the length of the words that Amit has just typed?

Show how you decide.

..... [3]

122. A bag of sweets contains jellies, mints and toffees.

The ratio of jellies to mints is $n : 2$.

The ratio of mints to toffees is $5 : 3n$.

Work out the ratio of jellies to toffees.

Give your answer in its simplest form.

..... : [4]

123. Rowan's bath has a hot tap and a cold tap.

When turned on full, each tap on its own will fill the bath in 6 minutes.

Rowan turns **both** taps on full.

How long will it take to fill the bath?

..... minutes [2]

124(a). Azmi, Beth and Callum share a flat.

The monthly rent is £760.

They share the rent in the ratio 2 : 3 : 3.

How much does Beth pay for rent each month?

£ [2]

(b). Azmi, Beth and Callum share the fuel bill in the ratio 2 : 3 : 3.

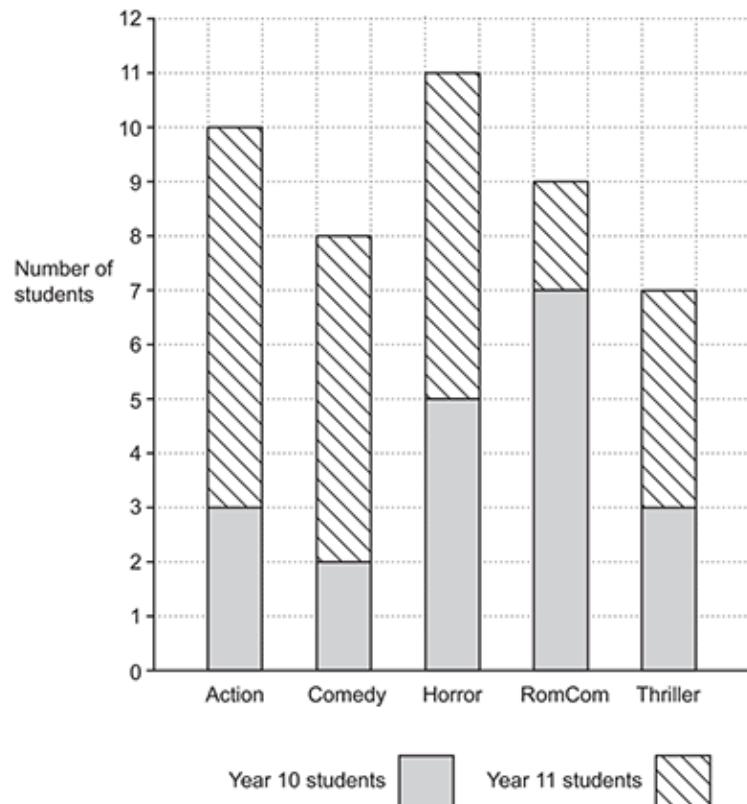
Callum pays £36 for fuel each month.

How much does Azmi pay for fuel each month?

£ [2]

125. In a survey, some students chose their favourite type of film from a list of five.

The bar chart shows the results.



45 students took part in the survey.

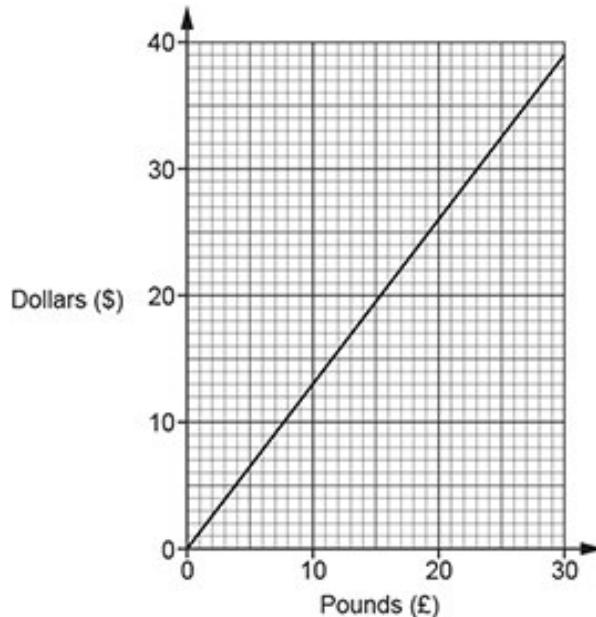
Write the ratio

number of Year 10 students taking part : number of Year 11 students taking part

in its simplest form.

..... : [3]

126(a). A conversion graph between pounds (£) and dollars (\$) is shown below.



Some trainers cost £170 in the UK.

The same trainers cost \$195 in the USA.

Show that the trainers cost less in the USA.

[4]

(b). If the trainers are brought from the USA there is an extra charge for tax and delivery.

Alex wants to pay the lowest total amount for the trainers.

Write down the maximum extra charge for tax and delivery that Alex should be willing to pay.
Give your answer in dollars.

\$ [1]

127. Charlie invests £9000 at a rate of 0.7% per year compound interest.

Calculate the total amount of **interest** Charlie will have earned after 5 years.
Give your answer correct to the **nearest penny**.

£ [4]

128. A biased five-sided spinner is numbered 1, 2, 3, 4 and 5.

The table shows the probability of the spinner landing on 1, 2 and 4.

Number	1	2	3	4	5
Probability	0.10	0.10		0.20	

The spinner is four times more likely to land on 5 than on 3.

Complete the table.

[4]

129. A worker received a 10% pay increase in 2017 and a further 10% pay increase in 2018.
The worker says

Over these two years, my pay increased by $10\% + 10\% = 20\%$.

The worker is incorrect.

Work out the correct percentage increase.
You must show your working.

[5]

130(a). Ben and Sundip are making pancakes using the ingredients below.

<p>Ingredients to make 12 pancakes</p> <p>75 ml water 200 ml milk 100 g flour 50 g butter 2 eggs</p>
--

Ben makes 18 pancakes.

Work out how much flour he needs.

..... g [2]

(b). Sundip has 225 g of butter and 10 eggs.
She has plenty of the other ingredients.

Work out the maximum number of pancakes that she can make.

..... [4]

131. The shape below is formed by a rectangle of width 4 cm and a regular pentagon.
For the rectangle, the ratio of the width to the length is 2 : 5.



Work out the perimeter of the shape.

..... cm [4]

132. A car mechanic has a tin containing 5 litres of engine oil.
Each week they use 450 millilitres of this oil for their vehicles.

The car mechanic says

After 9 weeks I will have used over 80% of the oil in this tin.

Are they correct?
Show how you decide.

[5]

133. Ben and Sundip are making pancakes using the ingredients below.

Ingredients to make
12 pancakes

75 ml water
200 ml milk
100 g flour
50 g butter
2 eggs

The ratio of the amount of water to the amount of milk needed is 75 : 200.

Write this ratio in its simplest form.

..... : [2]

END OF QUESTION PAPER