Year 10 Mock

Foundation Tier

Summer Catch-up

Name	
School	

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Ratios and Fractions

Ratio and Proportion

27n – Simplifying ratios and identifying **fractions** from **ratios**

MET Video

This video will show you how to complete these examples.

Example 1

A Box contains

270 purple beads, 450 blue beads and 180 red beads

Write the ratio of purple to blue to red in its simplest terms

(2)

Example 2

David is 44, his son is 28 years younger

What is the ratio of David's age to his son's age?

Give your answer in its simplest form

(2)

Example 3

Emily and Claire empty their piggy banks

Emily has £3.60 but Claire only has 75p

Write the ratio of Emily's money to Claire's money as a ratio in its simplest terms

(2)

Example 4

A box contains Blue, Black and White buttons in the ratio 2 : 3 : 8

What fraction of the buttons are Black?

(2)

Example 5

Brass is a mixture of copper and zinc

$\frac{1}{3}$ of the mixture is Zinc

What is the ratio of copper to zinc?

(2)

Question 1

Write the ratio 27 : 18 in its simplest terms

(1)

Question 2

Orange paint is a mixture of Red and Yellow in the ratio 1 : 2.

What fraction of the paint is Yellow?

(1)

Question 3

There are 72 members of a swimming club, 27 are men and the rest are women.

Write the ratio for the number of **women** to the number of **men** in its simplest form.

(2)

Question 4

Write the ratio 5.2km : 120m in its simplest form

(2)

Question 5

A jar contains Black, White and Blue buttons in the ratio 5 : 8 : 7

What fraction of the buttons are white?

(2)

Question 6

$\frac{7}{8}$ of the students at school own an iPhone, the rest have an Android phone

What is ratio of Android to IPhone users?

(2)

Recipes

Ratio and Proportion

60n - Adjust a ***recipe*** or check it there are enough ingredients to make a given number

MET Website

Example 1

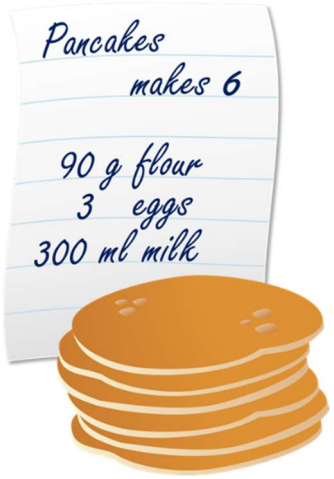
Here is a recipe for making 6 pancakes.

(a) Work out how much of each ingredient is needed to make 18 pancakes.

(2)

(b) Work out how much of each ingredient is needed to make 10 pancakes.

(2)



Example 2

Here is a recipe to make 20 cookies.

Denise want to make 30 cookies.

She has 500 g butter
200 g sugar
6 eggs
280 g flour
150 g choc chips

Does Denise have enough of each ingredient to make 30 cookies?

(4)

Example 3

Here is a recipe to make 15 muffins.

Nikolai has 450 g butter
300 g sugar
550 g flour
8 eggs

What is the greatest number of muffins Nikolai could make with his ingredients?

(4)

Question 1

The box shows the ingredients needed to make 16 gingerbread men.

Hamish wants to make 24 gingerbread men.

Work out how much of each of the ingredients he needs.

Ingredients to make 16 gingerbread men
180 g flour
40 g ginger
110 g butter
30 g sugar

(3)

Question 2

The box shows a list of ingredients for making 18 mince pies.

Elaine wants to make 45 mince pies.

Elaine has: 1 kg of butter
1 kg of flour
500 g of sugar
600 g of mincemeat
6 eggs

Ingredients for 18 mince pies
225 g of butter
350 g of flour
100 g of sugar
280 g of mincemeat
1 egg

Does Elaine have enough of each ingredient to make 45 mince pies?

You must show clearly how you got your answer.

(4)

Question 3

Here are the ingredients needed to make 8 shortbread biscuits.

Tariq is going to make some shortbread biscuits.

He has the following ingredients

300g butter
200g caster sugar
540g flour

Shortbread biscuits makes **8** biscuits
120 g butter
60 g caster sugar
180 g flour

Work out the greatest number of shortbread biscuits that Tariq can make with his ingredients.

You must show all your working.

(4)

Solving Equations

Expressions and Equations

32a – Solve ***equations*** formally using 1 or 2 inverse operations.

This video will show you how to complete these examples.

Example 1

a) Solve $a + 5 = 7$

..... (1)

b) Solve $7b = 21$

..... (1)

c) Solve $\frac{c}{5} = 10$

..... (1)

Example 2

a) Solve $a + a + a + a + a = 30$

..... (2)

b) Solve $4b - b + 2b - 3b = 8$

..... (2)

Example 3

a) Solve $3a - 5 = 16$

..... (2)

b) Solve $\frac{b}{4} + 13 = 16$

..... (2)

Question 1

a) Solve $k - 6 = 5$

..... (1)

b) Solve $m + m + 3m = 35$

..... (1)

c) Solve $\frac{r}{7} = 8$

..... (1)

Question 2

a) Solve $4x + 3 = 27$

..... (2)

b) Solve $7y - 4 = 45$

..... (2)

c) Solve $\frac{w}{3} + 7 = 19$

..... (2)

Factorising (single brackets)

Expressions and Equations

53a – ***Factorising*** into single brackets

MET Video

This video will show you how to complete these examples.

Example 1 Factorise $9a - 3$ …… (1)	***Example 2*** Factorise $a^2 - 5a$ …… (1)	***Example 3*** Factorise fully $12a^2 + 6ab$ …… (1)
Question 1 Factorise $3n + 12$ …… (1)	***Question 2*** Factorise $10r - 15$ …… (1)	***Question 3*** Factorise $12k - 9$ …… (1)
Question 4 Factorise $14t + 35s$ …… (1)	***Question 5*** Factorise $15a + 9b + 12c$ …… (1)	***Question 6*** Factorise $55t - 22u + 33v$ …… (1)
Question 7 Factorise $d^2 + 7d$ …… (1)	***Question 8*** Factorise $m^2 + m$ …… (1)	***Question 9*** Factorise $p^2 - 6pq$ …… (1)
Question 10 Factorise $3x^2 + 5x$ …… (1)	***Question 11*** Factorise $10t^2 + 11tw$ …… (1)	***Question 12*** Factorise $r^3 - 4rk$ …… (1)
Question 13 Factorise fully $8b + 4b^2$ …… (2)	***Question 14*** Factorise fully $12x^2 - 9x$ …… (2)	***Question 15*** Factorise fully $15y^3 + 20y$ …… (2)
Question 16 Factorise fully $12g^2 - 8g + 20gh$ …… (2)	***Question 17*** Factorise fully $6a^2b + 9ab^2$ …… (2)	***Question 18*** Factorise fully $18xy^3 - 24x^2y$ …… (2)

Plot Straight Line Graphs

Graphs

39a - Plotting ***graphs of straight lines*** including horizontal and vertical lines

MET Website

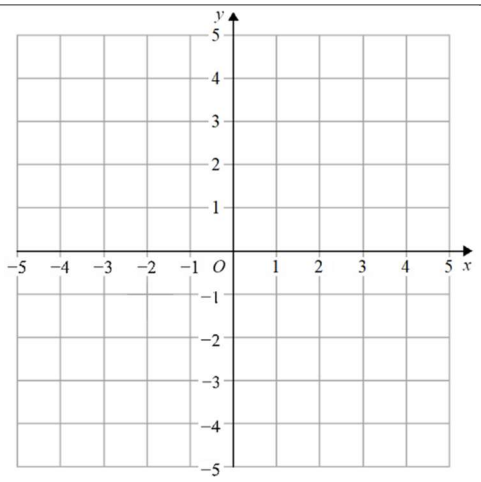
Example 1

a) Plot the line $x = 4$

b) Plot the line $y = -3$

c) Plot the line $y = x$

d) Plot the line $y = -x$

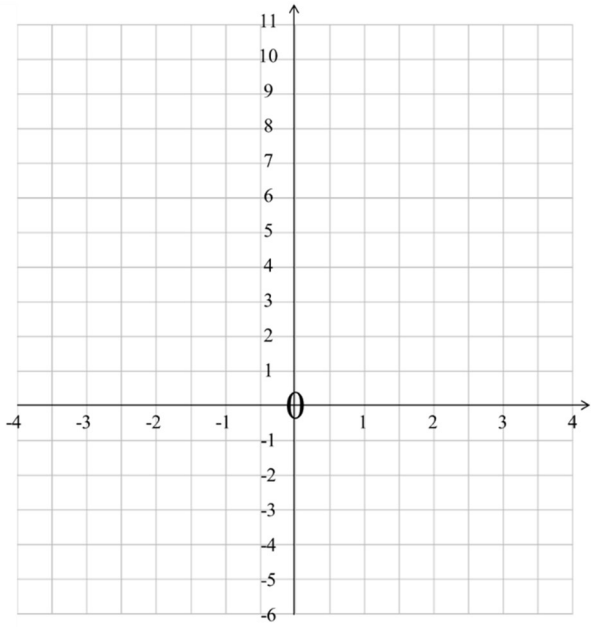


(4)

Example 2

Plot the line $y = 3x + 1$, for $-2 \leq x \leq 3$

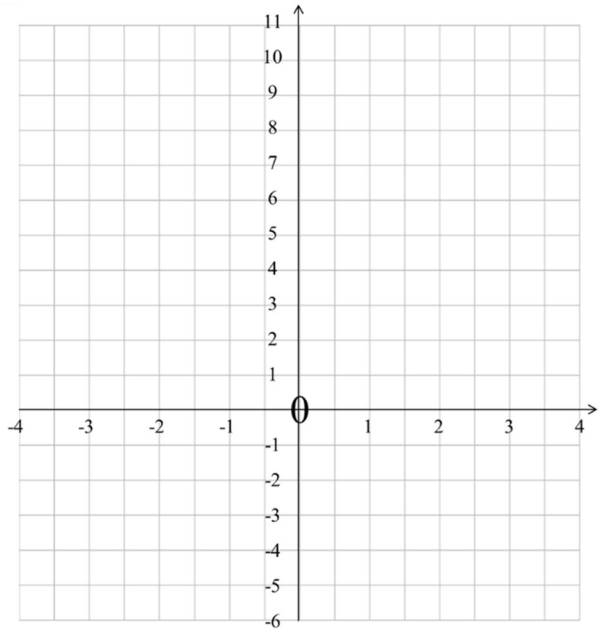
x	-2	-1	0	1	2	3
y						



(3)

Example 3

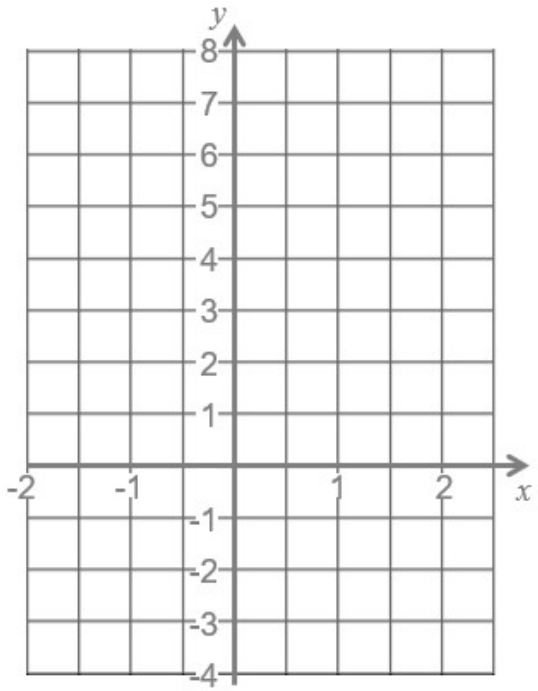
Plot the line $y = 5 - 2x$, for $-3 \leq x \leq 4$



(3)

Question 1

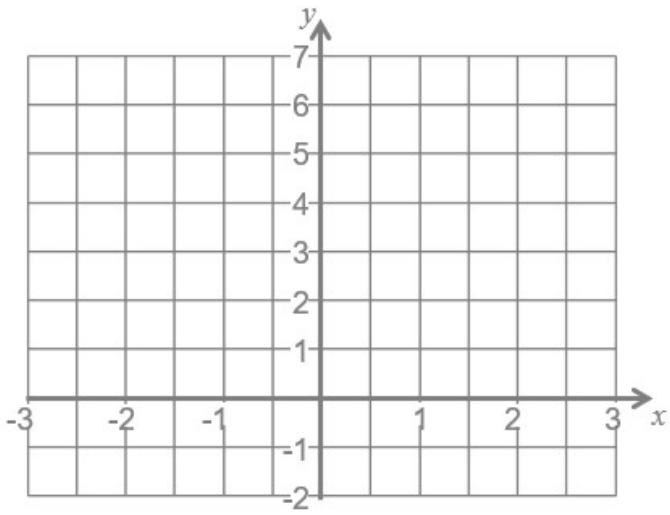
Plot the graph of $y = 3x + 2$ for values of x from -2 to 2



(3)

Question 2

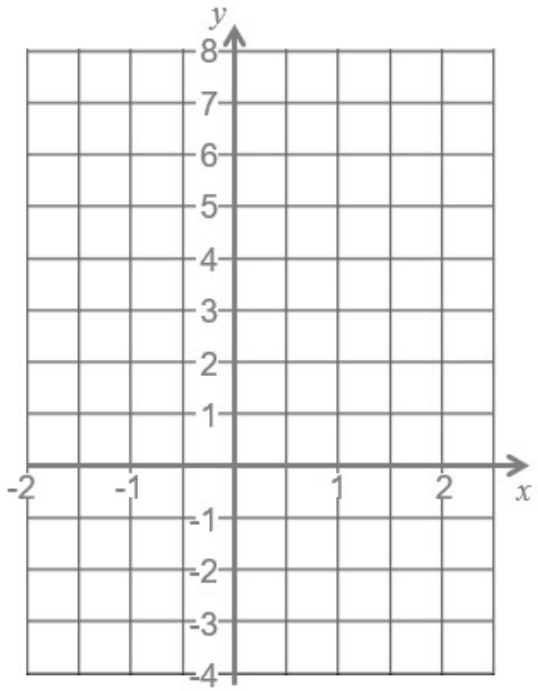
Plot the graph of $y = \frac{1}{2}x + 4$ for values of x from -3 to 3



(3)

Question 3

Plot the graph of $y = 3 - 2x$ for values of x from -2 to 2

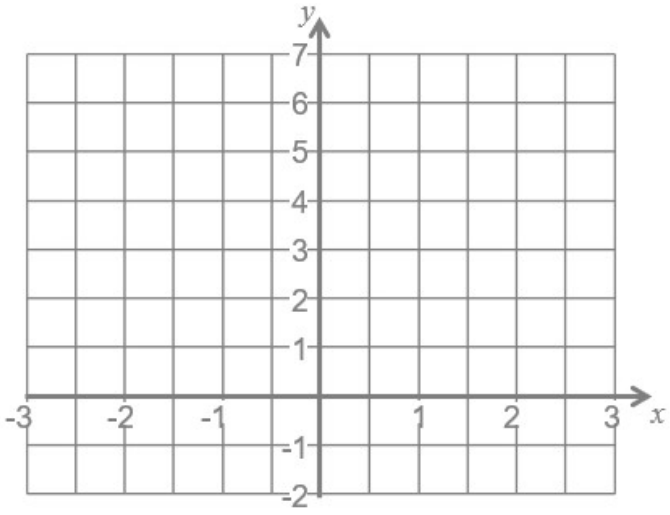


(3)

Question 4

On the grid plot, for values of x from -1 to 3, the graphs of

(a) $y = 4 - x$ (b) $y = 3$



(4)

(c) Write down the coordinates of the point where the two lines intersect.

(..... , ...) **(1)**

Geometric Equations

Expressions and Equations

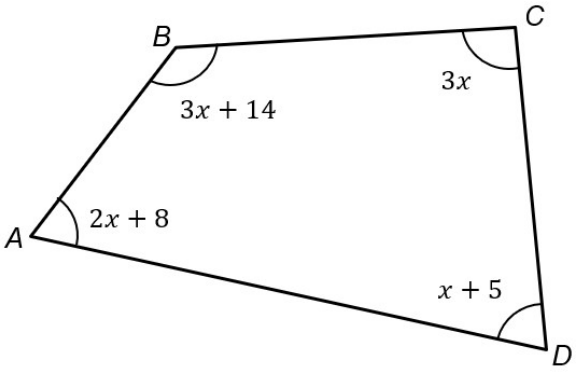
54a - ***Forming and solving equations*** arising from shape, measure or word problems

MET Website

Example 1

ABCD is a quadrilateral.

Find the size of the largest angle.



……..° **(4)**

Example 2

ABCD is a rectangle.

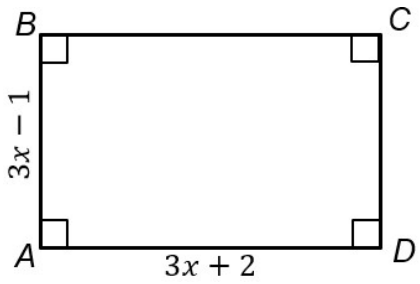
The length of side AB is $3x - 1$

The length of side AD is $3x + 2$

The perimeter of ABCD is 38 cm

All lengths are measured in centimetres.

Find the area of ABCD.



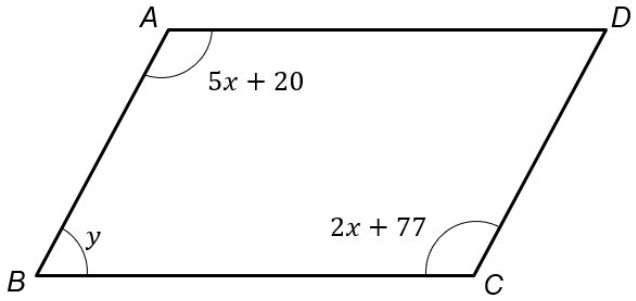
……..cm² **(4)**

Example 3

ABCD is a parallelogram.

All the angles are in degrees.

Find the values of x and y.



x = …… and y =…… **(4)**

Example 4

Mirza has the same number of sweets as Shireen.

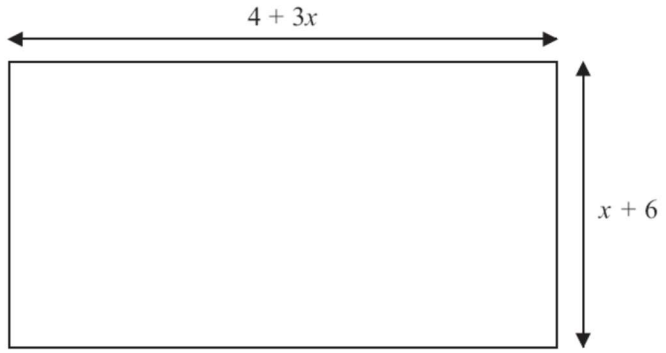
Mirza gives 24 of her sweets to Shireen.
Shireen now has 3 times as many sweets as Mirza .

Work out the total number of sweets that Mirza and Shireen have.

…….. **(4)**

Question 1

The diagram shows a garden in the shape of a rectangle.



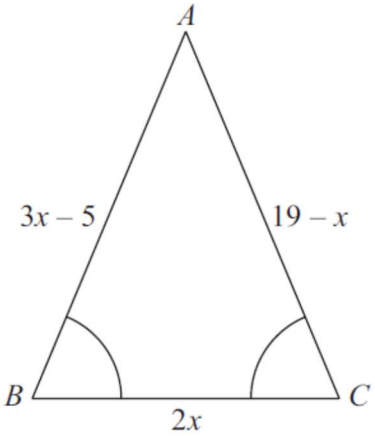
All measurements are in metres.
The perimeter of the garden is 32 metres.

Work out the value of x.

$x =$..... **(3)**

Question 2

ABC is a triangle.



Angle *ABC* = angle *BCA*.

The length of side *AB* is (3*x* – 5) cm.
The length of side *AC* is (19 – *x*) cm.
The length of side *BC* is 2*x* cm.

Work out the perimeter of the triangle.
Give your answer as a number of centimetres.

..... cm **(4)**

Question 3

Kiaria is 7 years older than Jay.
Martha is twice as old as Kiaria.
The sum of their three ages is 77.

Find the ratio of Jay's age to Kiaria's age to Martha's age.

..... **(4)**

Question 4

The size of the largest angle in a triangle is 4 times the size of the smallest angle.
The other angle is 27° less than the largest angle.

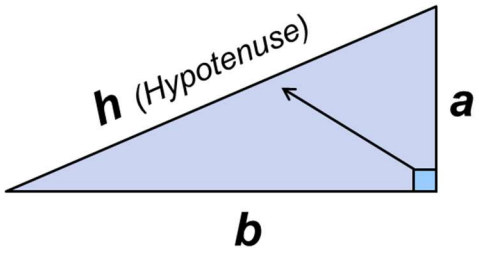
Work out, in degrees, the size of each angle in the triangle.
You must show your working.

..... °, ... °, ... ° **(5)**

Pythagoras' Theorem

Pythagoras and Trigonometry

51s - Using ***Pythagoras' Theorem*** to calculate the **hypotenuse** or short side of a right-angled triangle or to check if a triangle is right-angled.



Pythagoras

$a^2 + b^2 = h^2$

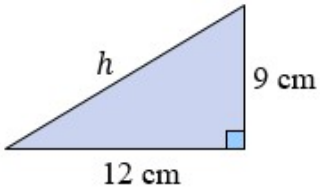
h = Hypotenuse

MET Video

This video will show you how to complete these examples.

Example 1

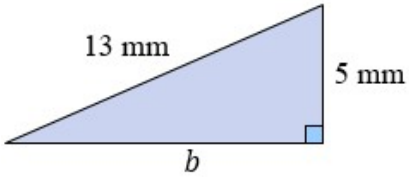
Work out the length of the side labelled h.



..... cm (2)

Example 2

Work out the length of the side labelled y.

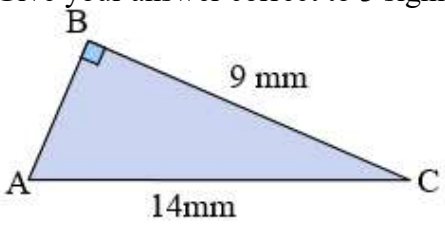


..... mm (2)

Example 3

Calculate the length of the edge AB.

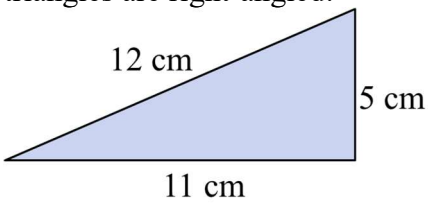
Give your answer correct to 3 significant figures.

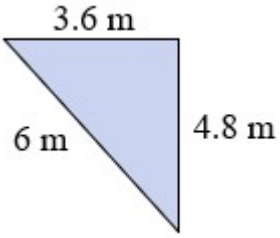


..... cm (2)

Example 4

Decide, by calculation, whether either of these triangles are right-angled.

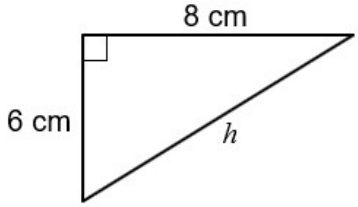




(2)

Question 1

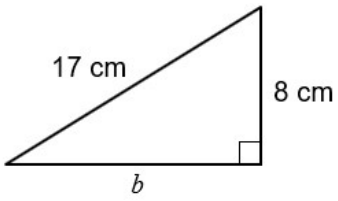
Work out the length of the side labelled h.



…… cm (2)

Question 2

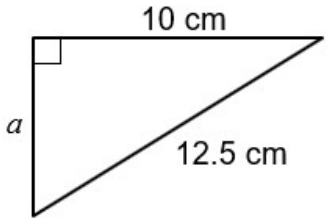
Work out the length of the side labelled b.



…… cm (2)

Question 3

Work out the length of the side labelled a.

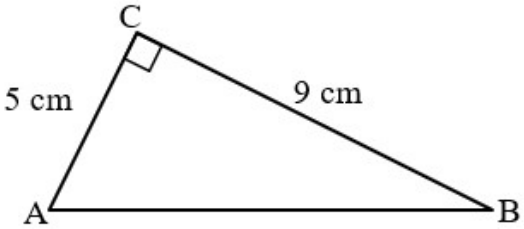


…… cm (2)

Question 4

Work out the length of AB.

Give your answer correct to 3 significant figures.

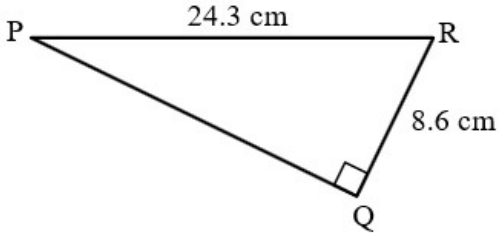


…… cm (2)

Question 5

Work out the length of PQ.

Give your answer correct to 3 significant figures.



…… cm (2)

Question 6

Triangle ABC has sides

AB = 10.4 cm

BC = 4 cm

AC = 9.6 cm

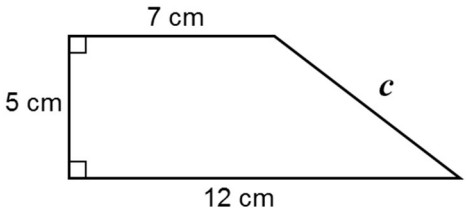
Decide, by calculation if ABC is a right-angled triangle.

…… cm (3)

Question 7

Calculate the perimeter of this trapezium.

Give your answer correct to 3 significant figures.



…… cm (4)

Frequency Trees

Present / Interpret Data

55d - Draw up a ***frequency tree*** from a list of information and use it to solve problems

MET Website

Example 1

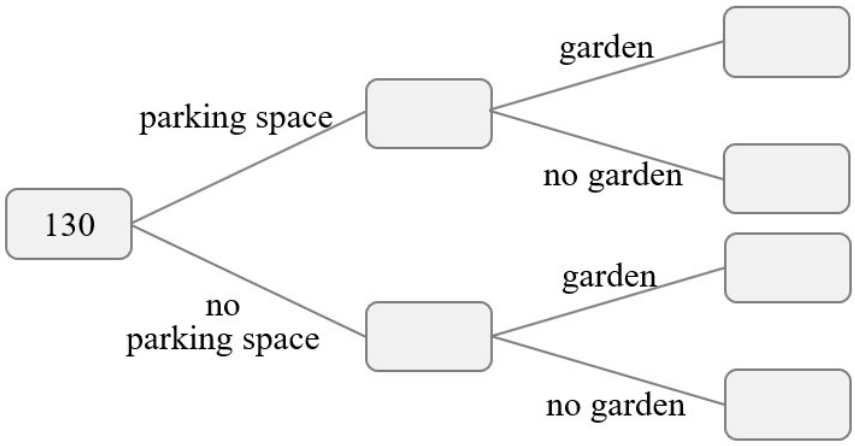
There are 130 houses in a village.

38 houses do not have a parking space.

107 houses have a garden.

12 houses do not have a garden or a parking space.

(a) Use this information to complete the frequency tree



(3)

One of the houses is picked at random.

(b) What is the probability this house has a garden and a parking space?

…….. **(1)**

One of the houses without a garden is picked at random

(c) What is the probability this house does not have a parking space?

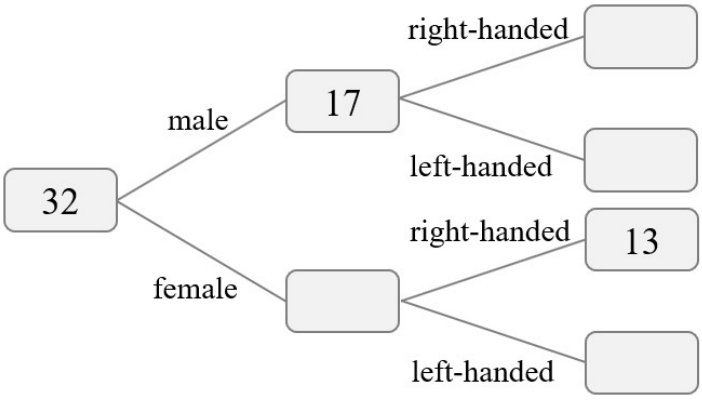
…….. **(1)**

Example 2

There are 32 students in a class.

Some information about the students is in the frequency tree and two-way table below.

Complete the frequency tree and the two-way table.



	Right-handed	Left-handed	**Total**
Male			
Female			
Total	27		32

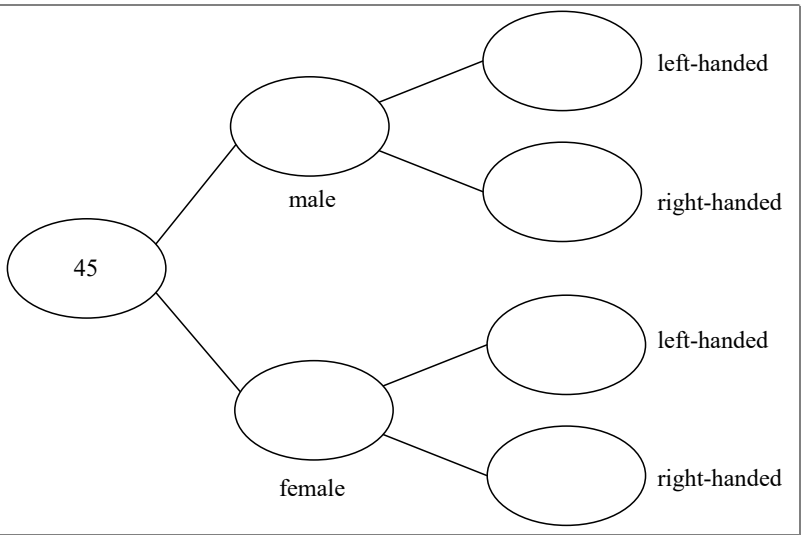
(4)

Question 1

Each worker in a factory is either left-handed or right-handed.

22 of the 45 workers are male.
16 of the 34 right-handed workers are female.

Complete the frequency tree for this information.



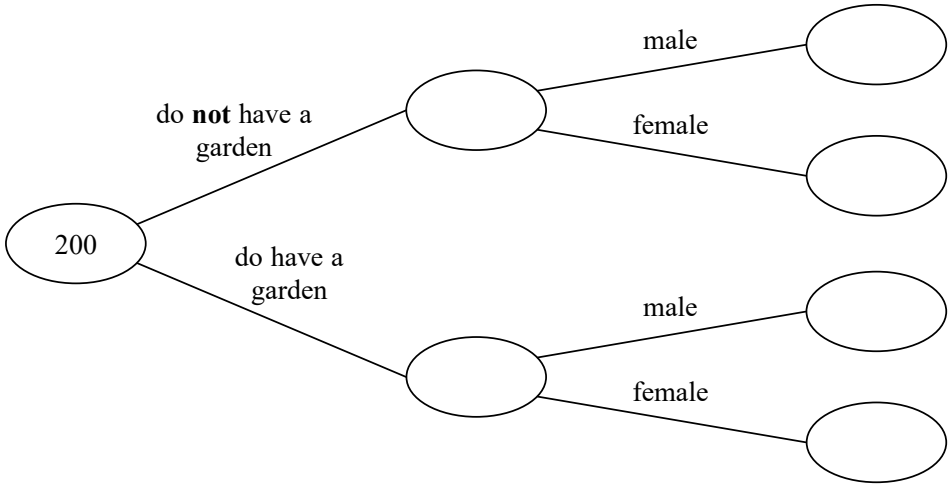
(3)

Question 2

200 people live in a village.

23 people do **not** have a garden.
10 males do **not** have a garden.
95 people are male.

(*a*) Use this information to complete the frequency tree.



(3)

One of the people who does **not** have a garden is chosen at random.

(*b*) Write down the probability that this person is female.

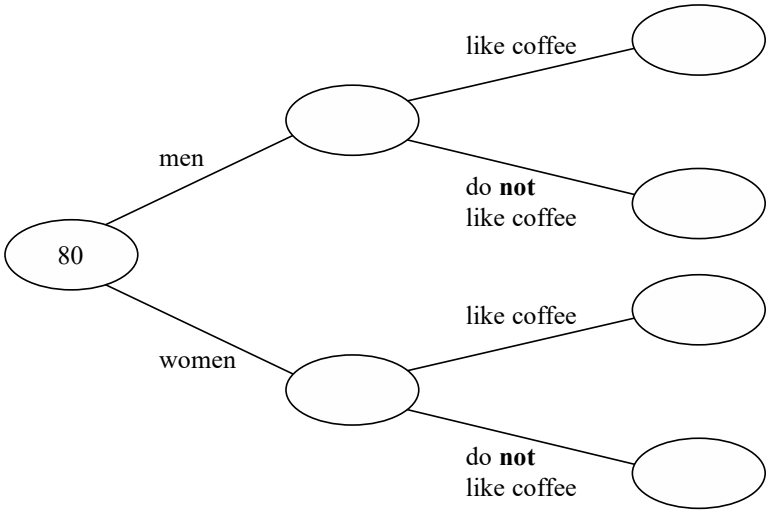
..... **(2)**

Question 3

80 people are asked if they like coffee.

48 of these people are women.
61 of the 80 people like coffee.
8 of the men do **not** like coffee.

(*a*) Use this information to complete the frequency tree.



(3)

One of the people who like coffee is chosen at random.

(*b*) Find the probability that this person is a woman.

..... **(2)**