

SEPTEMBER - OCTOBER



Exam Questions

GCSE MATHS

Name:

Vocational Course:

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All Qs from AQA past papers

Number

Grade 1 – 2

1

How many minutes are there in $3\frac{1}{2}$ hours?

Circle your answer.

[1 mark]

180.5

210

330

350

2

Work out $\frac{1}{4} + 0.5$

Circle your answer.

[1 mark]

0.30

0.6

0.75

0.9

3

How many millimetres are there in 7.5 centimetres?

Circle your answer.

[1 mark]

0.75

70.5

75

750

7500

4

Circle the shortest length.

[1 mark]

1200 cm

0.13 km

110 m

140 000 mm

5

The first part of a show starts at 7.45 pm
It lasts 35 minutes.

(a) What time does the first part end?

[1 mark]

Answer _____

(b) After the first part there is a 20-minute break.
The **second** part lasts 45 minutes.

What time does the second part end?

[2 marks]

6

Work out $\frac{1}{2} \times 5$

Circle your answer.

[1 mark]

$\frac{5}{10}$

$2\frac{1}{2}$

$\frac{1}{10}$

$2\frac{1}{5}$

7

Work out 83×26

[3 marks]

8

Work out 58×73

[3 marks]

9

The cost of 3 calendars is £18

Work out the cost of 5 calendars.

[2 marks]

Grade 3

10

By rounding each number to the nearest 10,

estimate the answer to $\frac{61 \times 47}{102}$

You **must** show your working.

[2 marks]

11

A helicopter blade does 3206 full turns in 7 minutes.

Work out the number of full turns per minute.

[2 marks]

12

Coaches take people to a festival.

Each coach can take 50 people.

From one city there are 820 people.

How many coaches are needed?

[3 marks]

13

By rounding each number to 1 significant figure, estimate the answer to

$$\frac{78 \times 11.6}{391}$$

You **must** show your working.

[3 marks]

14

By rounding each number to the nearest 10,

estimate the answer to $\frac{61 \times 47}{102}$

You **must** show your working.

[2 marks]

15

From a different city 13 coaches are needed.

Each coach costs £450 to hire.

Work out the total cost of hiring 13 coaches.

[3 marks]

16

Work out $25.68 \div 12$

[2 marks]

The cost of fuel is £1.10 per litre.

1 gallon = 4.5 litres

- (a)** Work out the cost of 1 gallon.

[3 marks]

Answer £ _____

- (b)** A car travels 35 miles per gallon of fuel.

How many gallons are used for a journey of 105 miles?

[2 marks]

Grade 4-5

18

1 mile = 5280 feet

1 foot = 12 inches

1 inch = 2.54 cm

Use the given conversions to show that 1 mile is approximately 1600 metres.

[3 marks]

19

The length of a table is 110 cm to the nearest cm

Complete the error interval.

[2 marks]

_____ cm \leq length $<$ _____ cm

20

The length of a pipe is 6 metres to the nearest metre.

Complete the error interval for the length of the pipe.

[2 marks]

Answer _____ m \leq length < _____ m

(b) The length of a different pipe is 4 metres to the nearest metre.

Olly says,

“The total length of the two pipes is 11 metres to the nearest metre.”

Give an example to show that he could be correct.

[2 marks]

21

Sam spends exactly £20 on petrol.

The petrol costs £1.45 per litre.

Work out the number of litres of petrol she buys.

Give your answer to 1 decimal place.

[3 marks]

The speed of the International Space Station is 27 576 kilometres per hour.

- (a) The station travels 42 600 kilometres in one orbit.

Work out the number of **full** orbits the station does in one day.

[3 marks]

Answer _____

- (b) Convert 27 576 kilometres per hour into metres per second.

[3 marks]

Fractions

Grade 1 – 2

1 _____

Work out $\frac{1}{3} \times \frac{1}{4}$

[1 mark]

Answer _____

2 _____

A different pack has 72 cards.

$\frac{5}{9}$ are yellow.

Work out the number of yellow cards.

[2 marks]

3 _____

What is one quarter of 5 hours?

Tick a box.

[1 mark]

1 hour 15 minutes	<input type="checkbox"/>
115 minutes	<input type="checkbox"/>
1 hour 25 minutes	<input type="checkbox"/>
125 minutes	<input type="checkbox"/>

4

Work out $\frac{3}{5} \times \frac{7}{2}$

Give your answer as a mixed number.

[2 marks]

5

Work out $\frac{1}{2} \times 5$

Circle your answer.

[1 mark]

$$\frac{5}{10}$$

$$2\frac{1}{2}$$

$$\frac{1}{10}$$

$$2\frac{1}{5}$$

6

Work out $\frac{3}{8} \times 11$

Give your answer as a mixed number.

[2 marks]

Answer _____

Grade 3

7

120 men and 80 women were asked if they drive to work.

Altogether $\frac{1}{4}$ of the people said yes.

$\frac{1}{3}$ of the men said yes.

What fraction of the women said yes?

[4 marks]

8

Work out $\frac{5}{6} + \frac{3}{7}$

Give your answer as a mixed number.

[3 marks]

9

The average age of teachers at a school is 36 years.

Mr Smith's age is $\frac{11}{9}$ of the average.

How old is Mr Smith?

[2 marks]

10

In a class, the number of girls as a fraction of the number of boys is $\frac{5}{4}$

Write down the number of boys as a fraction of the number of girls.

[1 mark]

There are 20 girls in the class.

Work out the number of boys.

[2 marks]

11

A train has 1 first-class carriage and 6 standard carriages.

The first-class carriage has 64 seats.

$\frac{3}{8}$ are being used.

Each standard carriage has 78 seats.

$\frac{7}{13}$ in each carriage are being used.

Are **more than** half the seats on the train being used?

You **must** show your working.

[5 marks]

12

Work out $\frac{1}{4} + \frac{7}{10}$

Give your answer as a fraction.

[2 marks]

Grade 4-5

13

Work out $2\frac{1}{3} + 1\frac{3}{4}$

Give your answer as a mixed number.

[3 marks]

Answer _____

14

Work out $5\frac{1}{4} + \frac{1}{2} \times \frac{2}{3}$

Give your answer as a mixed number.

[2 marks]

Percentages

Grade 1-2

1

What is $\frac{9}{10}$ as a percentage?

Circle your answer.

[1 mark]

0.09%

0.9%

9%

90%

2

Circle the fraction equal to 0.1%

[1 mark]

$\frac{1}{10}$

$\frac{1}{100}$

$\frac{1}{1000}$

$\frac{1}{10\,000}$

3

Which statement is true?

Circle your answer.

[1 mark]

10% of 50 = 50% of 20

10% of 10 = 20% of 20

10% of 20 = 20% of 10

10% of 40 = 25% of 100

4

What is 18 as a percentage of 72 ?

Circle your answer.

[1 mark]

18%

20%

25%

40%

Grade 3

5

Work out 258% of 6300

[2 marks]

Answer _____

6

Here is some information about a group of children.

	Boys	Girls
Left-handed	3	8
Right-handed	12	20

6 (a) Write down the number of left-handed girls to right-handed girls as a ratio.
Give your answer in its simplest form.

[1 mark]

Answer _____ : _____

6 (b) What percentage of the boys are left-handed?

[2 marks]

Answer _____ %

7

In a test,

Section A has 80 marks

Section B has 120 marks.

Riya scores

55% in Section A

70% in Section B.

To pass, Riya needs to score 65% of the **total** marks.

Does she pass?

You **must** show your working.

[4 marks]

8

5% of a number is 31

1% of the same number is 6.2

Work out 13% of the number.

[3 marks]

9

Sam wants to buy a camera for £345

He has already saved £96

Each week

his pay is £80

he saves 30% of this pay.

How many **more** weeks must he save?

[4 marks]

Grade 4-5

10

Last season a football club sold 8000 season tickets at £250 each.

This season the season ticket price is reduced by 20% to £200

If the club sell 20% **more** tickets will the amount of money they receive increase, decrease or stay the same?

You **must** show your working

[5 marks]

11

Ellen works for a company that sells cars.

Her **monthly** pay is

- a salary of £1470
- 28% of the total **profit** the company makes from her sales
- a £250 bonus **if** she sells at least 15 cars.

The table shows information about the cars she sold last year.

Total cost to the company	Total income for the company	Number of months when she sold at least 15 cars
£464 500	£538 000	3

Was Ellen's total pay for the **year** more than £40 000?

You **must** show your working.

[6 marks]

Ratio

Grade 1-2

1

Divide 120 in the ratio 1 : 4

[2 marks]

2

Here is a map of France.



Scale: 1 cm represents 80 km

Work out the actual straight-line distance from Paris to Marseille.

[2 marks]

3

Circle the ratio which is the same as the scale 1 cm represents 2 m

[1 mark]

1 : 2

1 : 20

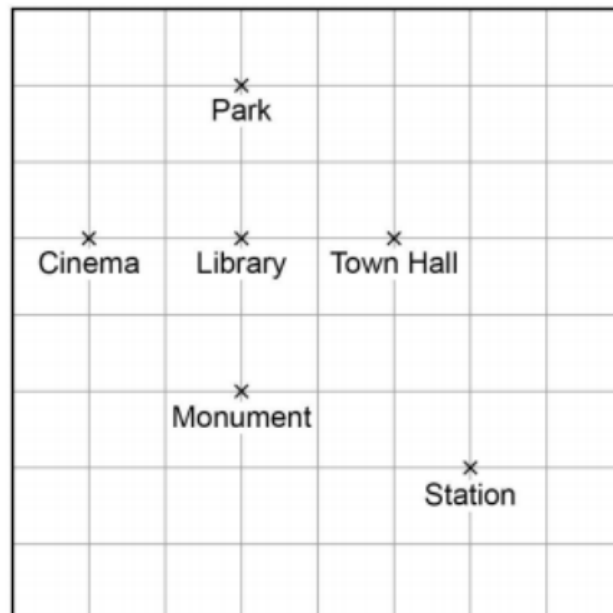
1 : 200

1 : 2000

4

Here is a map of a town.

Scale: 1 cm represents 200 m



What is the distance, in metres, from the Cinema to the Station?

[3 marks]

5

Which ratio is **not** equivalent to the ratio 3 : 4

Circle your answer.

[1 mark]

 $\frac{3}{4} : 1$ $1 : \frac{4}{3}$

1 : 1.3

6 : 8

6

White paint costs £2.80 per litre.

Blue paint costs £3.50 per litre.

White paint and blue paint are mixed in the ratio 3 : 2

Work out the cost of 18 litres of the mixture.

[4 marks]

7

Write the ratio $7 : 4$ in the form $n : 1$

[1 mark]

8

In a school show,

girls : boys = 1 : 1

girls who sing : girls who do not sing = 1 : 2

8 girls **sing** in the show.

How many students are in the show altogether?

[3 marks]

9

Here is some information about a group of children.

	Boys	Girls
Left-handed	3	8
Right-handed	12	20

Write down the number of left-handed girls to right-handed girls as a ratio.

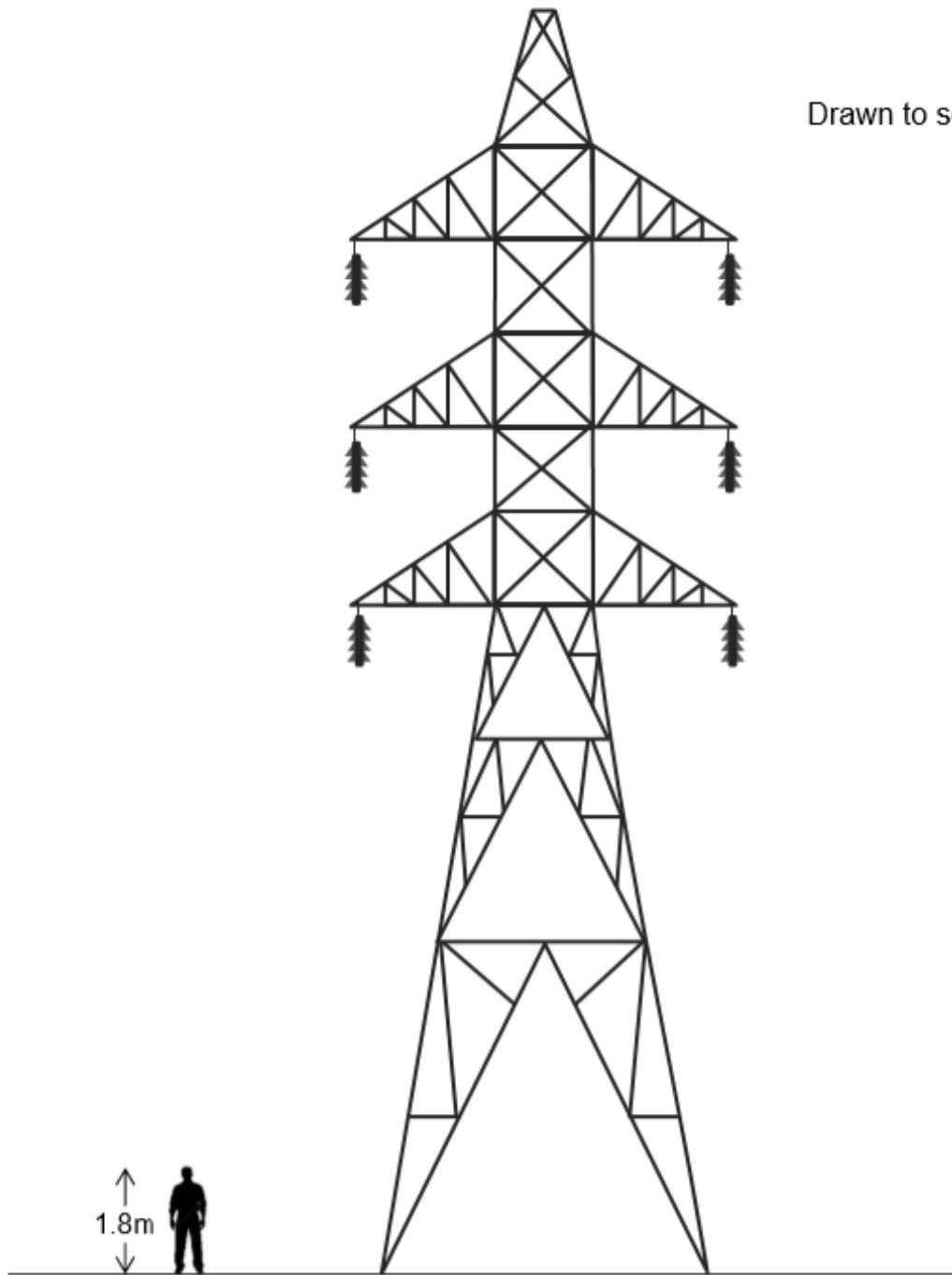
Give your answer in its simplest form.

[1 mark]

10

What percentage of the boys are left-handed?

[2 marks]



Use the height of the man to estimate the height of the pylon.

[2 marks]

12

The scale on a map is 1 : 200 000

Work out the number of kilometres represented by 2.5 cm on the map.

[2 marks]

Grade 4-5

13

Here are the instructions on a bottle of fruit squash.

To make fizzy juice
mix 2 parts fruit squash
with 7 parts lemonade



How much fruit squash is needed to make 450 ml of fizzy juice?

[2 marks]

14

Tom has 80 ml of fruit squash.

He also has 210 ml of lemonade.

What is the **maximum** amount of fizzy juice he can make?

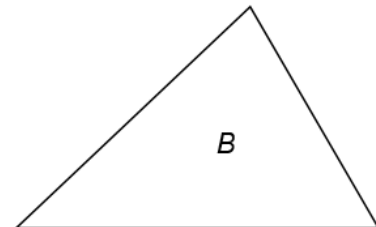
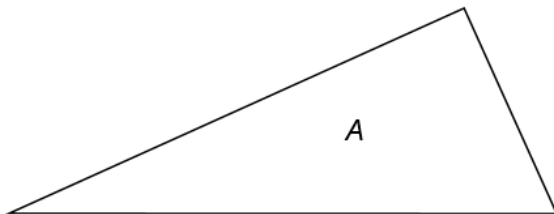
[3 marks]

15

The angles in triangle *A* are in the ratio 1 : 2 : 3

The angles in triangle *B* are in the ratio 4 : 5 : 6

Not drawn
accurately



Jack says,

“The middle number in each ratio is one third of the total,
so one of the angles in each triangle is 60 degrees”

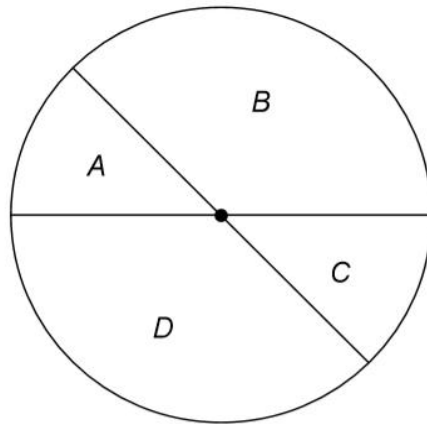
Is he correct?

Show working to support your answer.

[2 marks]

A circle has radius 6 cm

Two diameters split the circle into four sectors, as shown.



Not drawn
accurately

Area of sector A : Area of sector $B = 1 : 3$

Work out the area of sector A .

Give your answer in terms of π .

[3 marks]

Collecting Like Terms & Expanding Brackets

Grade 1-2

1

Simplify $a + a + a + a + a + a$

[1 mark]

Answer _____

2

Multiply out $5(2a - 7)$

[2 marks]

Answer _____

3

Multiply out $7(3a + 8)$

[2 marks]

Answer _____

4

Simplify $7x + 5 - 8 - 3x$

Circle your answer.

[1 mark]

x

$4x + 3$

$4x - 3$

$10x - 3$

5

Simplify $5a - (2a + 6)$

Circle your answer.

[1 mark]

$3a + 6$

$9a$

$-3a$

$3a - 6$

6

Simplify $7a + 5b + 3a - 2b$ **[2 marks]**

7

Simplify $6w - 5x - 4w - 2x$ **[2 marks]**

8

Simplify $12x^2 - 8x^2 - 5x + 2x$ **[2 marks]****Grade 3**

9

Simplify $5(x + 3) - x + 2$ **[3 marks]**

10

Expand and simplify $3(2x - 5) + 4(2x + 1)$ **[2 marks]**

11

Simplify $5(x + 3) - x + 2$ **[3 marks]**

12

George says that $4 + a + a + a + b + b = 24ab$

Describe the mistakes George has made.

Give the correct answer.

[2 marks]

Answer _____

13

Expand and simplify

$$2(3h + 6) + 5(4h + 2)$$

[3 marks]

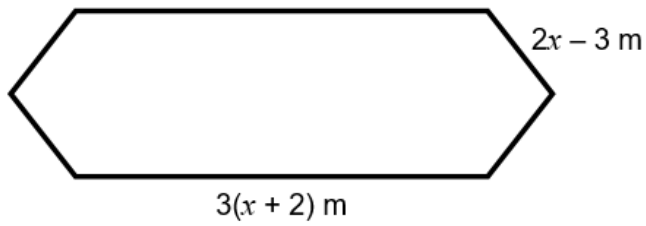
Answer _____

$$6(3j - 2) - 4(2j + 4)$$

[3 marks]

Answer _____

Sam wants to build a water play area for children.
He wants the shape to have **two** lines of symmetry.



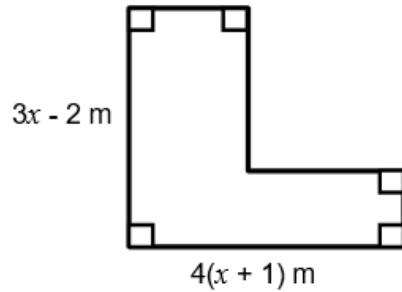
Work out an expression for the total perimeter of the shape.

[4 marks]

Answer _____ m

15

A house has an open plan kitchen and lounge as shown.



Not drawn accurately

Work out an expression for the total perimeter of the shape.

[4 marks]

Answer _____ m

16

Work out the values of a and b in the identity

$$3ax + 6 - 4(x + b) \equiv 11x + 14$$

[5 marks]

Substitution

Grade 1-2

1

a is a negative odd number.

Circle the words that describe a^2

[1 mark]

negative and odd

negative and even

positive and odd

positive and even

2

A shopkeeper uses this formula to work out the cost of bags of oranges.

$$C = 1.8n$$

C is the cost in £

n is the number of bags

Work out the cost of 7 bags.

[2 marks]

There are four oranges in each bag.

Work out the average cost of an orange.

Give your answer in pence.

[2 marks]

3

Here is a formula.

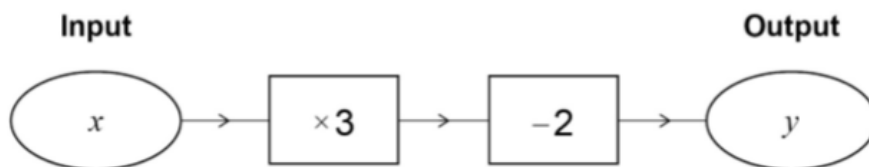
$$V = \frac{1}{2}x^2h$$

Work out the value of V when $x = 11$ and $h = 6$

[2 marks]

4

Here is a number machine.



Work out the output when the input is 4

[1 mark]

Work out the output when the input is -4

[1 mark]

5

You are given that

$$a = 3 \text{ and } b = 5$$

Tick whether each statement is true or false.

Give a reason for each answer.

[2 marks]

Statement	True	False	Reason
$ab = 35$			
$2b^2 = 100$			

Grade 3

6

n is an odd number.

p is a prime number.

In each part write down possible values of n and p so that

$n + p$ is a square number.

[1 mark]

np is a square number.

[1 mark]

7

A football team has P points.

$$P = 3W + D$$

W is the number of wins

D is the number of draws

A team has 6 wins and 2 draws.

How many points does the team have?

[1 mark]

After 33 games a different team has 53 points.

11 games were draws.

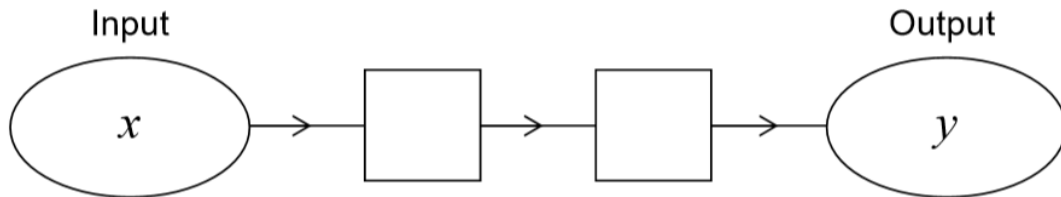
How many games has this team **lost**?

[4 marks]

8

Complete this number machine so that $y = 2(x + 7)$

[1 mark]



9

A company uses this formula to work out the cost, £ A , of a taxi ride.

$$A = 4 + 1.8m + b$$

£4 is a fixed charge

m is the number of miles travelled

£ b is a charge for booking online

- (a) Clare books a taxi online and travels 8 miles.
She pays £20 altogether.

How much is the charge for booking online?

[3 marks]

10

Here is a formula for the amount of water needed to cook rice.

$$w = 1.5r + 0.5$$

w is the number of cups of water needed

r is the number of cups of rice to be cooked

(a) How many cups of water are needed to cook 7 cups of rice?

[2 marks]

(b) How many cups of rice can be cooked with 20 cups of water?

[3 marks]

11

$$a - b = 5$$

Work out the value of $2(a - b)$

[1 mark]

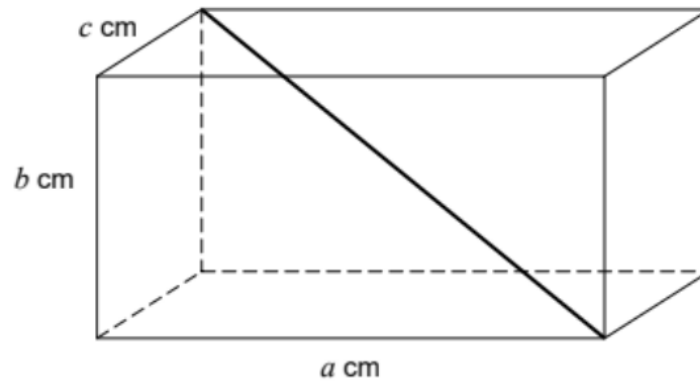
Work out the value of $7a - 7b$

[1 mark]

Work out the value of $b - a$

[1 mark]

The diagram shows a cuboid and its diagonal.



The formula to work out the length of the diagonal in centimetres is

$$\text{Length of diagonal} = \sqrt{a^2 + b^2 + c^2}$$

- (a) Work out the length of the diagonal when $a = 8$, $b = 3$ and $c = 2$
Give your answer to 2 significant figures.

[3 marks]

Work out the value of $4(2x + 3y)$ when $x = 8$ and $y = -3$

[2 marks]

Here is a formula.

$$s = 5t^2$$

s is the distance in metres a ball falls when dropped

t is the time taken in seconds

A ball is dropped.

1.2 seconds later it hits the floor.

What distance does the ball fall?

[2 marks]

A different ball is dropped from 2 metres above the floor.

Work out the time taken for this ball to hit the floor.

[3 marks]

Here is a formula to convert degrees Celsius ($^{\circ}\text{C}$) to degrees Fahrenheit ($^{\circ}\text{F}$).

$$F = 1.8C + 32$$

F is the number of degrees Fahrenheit

C is the number of degrees Celsius

(a) Show that $-40^{\circ}\text{C} = -40^{\circ}\text{F}$

[2 marks]

(b) The temperature is -15°C

Nick says,

“Because the temperature is negative in Celsius, it **must** be negative in Fahrenheit.”

Is he correct?

You **must** show your working.

[1 mark]

n is an odd number.

Tick any statements that are true.

[3 marks]

$n^2 + 1$ is odd

$n(n + 1)$ is odd

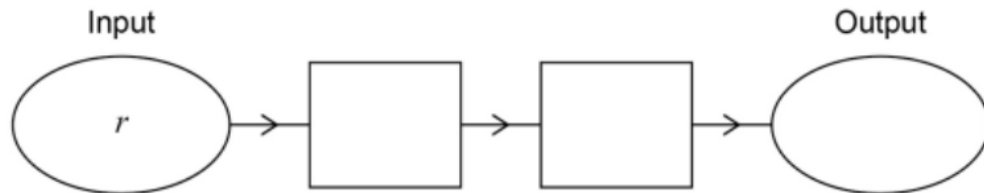
$(n + 1)^2$ is odd

$n^2 + 2$ is odd

$n(n + 2)$ is odd

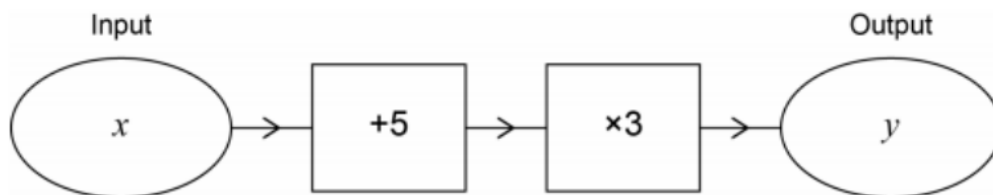
$(n + 2)^2$ is odd

- (a) Complete the number machine so that $q = 7r - 2$



[2 marks]

- (b) Write down the output y in terms of x .



[1 mark]

This formula works out the tax you pay.

$$T = 0.2(E - 10\,600)$$

T is the tax you pay in pounds.

E is the amount you earn in pounds.

- (a) How much tax do you pay if you earn £20 000?

[2 marks]

- (b) What is the most you can earn without paying tax?

[1 mark]

- (c) Alison pays £5200 tax.

Work out the amount she earns.

[3 marks]

Linear Equations & Inequalities

Grade 1-2

1

Solve $5y = 45$

[1 mark]

2

Solve $x - 3 = 14$

[1 mark]

3

Solve $8 + w = 6$

[1 mark]

4

Solve $x - 3 = 0$

Circle your answer.

[1 mark]

$x = -3$

$x = 0$

$x = \frac{1}{3}$

$x = 3$

Grade 3

5

Solve $3x - 8 = 19$

[2 marks]

6

Solve $4x - 3 = 14$

[2 marks]

7

Solve $8x - 3 = 6x - 9$

[3 marks]

8

Solve $4(3x - 2) = 2x - 5$

[3 marks]

Grade 4-5

9

(a) Solve the inequality $\frac{3x}{2} \leq 9$

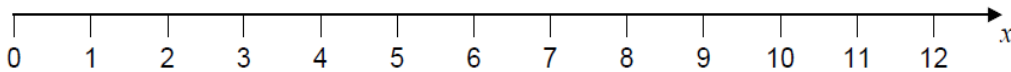
[2 marks]

(b) Solve the inequality $4(x + 2) > 12$

[2 marks]

(c) Represent the solution set that satisfies **both** answers to parts (a) and (b) on the number line.

[1 mark]



10

Solve $5(x + 3) < 60$

[2 marks]

11

Solve $7x + 6 > 1 + 2x$

[2 marks]

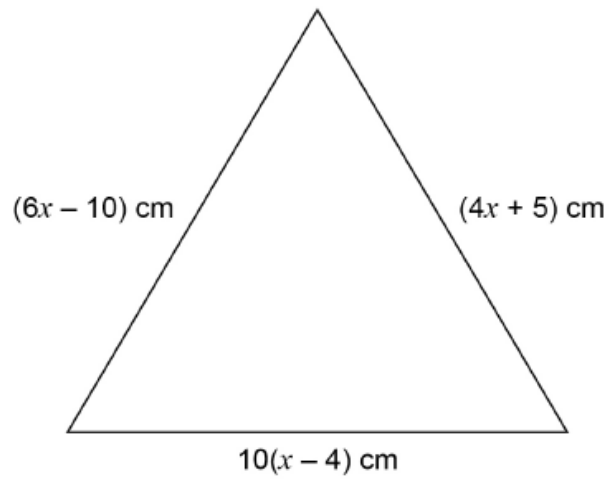
12

Solve $\frac{2x}{5} + 1 = 13$

[3 marks]

13

This triangle is equilateral.



Not drawn
accurately

Is the perimeter of the triangle greater than one metre?

You **must** show your working.

[5 marks]