AQA

.CG Maths.
Hints

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

# GCSE MATHEMATICS

**F**

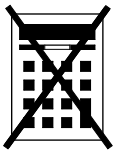
Foundation Tier Paper 1 Non-Calculator

Tuesday 19 May 2020 Morning Time allowed: 1 hour 30 minutes

## Materials

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



## Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

## Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

## Advice

In all calculations, show clearly how you work out your answer.

| For Examiner's Use | |
|---|---|
| Pages | Mark |
| 2–3 | |
| 4–5 | |
| 6–7 | |
| 8–9 | |
| 10–11 | |
| 12–13 | |
| 14–15 | |
| 16–17 | |
| 18–19 | |
| 20–21 | |
| 22–23 | |
| 24–25 | |
| **TOTAL** | |

**Please note that these worked solutions have neither been provided nor approved by AQA and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.**

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

**.CG Maths.**

Answer **all** questions in the spaces provided.

*Do not write outside the box*

**1** Here are some numbers.

| 5 | 5 | 8 | 13 | 14 | 15 | 17 |
|---|---|---|---|---|---|---|

Circle the range.

**[1 mark]**

5 11 12 13

Range = largest - smallest

**2** Circle the value of the digit 5 in 256 934

**[1 mark]**

5000 500 000 50 50 000

The 5 is in the 10000s place

**3** Work out $-2 - 5$

Circle your answer.

**[1 mark]**

$-7$ $-3$ 3 7

Subtracting from a negative makes it more negative

*Do not write outside the box*

**4** What is 680 millimetres in centimetres?

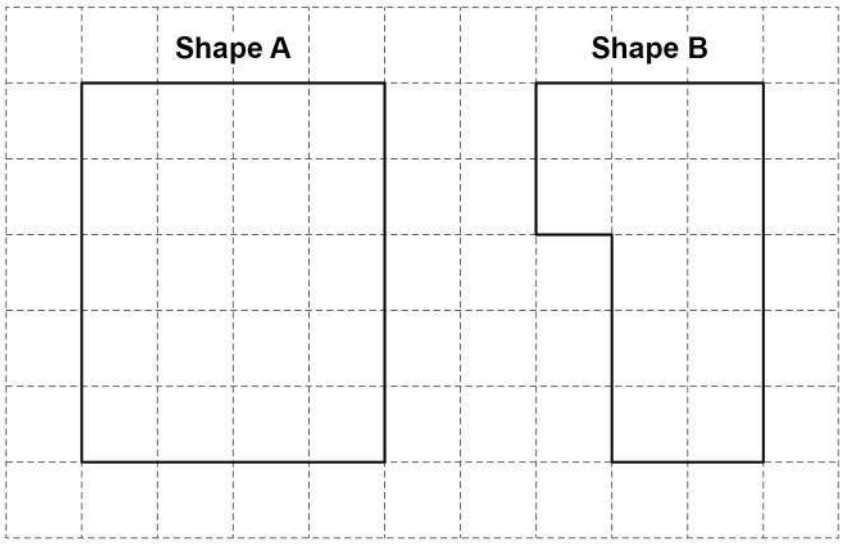
Circle your answer.

**[1 mark]**

0.68 cm  6.8 cm  68 cm  6800 cm

There are 10mm in 1cm

**5**




Work out  area of Shape A : area of Shape B

Give your answer in its simplest form.

**[2 marks]**

Counting the squares in both shapes finds the areas. The ratio can be simplified by dividing both sides of the ratio by the same amount to get smaller whole numbers until they can't be divided any further. Ratios in their simplest form have whole numbers, not decimals

Answer _____ : _____

6

*Do not write outside the box*

**6 (a)** Samir and Dan run a race.

Samir finishes in $2\frac{1}{2}$ minutes.

Dan finishes in 130 seconds.

Complete the following sentence.

**[2 marks]**

_____ wins by _____ seconds.

There are 60 seconds in a minute. Convert Samir's time into seconds. The winner is the one who took the least amount of time

**6 (b)** Alice does a sponsored walk.

She starts from home on Monday at 8 am

She arrives back home 55 hours later.

Work out when she arrives back home.

**[2 marks]**

24 hours is one day. Work out how many lots of 24 go into 55. Work out this many days after Monday. Then add the remaining hours to 8am

Day _____

Time _____

*Do not write outside the box*

**7** Work out $(43 \times 8) - (234 \div 6)$

**[3 marks]**

The order of operations, BIDMAS, needs to be followed.
So everything in the brackets needs to be worked out first

Answer _____

**Turn over for the next question**

7

*Do not write outside the box*

**8** Here is some information, by ticket type, about the number of people visiting a cinema one week.

**Key:** ⊞ represents 40 people

| | |
|---|---|
| **Adults** | ⊞ ⊞ ⊞ ▯ |
| **Students** | ⊞ ⊞ ⊞ ⊞ ⊞ ⊞ |
| **Children** | ⊞ ⊞ ⊞ ⊞ |

**8 (a)** How many children visited the cinema?

**[1 mark]**

There are 4 full symbols for the children, each one representing 40 people

Answer _____

**8 (b)** How many **more** students than adults visited the cinema?

**[2 marks]**

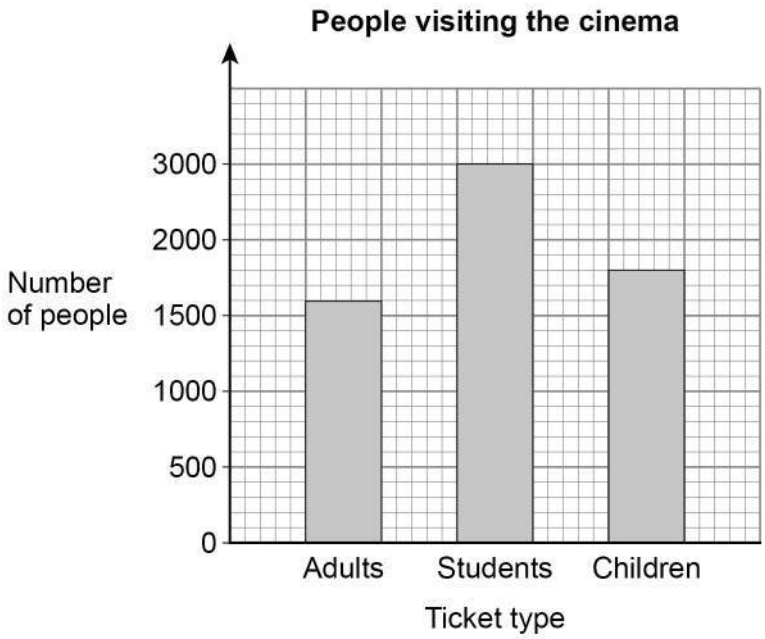
There are $2^1/_2$ more symbols for the students than adults

Answer _____

*Do not write outside the box*

**8 (c)** A bar chart is drawn to show the number of people visiting the cinema one month.

| Ticket type | Number of people |
|---|---|
| Adults | 1600 |
| Students | 3000 |
| Children | 1800 |




Give **one** criticism of the bar chart.

**[1 mark]**

There is something wrong with the scale

4

**Turn over ►**

*Do not write outside the box*

**9** Harry will pay income tax if he earns more than £12 500 in a year.

After 8 months he has earned a **total** of £7600

For the rest of the year he earns £1200 each month.

Will he pay income tax?

You **must** show your working.

**[3 marks]**

There are 12 months in a year. Work out how many more months there are in the year after the 8 months. In each of these he earned £1200. Add what he earned in the 8 months to what he earned in the rest of the months to get how much he earned in a year. Compare this to the £12500 to decide if he will pay tax

**10** $x$ is a 2-digit whole number.

How many digits does the number $10x$ have?

Circle your answer.

**[1 mark]**

cannot tell  2  3  4

Any 2-digit whole number multiplied by 10 will have a 0 put on the end

Do not write outside the box

**11 (a)** Circle the answer to $50 \times 0.2$

**[1 mark]**

1 10 100 1000

0.2 = 2/10. To multiply by a fraction, divide by the denominator then multiply by the numerator

**11 (b)** Work out $3.65 \div 5$

Give your answer as a decimal.

**[2 marks]**

5 | 3.65 ← Dividing a decimal is the same as dividing a whole number except there needs to be a decimal point above in the same place as the decimal point below

Answer _____

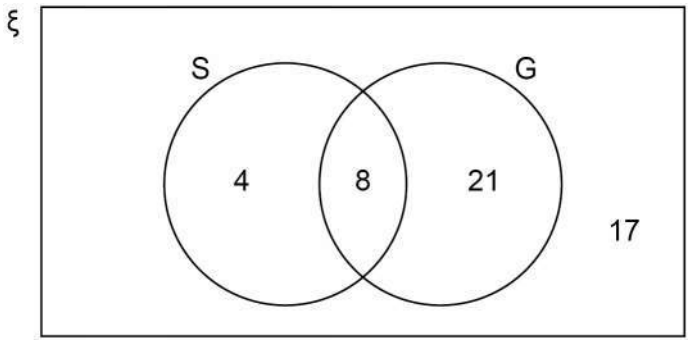
**Turn over for the next question**

7

*Do not write outside the box*

**12** The Venn diagram shows information about 50 people who are in bands.

S = singers G = guitar players




**12 (a)** How many of the people are guitar players?

**[1 mark]**

Answer _____

Both the 8 and the 21 are in the guitar ring

**12 (b)** How many of the people are singers but **not** guitar players?

**[1 mark]**

Answer _____

In the singer ring which are not in the guitar ring

**12 (c)** One of the people is chosen at random.

Write down the probability that the person is

**not** a singer

and

**not** a guitar player.

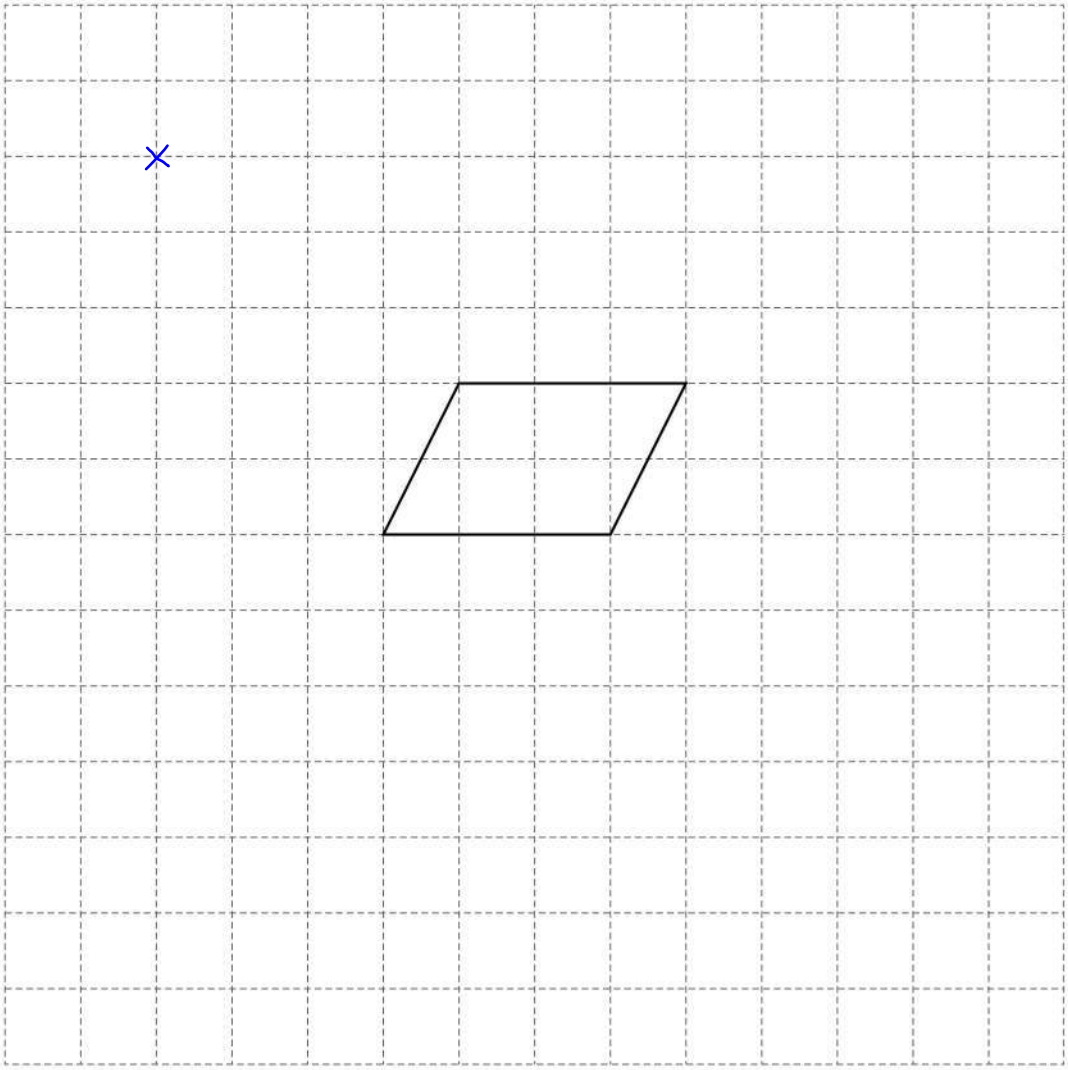
**[1 mark]**

Answer _____

Express the fraction of the 50 people who are not in the guitar ring and not in the singer ring

Do not write outside the box

**13** Here is a parallelogram.



The parallelogram is translated 4 squares to the left and 3 squares up.

Draw the translated parallelogram.

**[2 marks]**

Move each corner 4 to the left and 3 up then join up the corners

5

*Do not write outside the box*

**14 (a)** Solve $6x - 11 = 13$

**[2 marks]**

x is on the left and needs to stay on the left. The 6 and the -11 need to go. Follow BIDMAS backward to decide what to get rid of first and do the opposite operation to both sides to eliminate them

$x =$ _____

**14 (b)** Simplify fully $(2 \times 4a) + 9 + \frac{15a}{3} - 7$

**[3 marks]**

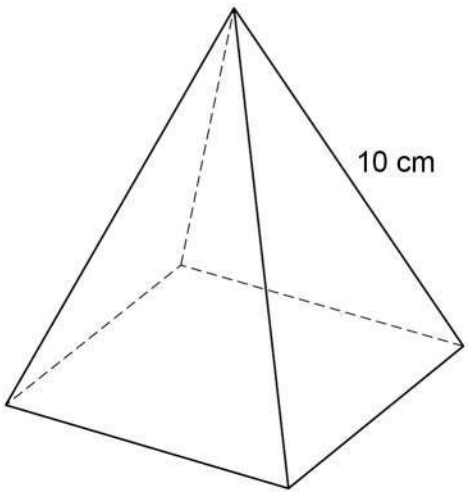
First simplify 2 x 4a and 15a/3. Then collect like terms

Answer _____

Do not write outside the box

**15** A pyramid has a square base.

Each of the four sloping edges has length 10 cm




The total length of all eight edges is 68 cm

Work out the **area** of the square base.

**[4 marks]**

Area of square = length$^2$. Subtracting the four sloping edges from the total of all eight edges leaves the total of the edges on the square. All the edges of a square are equal so we can work out the length of one of these edges

Answer _____ cm$^2$

9

*Do not write outside the box*

**16** The table shows information about how 150 students travel to school.

| | Walk | Bus | Car | |
|---|---|---|---|---|
| **Girls** | 22 | 33 | 17 | Total = 72 |
| **Boys** | 24 | 41 | 13 | Total = 78 |

**16 (a)** What fraction of the **girls** walk to school?

Give your answer in its simplest form.

**[2 marks]**

22 out of the 72 girls walk to school. Express this as a fraction and simplify it fully. To simplify a fraction, divide both the numerator and denominator by the same amount to get smaller whole numbers

Answer _____

**16 (b)** One of the **boys** is chosen at random.

What is the probability that the boy travels to school by bus?

**[1 mark]**

Express the number of boys who travel to school by bus as a fraction of the total number of boys. This is the probability

Answer _____

*Do not write outside the box*

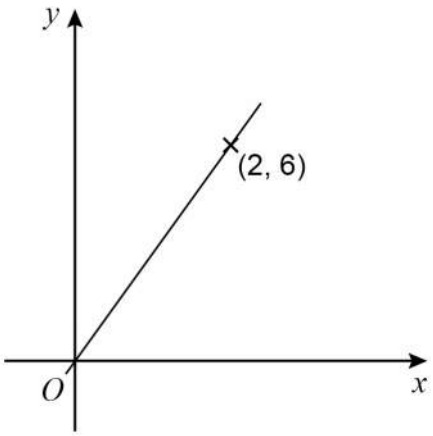
**16 (c)** What percentage of the 150 **students** travel to school by car?

**[2 marks]**

Work out the total number of students who travel by car. Express this as a fraction of the 150 students. Simplify the fraction then multiply both the numerator and denominator until the denominator is 100. x/100 = x%

Answer _____ %

**17** A straight line passes through $O$ and (2, 6)




Circle the equation of the line.

**[1 mark]**

$y = x + 4$ $y = 6$ $y = 3x$ $y = \frac{1}{3}x$

As it goes through the origin, when x = 0, y = 0. Also when x = 2, y = 6. Substitute these values into the equations to see if they work. They do not work if the left side does not equal to the right side. Only one of them works for both sets of values

6

*Do not write outside the box*

**18 (a)** Work out 110% of 80

**[2 marks]**

Adding 10% to 100% gives 110%. 100% is the full amount. 10% as a fraction is 1/10

Answer _____

**18 (b)** Work out 21 as a fraction of 12

Circle your answer.

**[1 mark]**

$\frac{7}{4}$ $\frac{4}{7}$ $\frac{3}{4}$ $\frac{4}{3}$

21/12. This needs to be simplified

*Do not write outside the box*

**19** Bags X and Y each contain counters.

| **Bag X** | **Bag Y** |
|---|---|
| 30 counters | 5 counters |
| Each counter is green, white or yellow | 3 green and 2 red |

**19 (a)** P(green counter from X) = P(red counter from Y)

Work out the number of green counters in X.

**[2 marks]**

2 out of the 5 counters in Y are red. Express this as a fraction to get the probability of getting a red counter from Y. This is equal to the probability of getting a green counter in X. Multiplying the probability of a colour by the total number of counters will give the number of counters of that colour

Answer _____

**19 (b)** All 35 counters are put into one bag.

One counter is picked at random.

Work out the probability that the counter is **not** red.

**[2 marks]**

Subtracting the number of red counters from the total number of counters leaves the number of counters which are not red. Express the number of counters which are not red as a fraction of the total number of counters. This is the probability

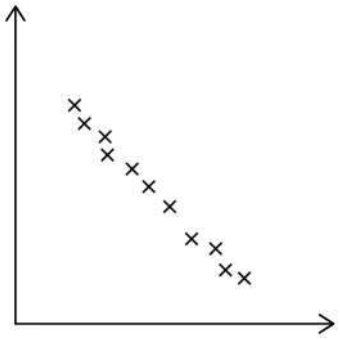
Answer _____

7

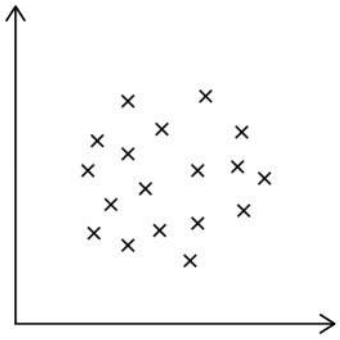
*Do not write outside the box*

**20** A and B are scatter graphs.

**Graph A**



**Graph B**



What type of correlation is shown by each graph?

Choose from

| |
|---|
| Weak positive |
| Strong positive |
| Weak negative |
| Strong negative |
| No correlation |

**[2 marks]**

Graph A _____

Graph B _____

Correlation is to do with how the two variables are linked. One variable is on the x axis and the other is on the y axis. There is positive correlation if both variables increase together. There is negative correlation if one increases while the other decreases. There is no correlation if there is no link between the two variables

Do not write outside the box

**21 (a)** All the terms of a **geometric** progression are positive.

The second and fourth terms are shown.

……. 4 ……. 16

Work out the first and third terms.

**[2 marks]**

Geometric means that each term is multiplied by the same amount to get the next term. Let x be the amount it multiplies by each time. 4 multiplied by x twice gives 16. Write this as an equation then rearrange to find x. It cannot be negative. Once we have the amount it multiplies by each time, we can follow the sequence backward by doing the opposite of multiplying to get the third and first term

First term _____

Third term _____

**21 (b)** The first two terms of an **arithmetic** progression are shown.

$p$ $5p$ …..

The sum of the first three terms is 90

Work out the value of $p$.

**[3 marks]**

The sequence is arithmetic so increases by the same amount between each term. Add up the first three terms in terms of p and set this equal to 90. Then rearrange to find p by doing opposite operations to both sides

Answer _____

7

*Do not write outside the box*

**22** This formula converts temperature in degrees Fahrenheit ($F$) to kelvin ($K$)

$$K = \frac{5}{9}(F - 32) + 273$$

A pottery oven is heated to 2192 degrees Fahrenheit.

Work out this temperature in kelvin.

**[3 marks]**

Follow the order of operations, BIDMAS. Substitute in 2192 for F. To multiply by a fraction, divide by the denominator then multiply by the numerator

Answer _____ kelvin

**23** As a decimal $\frac{11}{40} = 0.275$

Work out $\frac{33}{400}$ as a decimal.

**[2 marks]**

The numerator is 3 times as large and the denominator is 10 times as large. Increasing the numerator increases the decimal. Increasing the denominator decreases the decimal

Answer _____

*Do not write outside the box*

**24** The cost of a holiday is £2400

Rana pays a deposit followed by monthly payments, in the ratio

deposit : total of the monthly payments = 3 : 5

She makes 6 equal monthly payments.

Work out her monthly payment.

**[4 marks]**

Work out how many parts there are in total in the ratio. This many parts represents the total of £2400. Work out what 1 part is worth. Then work out what 5 parts are as this gives the total of the monthly payments. Then work out what 1 of the monthly payments is worth

Answer £ _____

**25** Factorise fully $2x^2 + 6x$

**[2 marks]**

Find the highest common factor of both terms, bring this out as a factor and leave the rest in a bracket

Answer _____

11

*Do not write outside the box*

**26** Two wire shapes make an earring.

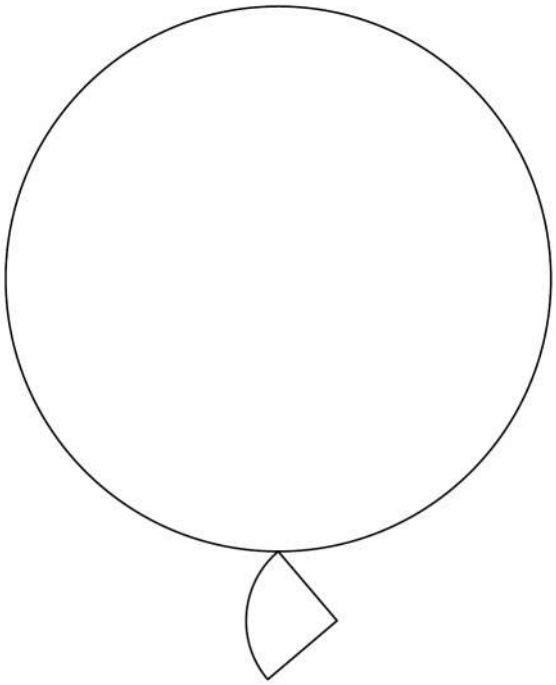
The shapes are

a circle with radius 21 mm

and

a quarter circle.

Not drawn accurately



radius of circle : radius of quarter circle = 7 : 2

**26 (a)** Show that the radius of the quarter circle is 6 mm

**[1 mark]**

7 parts of the ratio represent the radius of the circle which is 21mm. Work out 1 part of the ratio. Then work out the 2 parts which represents the radius of the quarter circle

Do not write outside the box

**26 (b)** Work out the **total** length of the wire in the earring.

Give your answer in the form $a\pi + b$ where $a$ and $b$ are integers.

**[4 marks]**

Adding the wire used for the circle and quarter circle give the total length of wire.
Arc length = 1/4 of the circumference
Circumference = π x diameter
Diameter = 2 x radius
Don't forget to add the two radii on the quarter circle

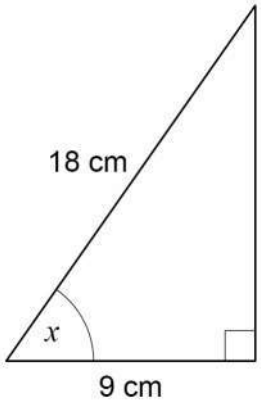
Answer _____ mm

**Turn over for the next question**

5

*Do not write outside the box*

**27** Use trigonometry to work out the size of angle $x$.




Not drawn accurately

**[2 marks]**

SOH CAH TOA

List SOH CAH TOA as formula triangles. Tick what sides we have to decide which formula triangle to use. Cover over the term which involves the angle x to work out the formula involving the angle. We should get a trig function of x = a fraction. Simplify the fraction then work out what angle of x would give this fraction. S: sin of the angle. C: cos of the angle. T: tan of the angle. O: opposite. H: hypotenuse. A: adjacent

Answer _____ degrees

The angles we need to remember for the trig values are 0, 30, 45, 60 and 90. List these out in order. For the sin values list 0, 1, 2, 3, 4 under these. For the cos values list 4, 3, 2, 1, 0 under these. Then square root them all then put them over 2. For the tan values, divide the sin value by the cos value

*Do not write outside the box*

**28** Rearrange $c = \frac{d+2}{3}$ to make $d$ the subject.

**[2 marks]**

Do the opposite operation to both sides to eliminate everything apart from d on the side d is on. First eliminate the fraction

Answer _____

**29 (a)** Write 360 000 in standard form.

**[1 mark]**

Keep dividing it by 10 until we get a number between 1 and 10, not including 10. Then multiply the result by 10 to the power of the number of times we divided by 10

Answer _____

**29 (b)** Write $9.2 \times 10^{-3}$ as an ordinary number.

**[1 mark]**

Divide by 10 3 times

Answer _____

**END OF QUESTIONS**

6