Surname	TP Solutions	Centre Number	Candidate Number
Other Names			0

GCSE

wjec cbac

eduqas Part of WJEC

MATHEMATICS – Component 1
Non-Calculator Mathematics
FOUNDATION TIER

– MORNING

2 hours 15 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	7	
2.	3 10	
3.	5 15	
4.	7 22	
5.	3 25	
6.	4 29	
7.	5 34	
8.	6 40	
9.	8 48	
10.	9 57	
11.	5 62	
12.	4	
13.	7	
14.	4	
15.	3	
16.	5	
17.	5	
18.	8	
19.	2	
20.	6	
21.	5	
22.	7	
23.	2	
Total	120	

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

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

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone = πrl

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Foundation Tier

Perimeter, area and volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

Area of a trapezium $= \frac{1}{2}(a+b)h$

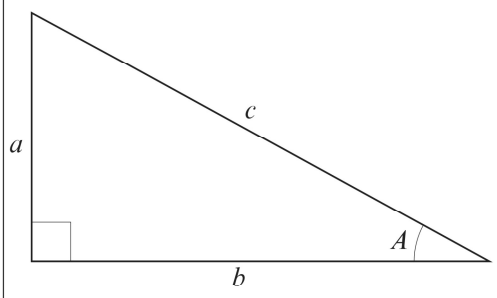
Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle $= 2\pi r = \pi d$

Area of a circle $= \pi r^2$

Pythagoras' theorem and trigonometry



In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

Compound interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

Total accrued $= P\left(1 + \frac{r}{100}\right)^n$

Probability

Where $P(A)$ is the probability of outcome A and $P(B)$ is the probability of outcome B:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Examiner only

1. *(a)* (i) Work out 0·5 × 100. [1]

half half of 100 = 50

(ii) Work out 45 ÷ 10. [1]

45·0

45 ÷ 10 = 4·5

(b) Write 0·31 as

(i) a fraction, [1]

$\frac{31}{100}$

(ii) a percentage. [1]

31 %

(c) Circle the greatest value. [1]

4·0700	4·1800	4·6010	4·0615	4·0090
700	1800	6010	615	9

(d) Work out $\frac{4}{5}$ of 45. [2]

45 ÷ 5 x 4

45 ÷ 5 = 9

9 x 4 = 36

Turn over.

Examiner only

2. *(a)* Halima makes a shape by joining 5 cubes.

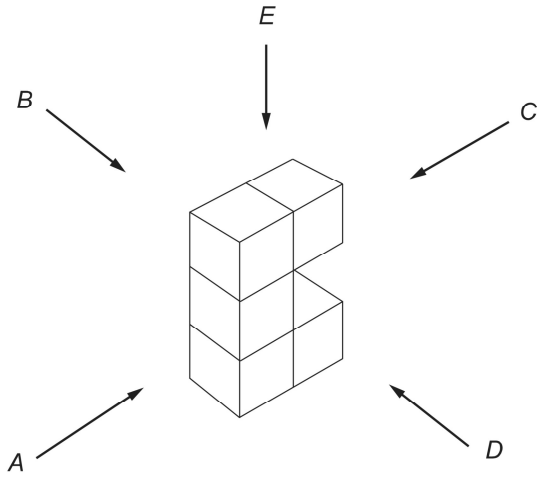
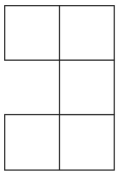


Diagram not drawn to scale

She looks at each of the side elevations, from the positions *A*, *B*, *C* and *D*, and the plan, from *E*.

(i) Here is what Halima sees from one of her positions.



Which position is this?
Circle your answer. [1]

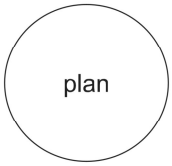
A *B* *C* *D* *E*

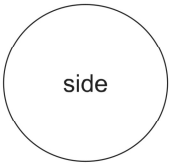
(ii) How many square faces can Halima see from position *C*?
Circle your answer. [1]

1 2 3 4 5

Examiner only

(b) The diagram shows the plan and side elevation of another 3D shape.





Circle the correct name for the 3D shape shown. [1]

cylinder circle pyramid cone sphere

3. *Cover Insurance* sells insurance for laptops.
They have two offers.

Laptop insurance **Offer 1**	Laptop insurance **Offer 2**
One payment only **£60 for one whole year**	Pay monthly **12 months for £4.50 per month**

(a) Mika wants to buy insurance for his laptop.

Show that if Mika uses Offer 2 he will save 10% of the cost of using Offer 1. [3]

12 x 4.50 → 12x4 = 48

12x0.5 = 6 +

54

10% of 60 = 6

60 − 6 = 54

→ 30

(b) During April, *Cover Insurance* sold 630 policies.

How many policies per day, on average, did they sell for this month? [2]

$$30 \overline{)630} = 21 \text{ policies}$$

Turn over.

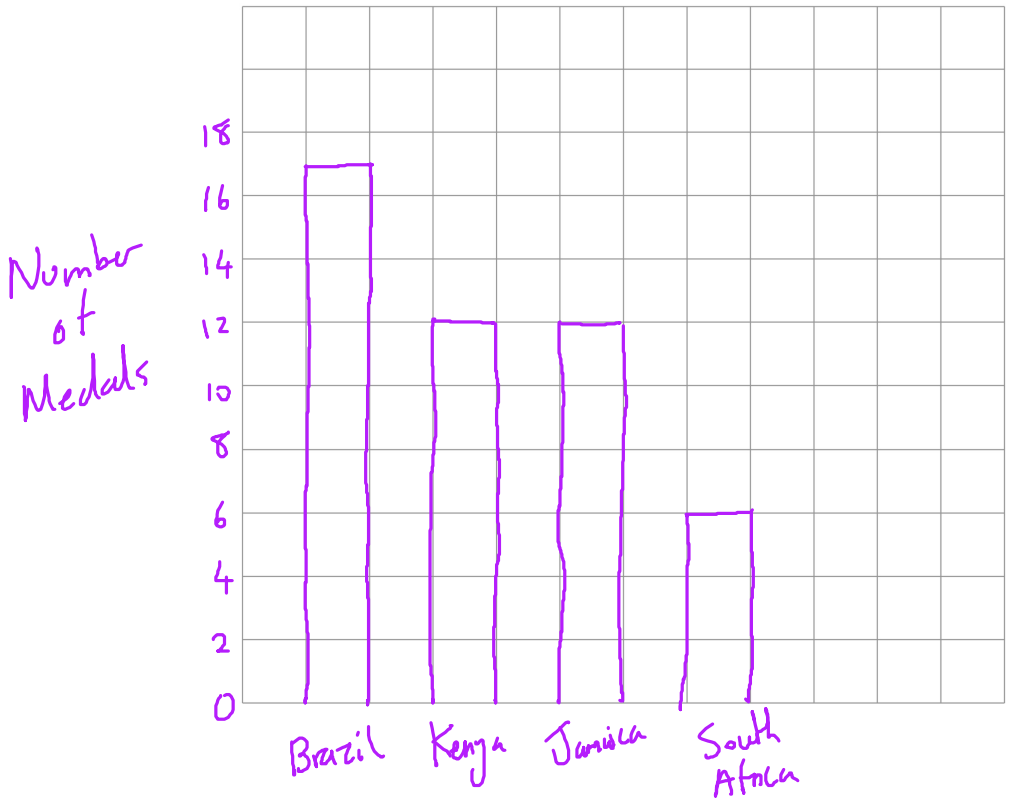
Examiner only

4. *(a)* (i) This table shows the total number of medals won by four countries in the 2012 London Olympic Games.

Country	Number of medals
Brazil	17
Kenya	12
Jamaica	12
South Africa	6

Draw a bar chart to show this information. [3]

2012 Olympic Medals Won



Examiner only

(ii) The pictogram shows the total number of medals won by the same four countries in the 2016 Rio Olympic Games.

4 8 12 16

Brazil	●●●●◔	= 19
Kenya	●●●◕	= 13
Jamaica	●●●◔	= 11
South Africa	●●◗	= 10

2012
17
12
6

Key: ● represents 4 medals

Use the information given in the table and pictogram to complete the sentences below:

19 − 17 = 2

The total number of medals won by Brazil in 2016 is ..... 2 ..... more than they won in 2012.

The total number of medals won by ..... South Africa ..... in 2016 is 4 more than they won in 2012. [2]

(b) In 2016, the total of gold, silver and bronze medals won by China was 70.

They won:
- 18 silver medals,
- the same number of gold medals as they did bronze medals.

How many gold medals did China win? [2]

26
2 ⟌ 5¹2

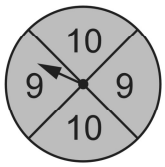
70 − 18 = 52 52 ÷ 2 = 26

..... 26 ..... gold medals

Turn over.

Examiner only

5.



The diagram shows a fair 8-sided dice, numbered from 1 to 8, and a fair spinner.

Jamie rolls the dice and spins the spinner.
He then multiplies the two scores.

(a) Complete the diagram to show all Jamie's possible outcomes.

Spinner								
10	10	20	30	40	50	60	70	80
9	9	18	27	36	45	54	63	72
×	1	2	3	4	5	6	7	8

Dice

3 x 9 = 27

5 x 9 = 45

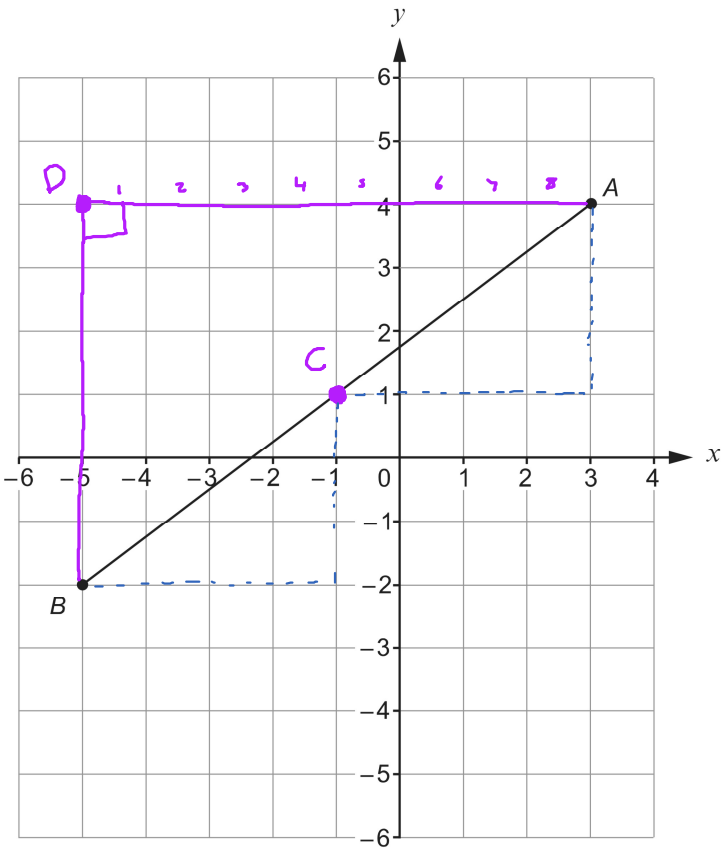
[1]

(b) Find the probability that Jamie's outcome is an even number greater than 50. [2]

$\frac{5}{16}$

Examiner only

6.



"along the corridor and up the stairs"

The line *AB* is drawn on the 1 cm grid above.

(a) (i) Write down the coordinates of *A*. [1]

A (3 , 4)

(ii) The point *C* is the mid-point of *AB*.

Mark the position of the point *C* on the grid. [1]

(b) The line *BD* is parallel to the y-axis.
Triangle *ABD* is a right-angled triangle.

Mark the position of point *D* on the grid and write down the length of *AD*. [2]

Length *AD* = 8 cm

Turn over.

Examiner only

7. *(a)* Simplify

(i) $2a - b + 5a - 3b,$ [2]

$2a + 5a = 7a$

$-b - 3b = -4b$

$= 7a - 4b$

(ii) $1 + 4 \times c \times c.$ [1]

$1 + 4c^2$

(b) (i) This formula converts a UK shoe size to a Japanese shoe size.

Japanese size = UK size + 19

Yuto wears a Japanese size 29·5.

What would Yuto's shoe size be in the UK? [1]

$29.5 = \text{UK size} + 19$

$-19 \qquad -19$

$10.5 = \text{UK size}$

(ii) This table shows the equivalent shoe sizes used in the UK and the USA.

UK size	5	6	7	8	9
USA size	6	7	8	9	10

Complete this formula connecting the UK size and the USA size. [1]

UK size = USA size − 1

Examiner only

8. The table shows nutritional information about a bottle of the sports drink, *Fitade*.

Nutritional Information	per 100 ml	per bottle
Energy (kilocalories)	28	112
Carbohydrate (grams)	6·25	25
of which sugars (grams)	4	16
Salt (grams)	0·1	0·4

(a) Complete the table. [3]

28 x 4 →

0.4 ÷ 4 →

(b) One afternoon, Tori drinks 3 full bottles of *Fitade*.

How many millilitres of *Fitade* does Tori drink altogether, and how many grams of salt does this contain? [2]

3 x 400 = 1200

400 + 400 + 400

3 x 0·4 = 1·2

0·4 + 0·4 + 0·4

She drinks 1200 ml containing 1·2 grams of salt.

(c) Show that sugars are 64% of the carbohydrate in *Fitade*.
You must show all your working. [1]

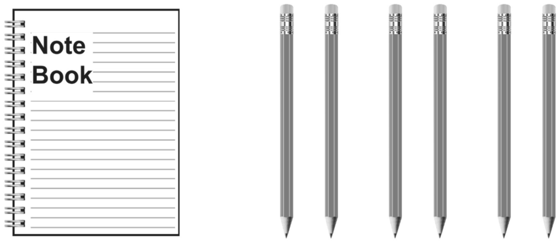
From whole bottle → sugars 16 / carbs 25 = 64/100 = 64%

Turn over.

Examiner only

9. Petra is shopping with 2 of her friends.

(a) She buys a note book and six **identical** pencils.



The note book costs the same as 2 of the pencils.
Her bill is £16.80.

→ so like 8 pencils in total

(i) How much does a note book cost? [3]

02·10
8 | 16·80 → 2·10 for 1 pencil

notebook = 2 pencils = 2 x 2·10
= £4·20

(ii) Petra pays with a £50 note.
She is given £34.20 change.

She tells the shopkeeper,

"You have given me too much change."

Is Petra correct?

Yes ✓ No ☐

Show how you decide. [1]

$50·00
− 16 80
change should be → 33 20 → £33·20

Examiner only

(b) The 3 friends go to a café.
Here is part of the menu.

Drinks	
Flat white	£4.25
Latte	£3.95
Americano	£2.95
Tea (per pot)	£3.00
Cakes	
Cupcake	£2.00
Cake of the day (per slice)	£4.00

Today only!

3 for 2* on all drinks
AND
3 for 2* on all cakes

*cheapest drink free and cheapest cake free

Each of the 3 friends orders one drink and one cake from this menu.

They save a total of exactly £5 using the 3 for 2 offers.
Their bill totals £16.50 **after** the saving has been taken off.

What drinks and cakes did the 3 friends order?
You must show all your working. [4]

£16.50 for 2 most expensive drinks + cakes chosen

Try 2 x flat white = 8.50
2 x cake of day = 8.00 +
16.50 correct

Then £5 for third person drink and cake

Tea + cupcake = £5

Drinks Flat white , Flat white , Tea

Cakes Cake of day , Cake of day , Cupcake

Turn over.

Examiner only

10. Twelve members of a running club take part in three runs.

(a) The table shows the times taken, in hours, by the 12 runners to complete the first run.

1·2	0·9	2·5	1·3	2·1	2·6
1·8	2·0	2·1	2·1	1·5	2·2

(i) Find the mode of the times. [1]

most

2·1

(ii) Find the range of the times. [1]

26 − 9 = 7

Highest − Lowest = 2·6 − 0·9

= 1·7

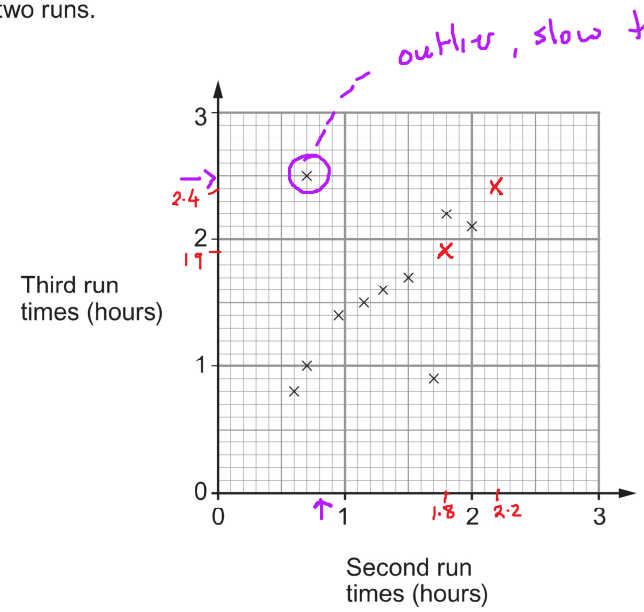
(iii) A runner was chosen at random from those who took part in the first run.

Find the probability that this runner took at most 1·5 hours. [1]

$\frac{4}{12}$

Examiner only

(b) The scatter diagram shows the times it took 10 of the runners to complete the other two runs.



(i) One of these 10 runners was injured during the third run and walked most of the way.

Circle the plot most likely to represent this runner on the scatter diagram. [1]

(ii) The times, in hours, taken by the remaining 2 runners were:

	Runner 11	Runner 12
Second run	1·8	2·2
Third run	1·9	2·4

Plot these times on the scatter diagram. [2]

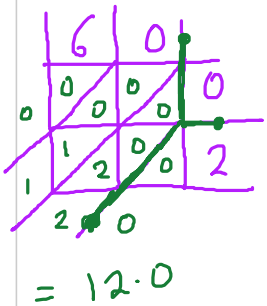
(iii) Using the information on the completed scatter diagram, what was the difference between the fastest time for the second run and the fastest time for the third run? Give your answer in minutes. [3]

Fastest 2nd run = 0·6 hrs Fastest 3rd run = 0·8 hrs

Dif = 0·8 − 0·6 = 0·2 hrs

In minutes 0·2 × 60 = 12 mins

Time difference = 12 minutes



= 12·0

Turn over.

Examiner only

11. *(a)*

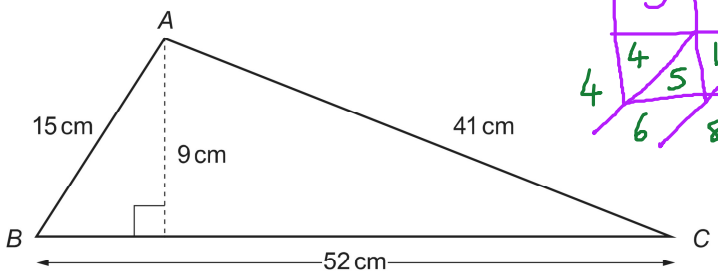


Diagram not drawn to scale

Work out the area of triangle *ABC*. [2]

Area = $\frac{b \times h}{2} = \frac{52 \times 9}{2} = \frac{468}{2} = 234$

Area *ABC* = 234 cm²

(b) This shape is made from two rectangles.

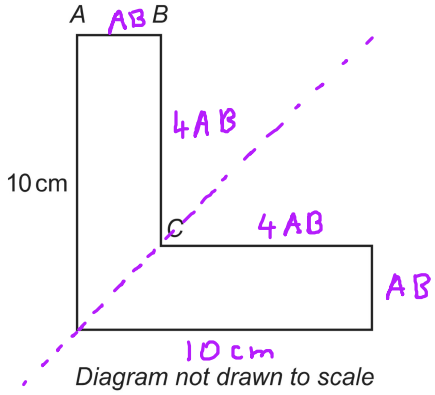


Diagram not drawn to scale

The shape has one line of symmetry.
The perimeter of the shape is 40 cm.
The length of *BC* is 4 times the length of *AB*. $40 - 10 - 10 = 20$

Work out the length of *BC*. [3]

$20 = AD + 4AB + 4AB + AB$

$20 = 10\,AB$

$\div 10 \quad \div 10$

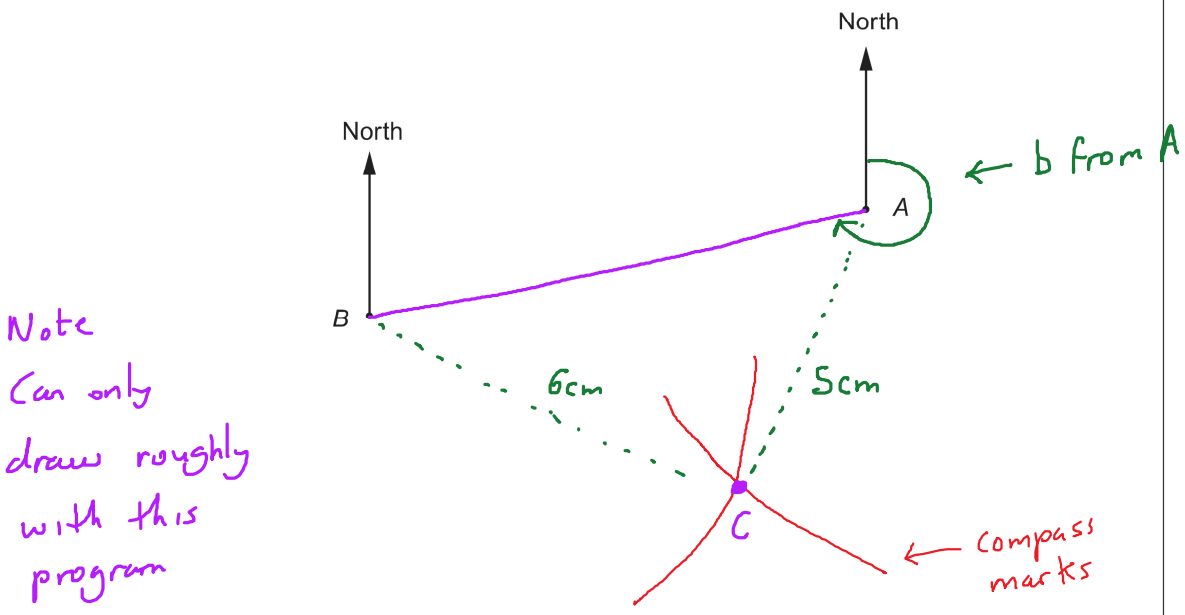
$2 = AB$

$BC = 4 \times 2 = 8$

BC = 8 cm

Examiner only

12. The diagram shows the position of two points, *A* and *B*.
The scale is 1 cm represents 1 km.



Note
Can only draw roughly with this program

1 cm represents 1 km

(a) Measure and write down the bearing of *B* from *A*. [1]

258°

(b) Point *C* is 5 km from *A* and 6 km from *B*.
The bearing of *C* from *B* is an acute angle.

Complete the diagram to find the position of point *C*. [3]

Turn over.

Examiner only

13. Steph is a baker.

(a) She bakes 42 white rolls and 60 brown rolls.

Write the ratio of white rolls to brown rolls in its simplest form. [2]

42 : 60

÷2 21 : 30 ÷2

÷7 7 : 10 ÷3

white rolls : brown rolls = 7 : 10

(b) Steph makes scones in three flavours: cheese, fruit and plain.
She makes:

- 4 times as many fruit scones as cheese scones,
- 3 times as many plain scones as cheese scones.

She sells each scone for the same price.
She makes a total of £96 from the sale of all the scones.

How much does she make from the sale of the plain scones? [3]

8 | 96 → 12

C : F : P

1 : 4 : 3 1+4+3=8

×12 ×12 ×12 96 ÷ 8 = 12

12 : 48 : 36

£36

(c) Steph makes and sells birthday cakes.
Each cake costs £54 to make.
She makes a profit of 15% on each cake.

What is the selling price of Steph's birthday cakes? [2]

2 | 5.4 → 2.7

10% of 54 = 5.4

5% of 54 = 2.7 +

8.1

15% → £8.10

5400

+ 810

62.10

Selling price = £ 62.10

Examiner only

14.

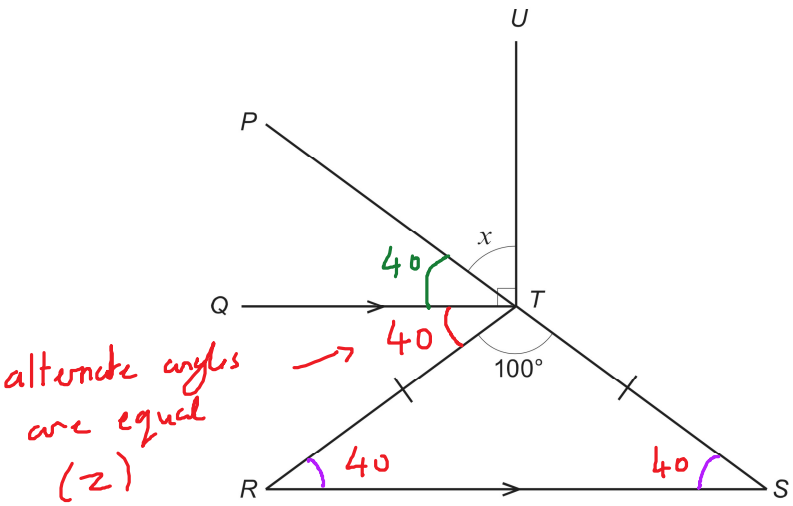


Diagram not drawn to scale

Show that $x = 50°$.
Give a reason for each step of your answer. [4]

180 − 100 = 80 angles in a triangle sum to 180°

80 ÷ 2 = 40 base angles in isoscales are equal

180 − 100 − 40 = 40 angles on a straight line sum to 180°

90 − 40 = 50 ⌐ means 90°

so $x = 50°$

Turn over.

Examiner only

15. Terry is doing his homework.

(a) He is trying to find the value of x when

$$x : 2 = 30 : 12$$

He writes:

-18

$x : 2 = 30 : 12$

The rule is -18

So $x = 20$

$\div 6$

$x : 2 = 30 : 12$

$\div 6$

Explain why Terry is wrong. [1]

Should be dividing not subtracting. Factor is 6 so $x = 30 \div 6 = 5$

(b) Terry's next question is:

> A factory production line makes 275 thousand cans of drink in 5 hours.
> How many hours would it take for this production line to make
> 165 thousand cans of the same drink?
> You may assume each can is the same size.

Terry thinks the answer is 3 hours.

Is Terry correct?

Yes ☑ No ☐

Show how you decide. [2]

$275 \div 5 \rightarrow$ $5 \overline{)275}$ = 055 = 55

$165 \div 3 \rightarrow$ $3 \overline{)165}$ = 055 = 55

7 9
14 18
21 27
28 36
35 45
42 54
49 63
56
63

Examiner only

16. *(a)* Calculate $\frac{3}{7} + \frac{7}{9}$.

Give your answer as a mixed number. [3]

$\frac{3}{7} + \frac{7}{9}$

×9 ×7

$\frac{27}{63} + \frac{49}{63} = \frac{76}{63} = 1\frac{13}{63}$

(b) When a fraction is divided by $\frac{1}{3}$ the answer is $\frac{6}{7}$.

Find this fraction. [2]

$\frac{\square}{\square} \div \frac{1}{3} = \frac{6}{7}$

×

$\frac{\square}{\square} = \frac{6}{7} \times \frac{1}{3} = \frac{6}{21} \left(= \frac{2}{7}\right)$

Turn over.

Examiner only

17. Huw is paid a weekly wage.

Every week he:

- saves $\frac{1}{5}$ of his wage,
- spends 70% of the money **he has left** on his living expenses,
- spends all that remains on his social life.

(a) One week, Huw saves £40.

How much does Huw spend on his social life? [3]

£40 = $\frac{1}{5}$ → 40 × 5 = 200 total

take away savings 200 − 40 = 160

70% of 160 is living expenses

so 30% of 160 is social life → 10% of 160 = 16

30% of 160 = £48

(b) What percentage of his weekly wage does Huw spend on his social life? [2]

$\frac{48}{200} \overset{\div 2}{=} \frac{24}{100}$ → 24%

Examiner only

18. *(a)* Solve $19 - 4x = 11$. [2]

$19 - 4x = 11$
$-19 \quad -19$
$-4x = -8$
$\div -4 \quad \div -4$
$x = 2$

or

$19 - 4x = 11$
$+4x \quad +4x$
$19 = 4x + 11$
$-11 \quad -11$
$8 = 4x$
$\div 4 \quad \div 4$
$2 = x$
$x = 2$

(b) Solve $\dfrac{2x-3}{4} = 3x$. [3]

$\times 4 \quad \times 4$

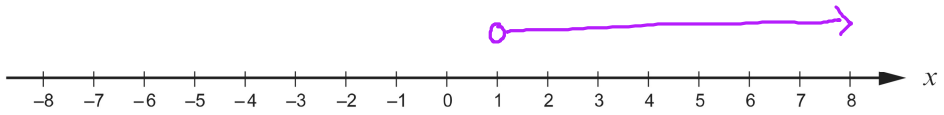
remove smallest x

$2x - 3 = 12x$
$-2x \quad -2x$
$-3 = 10x$
$\div 10 \quad -10$
$\dfrac{-3}{10} = x \rightarrow x = -\dfrac{3}{10}$

(c) (i) Solve $3x + 2 > 5$. [2]

$-2 \quad -2$
$3x > 3$
$\div 3 \quad \div 3$
$x > 1$

(ii) Represent your answer to part *(c)*(i) on the number line below. [1]



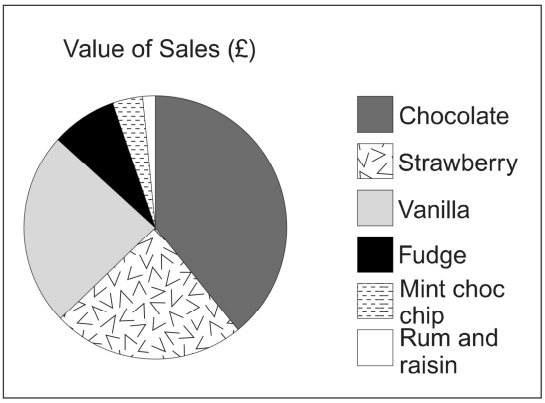
Turn over.

Examiner only

19. Cherie is in charge of marketing for a tourist attraction.

(a) One weekend, she collects some data about the value of ice cream sales from the café. She records her data in a table and uses it to draw a pie chart.

Ice cream flavour	Value of sales (£)
Chocolate	500
Strawberry	300
Coffee	0
Vanilla	300
Fudge	100
Green tea	0
Mint choc chip	50
Rum and raisin	20



State one criticism of the use of a pie chart to display her data. [1]

- You lose coffee and green tea
- You don't have the value of sales

(b) Cherie also records the number of visitors to the tourist attraction each season for 4 years.
Her results are shown in the table.

	Season	Winter	Spring	Summer	Autumn	sum
Visitors (thousands)	2015	9	14	19	13	55
	2016	9	13	17	12	51
	2017	6	11	14	9	40
	2018	4	8	15	10	37

Comment on the trend in the **annual** number of visitors shown by the data in the table. [1]

→ yearly

As years go by the number of visitors is decreasing

Examiner only

20. *(a)* $120 = 2^3 \times 3^k \times 5$ $= 2\times2\times2\times3^k\times5$

Find the value of k. $120 = 8 \times 3^k \times 5$ [1]

$120 = 40 \times 3^k$

$120 = 40 \times 3$ so $k = 1$

(b) Write 168 as a product of its prime factors. [2]

$168 = 2\times2\times2\times3\times7$

168 → 2, 84 → 2, 42 → 2, 21 → 3, 7

(c) *LoWatts Ltd* makes light bulbs that are identical in size.

They have regular orders from *Company A* for 120 light bulbs and from *Company B* for 168 light bulbs.

LoWatts Ltd uses one size of box to supply both *Company A* and *Company B*.
Each box used contains the same number of light bulbs and is full.
The number of boxes used is as few as possible.

How many light bulbs does each box hold? [3]

 → 120  → 168

Boxes need to be same size and all full

Highest common factor problem

$120 = 2\times2\times2\times3\times5$

$168 = 2\times2\times2\times3\times7$

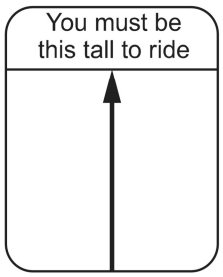
HCF $= 2\times2\times2\times3 = 24$ in each box

Turn over.

Examiner only

21. When Jenna was measured recently she was 127 cm tall, **correct to the nearest centimetre**.

For safety reasons, the minimum height for a person to ride the Big Coaster at a funfair in the USA is 50 inches.



You are given:
20 inches = 50·8 cm.

(a) Using the information given, decide whether it might possibly be safe, it is definitely safe, or it is definitely not safe for Jenna to ride the Big Coaster.

Might possibly be safe ✓ Definitely safe ☐ Definitely not safe ☐

Show how you decide. [3]

20 in = 50.8 cm (×2)
40 in = 101.6 cm
10 in = 25.4 cm (÷2)

50 in = 101.6 + 25.4
= 127.0 cm

101 6
25 4
127 0
1

If Jen was actually 126.9cm when measured, she would not be tall enough. If she were 127.1cm she would be tall enough

(b) (i) State an assumption that you have made in your answer to part *(a)*. [1]

Jenna has not grown since she was last measured.

(ii) Comment on the effect that your assumption has had on your decision. [1]

If she had grown then her chance of being safe to ride would increase.

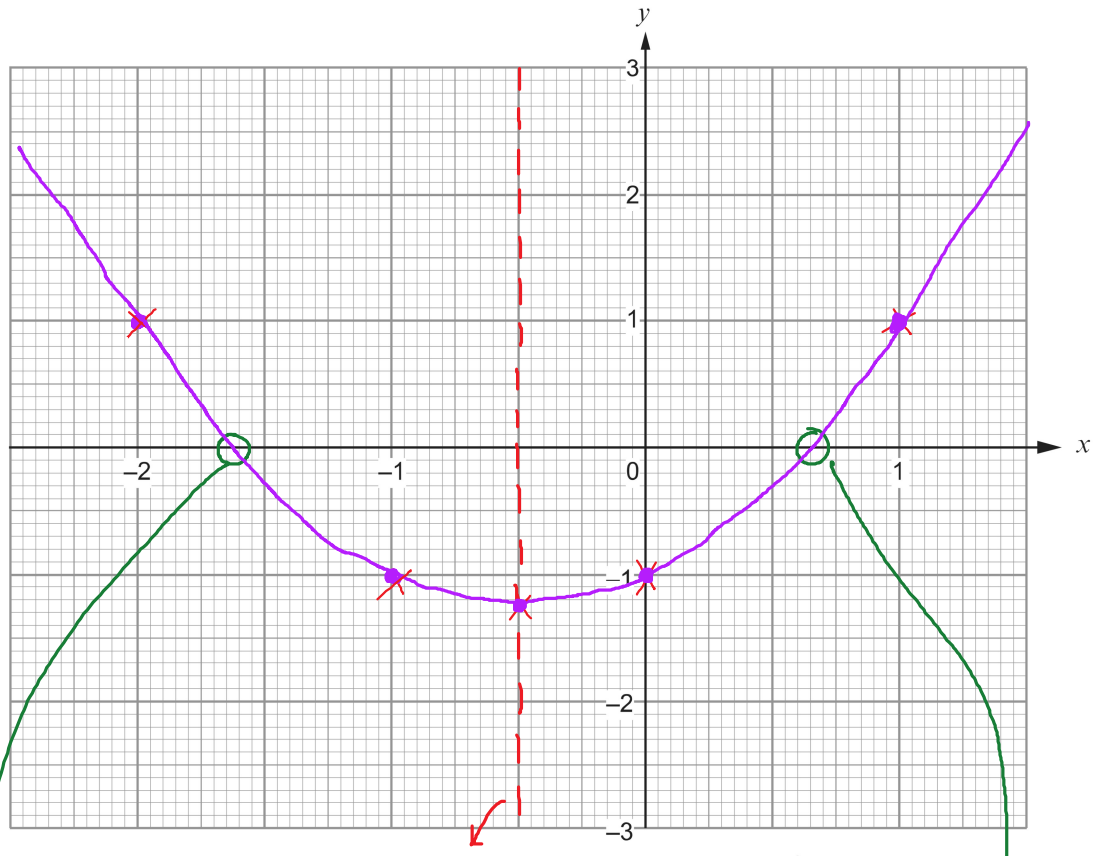
Examiner only

22. The table shows some of the values of $y = x^2 + x - 1$ for $-2 \leqslant x \leqslant 1$.

x	–2	–1	–0·5	0	1
$y = x^2 + x - 1$	1	–1	–1·25	–1	1

(a) Complete the table above. [2]

(b) On the graph paper below, draw the graph of $y = x^2 + x - 1$ for $-2 \leqslant x \leqslant 1$. [2]



(c) State the equation of the line of symmetry of the curve $y = x^2 + x - 1$. [1]

$x = -0.5$

(d) Use your graph to solve $x^2 + x - 1 = 0$. [2]

$x = -1.6, 0.6$

Turn over.

Examiner only

23.

$$\mathbf{p} = \begin{pmatrix} 4 \\ 2 \end{pmatrix} \text{ and } \mathbf{q} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$$

Work out the column vector $\frac{1}{2}\mathbf{p} - \mathbf{q}$. [2]

$= \frac{1}{2}\begin{pmatrix} 4 \\ 2 \end{pmatrix} - \begin{pmatrix} -3 \\ 2 \end{pmatrix}$

$= \begin{pmatrix} 2 \\ 1 \end{pmatrix} - \begin{pmatrix} -3 \\ 2 \end{pmatrix}$

$= \begin{pmatrix} 5 \\ -1 \end{pmatrix}$

$$\frac{1}{2}\mathbf{p} - \mathbf{q} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$$

END OF PAPER