Surname TP Solutions	Centre Number	Candidate Number
Other Names		0

wjec cbac

GCSE

eduqas Part of WJEC

MATHEMATICS – Component 2
Calculator-Allowed Mathematics
FOUNDATION TIER

THURSDAY, 8 JUNE 2017

– MORNING

2 hours 15 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	7	
2.	2	
3.	4	
4.	2	
5.	4	
6.	2	
7.	5	
8.	2	
9.	4	
10.	6	
11.	5	
12.	3	
13.	3	
14.	3	
15.	4	
16.	2	
17.	3	
18.	3	
19.	4	
20.	4	
21.	6	
22.	5	
23.	4	
24.	3	
25.	3	
26.	1	
27.	4	
28.	3	
29.	5	
30.	2	
31.	3	
32.	5	
33.	4	
Total	120	

ADDITIONAL MATERIALS

A calculator will be required for 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.

Take π as 3·14 or use the π button on your calculator.

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.

Examiner only

1. Mary and Philip are shopping.
They see these labels in a bakery.

(a) Complete Mary's bill below. [3]

10 x 23 = 230p

8.95 x 2 = 17.90

3.49 x 3 = 10.47

Mary's bill	
10 bread rolls	£ 2.30
2 birthday cakes	£ 17.90
12 cupcakes	£ 10.47
Total	£ 30.67

17.90 + 10.47 + 2.30 = 30.67

(b) Philip's bill at the bakery comes to £37.
The bakery offers a £5 discount when a customer spends £40 or more.
Philip decides to buy another pack of cupcakes.

(i) Explain why Philip decided to buy another pack of cupcakes. [1]

This will put him 49p over £40 so he will now get a £5 discount taking his total less than £37

(ii) Work out how much Philip pays for his shopping. [1]

37 + 3.49 − 5 = £35.49

(c) The bakery also has a "4 for the price of 3" offer on birthday cakes.
What would be the cost of 8 birthday cakes? [2]

Complete offer twice so get 8 for price of 6

6 x 8.95 = £53.70

Turn over.

Examiner only

2. *(a)* Kate was asked to compare the following fractions.

$\frac{3}{5}$ $\frac{3}{4}$ $\frac{2}{3}$

Kate tried to write them all using a common denominator of 20.

Explain what is wrong with her method. [1]

20 does not divide exactly by 3

(b) What is the lowest common denominator that should be used to compare these fractions? [1]

$\frac{2}{5}$ $\frac{3}{8}$ $\frac{9}{20}$, 40

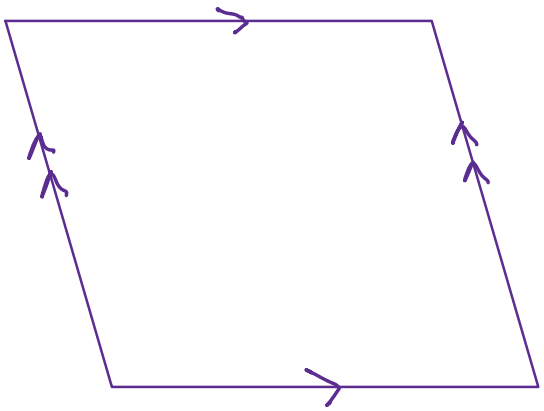
5, 10, 15, 20, 25, 30, 35, 40

8, 16, 32, 40

40

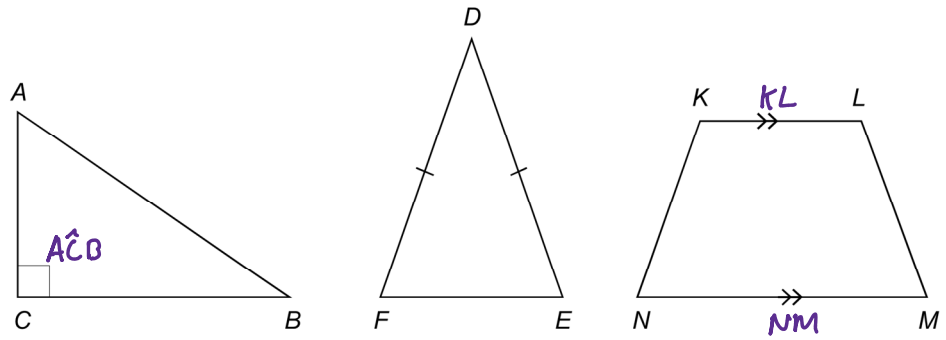
3. *(a)* Draw a diagram of the shape that is described below.

- The shape has 4 straight sides.
- The opposite sides are equal in length.
- The opposite sides are parallel to each other.
- There are no right angles. [1]



Examiner only

(b) The diagram shows two triangles and a trapezium.



Circle the correct answer for each of the following statements. [3]

(i) The right angle is

$A\hat{B}C$ $B\hat{A}C$ $A\hat{C}B$ $D\hat{F}E$ $D\hat{E}F$

(ii) A line parallel to *KL* is

KN *NM* *AB* *LM* *AC*

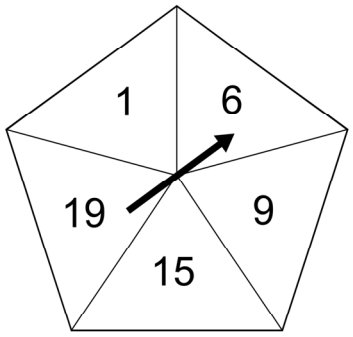
(iii) Triangle *DEF* is

scalene equilateral right-angled isosceles

Turn over.

Examiner only

4. The following fair five-sided spinner is spun once in a game.



What is the probability that the pointer will land on

(a) an odd number, [1]

odds : 1, 15, 9, 19 probability = $\frac{4}{5}$

(b) a square number? [1]

squares : 1, 9 probability = $\frac{2}{5}$

5. Solve the following equations.

(a) $x + 3 = 12$ [1]

$-3 \quad -3$

$x = 9$

(b) $\frac{y}{2} = 10$ [1]

$\times 2 \quad \times 2$

$y = 20$

Examiner only

(c) $8z + 13 = 27$ [2]

$-13 \quad -13$

$8z = 14$

$\div 8 \quad \div 8$

$z = \frac{14}{8} = \frac{7}{4} = 1\frac{3}{4} = 1.75$

6. The diagram shows a company logo.
It is made by removing a square from a rectangle and replacing it as shown.

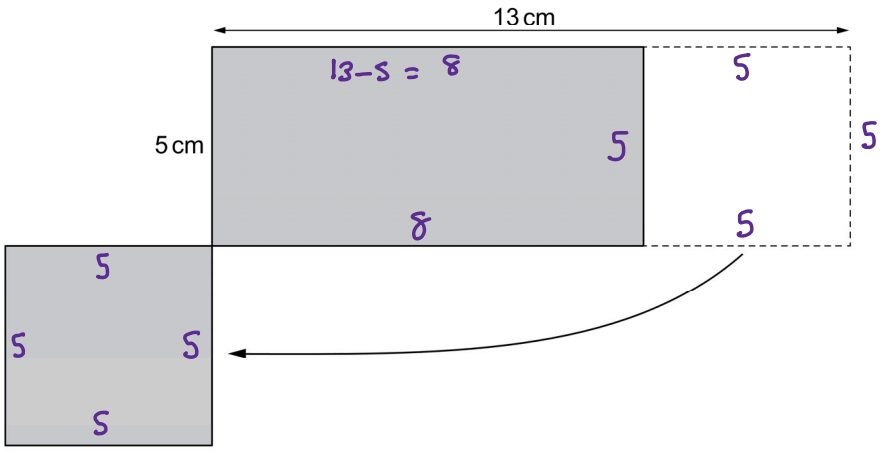


Diagram not drawn to scale

Is the perimeter of the logo greater, smaller or the same as the perimeter of the original rectangle?
Circle your answer.

Greater Smaller The same

Give a reason for your answer. [2]

Perimeter before = $5 + 5 + 13 + 13 = 36$

Perimeter after = $5 + 5 + 8 + 8 + 5 + 5 + 5 + 5 = 46$

Turn over.

Examiner only

7. *(a)* Simplify $p + p + p$. [1]

3p

(b) Simplify $3a + 4b + 5a - 2b$. [2]

8a + 2b

(c) Simplify $2 \times 3c$. [1]

6c

(d) Expand $3(a + 6)$. [1]

3a + 18

8. Write the following numbers in ascending order.

0·65 $\frac{2}{3}$ 60% 0·615

You must show all your working. [2]

0.6 0.6

0·60 , 0·615 , 0·65 , 0·6

60% 2/3

0.650
0.666
0.600
0.615

Examiner only

9. Jack has been set this problem by his teacher.

'How many cubes with sides of length 2 cm will fit inside the box?'

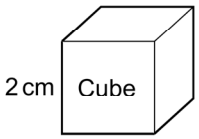


Diagram not drawn to scale

The box is a cuboid with the measurements shown.

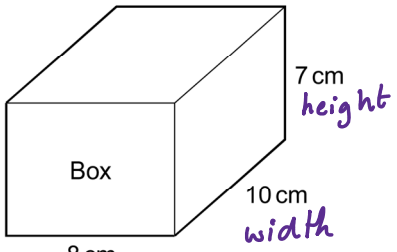


Diagram not drawn to scale

Jack has worked out that:

- *The volume of the cube is 8 cm³.*
- *The volume of the box is 560 cm³.*
- *560 ÷ 8 = 70*
- *So 70 cubes will fit inside the box.*

Jack's teacher has checked his work and told him that all his calculations are correct but his answer to the problem is wrong.

(a) What is wrong with the method Jack used? [1]

Because the height of the box is 7cm and 2cm does not fit exactly into it, there will only be 3 layers. Therefore not all the box will be filled and Jack's method assumes the whole box will be used.

Examiner only

(b) What effect has Jack's method had on his answer to the problem? [1]

His answer is too large

(c) Calculate how many cubes will fit inside the box. [2]

Can fit 4 cubes across the length, 5 across the width and 3 up the height. $4 \times 5 \times 3 = 60$

Turn over.

Examiner only

10. In a competition, there were two teams, *Axis* and *Beta*.
The teams bought and sold children's toys.
The winning team was the one that gained the most profit.

Team Axis	**Team Beta**
Final Profit £10	Bought 160 toys for £4.60 each Sold 75% of the toys for £5.20 each Sold the remaining toys for £3 each

Which team won the competition?
How much more profit did the winning team make? [6]

Cost of buying toys = 160 x 4.60
= £736

75% of 160 → 0.75 x 160 = 120

Takings
120 x 5.20 = 624 160 - 120 = 40
40 x 3 = 120 +
£744

Profit
744 - 736 = £8

So Team Axis won with £2 more profit

Examiner only

11. Sharifa keeps a record of the number of phone calls she makes each day.
These are her results for one week.

7 9 6 3 7 9 6

(a) Why is the mode not suitable to use as the average number of calls made each day? [1]

As in this case there are 3 modes which is not particularly helpful.

(b) Work out the range, and the median number of calls made each day. [2]

Range = highest − lowest = 9 − 3 = 6

3 6 6 7 7 9 9

Range 6 Median 7

(c) When Sharifa does not include the calls made on Saturday and Sunday, the new range is 4.

(i) How many calls were made on Saturday? [1]

7 − 3 = 4 ← no other options give 4 as range

So both 9's must go. 9 calls were made on Saturday

(ii) What impact does this have on the median? [1]

3 6 6 7 7

Lower by one

Turn over.

Examiner only

12. Next Wednesday, Omar plans to spend $\frac{1}{12}$ of the day playing tennis, $\frac{3}{8}$ working, and 8 hours sleeping.

Show that Omar will have enough time to go on a shopping trip that lasts 2 hours. [3]

24 hrs

$\frac{1}{12}$ of 24 = 2 hrs → tennis

$\frac{3}{8}$ of 24 = 9 hrs → working

24 - 2 - 9 - 8 = 5 hrs

Omar has 5 hours so yes he will have enough time.

13. Two companies, *Sail-Away* and *Cross-Quick*, have ferries that sail between Dover and Calais.

- *Sail-Away* ferries depart every 20 minutes.
- *Cross-Quick* ferries depart every 25 minutes.

Both companies have ferries that leave Dover at 9:00 a.m.
What is the next time that the two companies have ferries leaving Dover at the same time? [3]

20 40 60 80 (100)

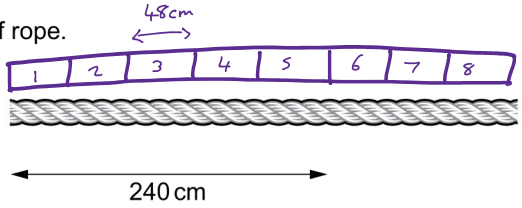
25 50 75 (100)

9:00 am + 100 mins → 1hr 40 mins

10:40 am

Examiner only

14. Daniel has a piece of rope.



$\frac{5}{8}$ of the total length of the rope is 240 cm.

Calculate the total length of the rope. [3]

240 ÷ 5 = 48 cm

48 x 8 = 384 cm

Turn over.

Examiner only

15. A pack of 500 sheets of paper is called a ream.

A ream of paper has a height of 5·3 cm.

1m = 100 cm

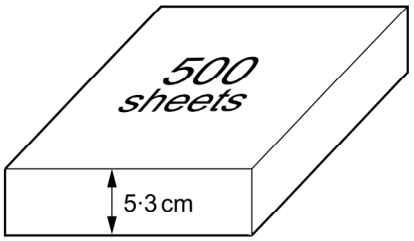


Diagram not drawn to scale

(a) Jazmin would like to stack as many reams as possible in a space that is 1·25 metres high.

How many complete reams of paper could she stack in this space? [3]

1·25 m = 125 cm or 5·3cm = 0·053m

125 ÷ 5·3 = 23·58 1·25 ÷ 0·053 = 23·58

Could stack 23

(b) Harry needs 6530 sheets of paper.
He calculates how many reams of paper he needs as follows:

Calculation: 6530 ÷ 500 = 13.06
Conclusion: I need 13 reams of paper.

Is Harry's conclusion correct?
You must justify your decision. [1]

He needed more than 13 as the answer was 13·06 so he will have less than 6530 sheets if he only gets 13 reams.

Examiner only

16. Boris has made this pattern out of black and white squares.

Boris has to add more squares to make a new pattern.
He has to use the smallest possible number of extra squares.

$\frac{2}{5}$ of the new pattern is black.

How many black squares and white squares will there be in the new pattern? [2]

If 4 blacks represents 2/5 then 2 blacks -> 1/5

Total blocks then 2 x 5 = 10 so add another 5 white

1+5=6

Black squares 4 White squares 6

17. Robert and Sheila have been given £400, which they plan to share in the ratio 1 : 4.

(a) Robert says

1+4 = 5 add

400 ÷ 5 = 80 divide

R : S

1 : 4 times

x80 x80

80 : 320

Explain what is wrong with Robert's method. [1]

He is only splitting the money into 4 parts, but the ratio 1:4 would total 5 parts

(b) Calculate the amounts that each of them should get. [2]

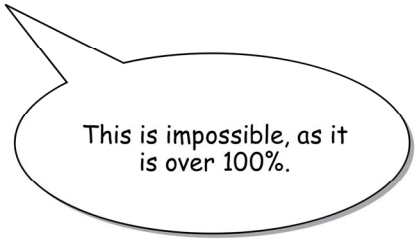
Robert's share = £ 80 Sheila's share = £ 320

Turn over.

Examiner only

18. *(a)* In Sumston, the current population is 320% of the population it was in 1983.

Naomi says



Explain how a value of 320% is possible. [1]

It means the population has more than tripled.

(b) In 1967, the population of Timesville was 40 000.

In January 2017, the population of Timesville was 250 000.

Write the January 2017 population as a percentage of the 1967 population. [2]

$\frac{250\,000}{40\,000} \times 100 = 625\%$

19. Jane has just taken two mathematics tests.

Her results were:

- 35 out of 40 in test 1,
- 31 out of 35 in test 2.

In which of these tests did Jane have the better result?
You must show all your working. [4]

$\frac{35}{40} = 0.875$ $\frac{31}{35} = 0.886$

Jane had a better result in test 2

Examiner only

20. *(a)* The nth term of a sequence is $3n - 2$.
Write down the first **three** terms in the sequence. [2]

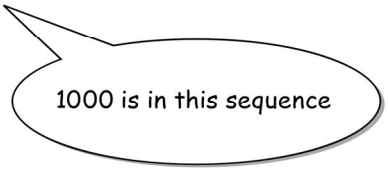
$n = 1 \rightarrow 3(1) - 2 = 1$

$n = 2 \rightarrow 3(2) - 2 = 4$

$n = 3 \rightarrow 3(3) - 2 = 7$

1, 4, 7

(b) Reza says



Show that Reza is correct. [2]

$3n - 2 = 1000$

$+2 \quad +2$

$3n = 1002$

$\div 3 \quad \div 3$

$n = 334$

It is the 334th term

21. Luca has to use the formula

$$v = u + at.$$

(a) Find the value of v when $u = 53$, $a = -4$, and $t = 6$. [2]

$v = 53 + (-4 \times 6)$

$= 53 - 24$

$= 29$

(b) Find the value of u when $v = 20$, $a = 2$ and $t = 6$. [2]

$20 = u + (2 \times 6)$

$20 = u + 12$

$(-12) \quad (-12)$

$u = 8$

(c) Rearrange the formula to make t the subject. [2]

$v = u + at$

$(-u) \quad (-u)$

$v - u = at$

$(\div a) \quad (\div a)$

$\frac{v - u}{a} = t$

Turn over.

Examiner only

22. *Wellbuilt Caravans* decided to reduce the mass of their caravans to make them easier to tow behind modern lightweight cars.

In 2015, they reduced the mass of their caravans by 8%. 100 − 8 = 92 '×0·92'
In 2016, they reduced the mass of their caravans by a further 3%. → 100 − 3 = 97 '×0·97'

The original mass of a *WB1* caravan was 1000 kg.

(a) What is the mass of a new *WB1* caravan after both the reductions? [3]

$1000 \times 0{\cdot}92 \times 0{\cdot}97 = 892.4$ kg

(b) What percentage of the original mass was the caravan reduced by? [2]

$$\text{Percentage change} = \frac{\text{new} - \text{original}}{\text{original}} \times 100$$

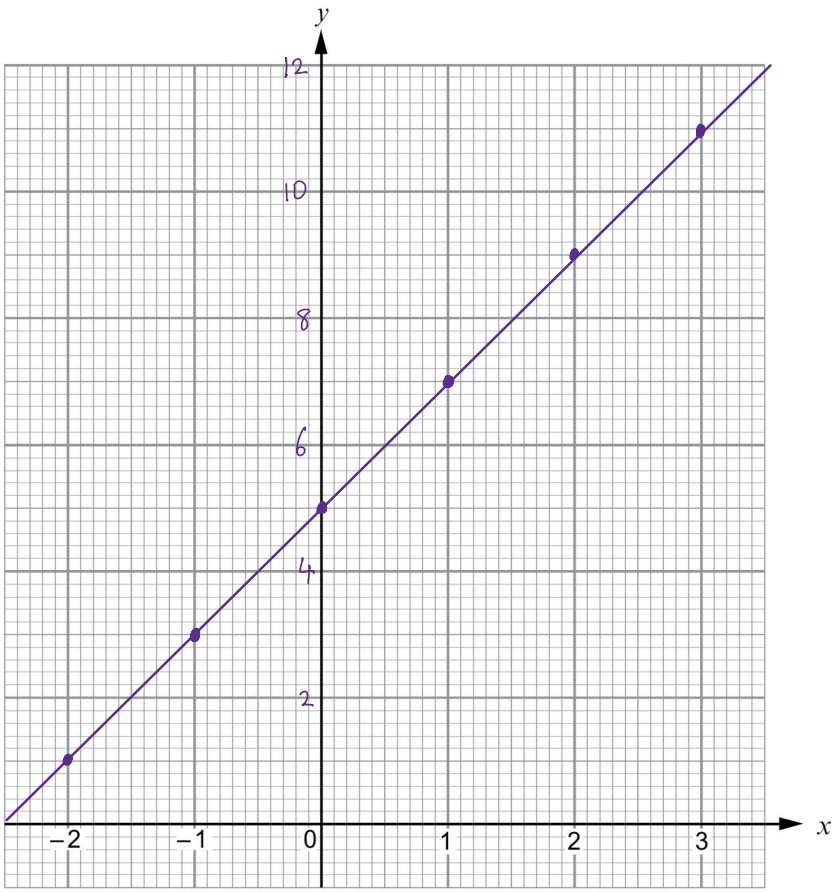
$$= \frac{892.4 - 1000}{1000} \times 100 = -10{\cdot}76\,\%$$

so reduced by 10·76 %

Examiner only

23. *(a)* Draw the graph of $y = 2x + 5$ for values of x from –2 to +3.
Use the graph paper below. [3]

x	–2	–1	0	1	2	3
y	1	3	5	7	9	11



(b) Are the lines $y = 3x - 5$ and $y = 3x + 1$ parallel?
You must give a reason for your answer. [1]

Yes they have the same gradient of 3.

Turn over.

Examiner only

24.

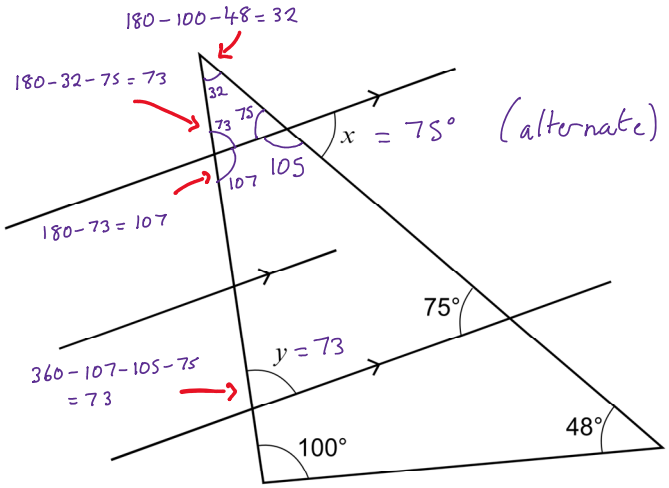


Diagram not drawn to scale

Work out the sizes of angle x and angle y. [3]

x = 75 °

y = 73 °

Examiner only

25. The area of a circle is 24 cm^2.

Calculate the radius of the circle. [3]

$A = \pi \times r^2$

$24 = \pi \times r^2$

$\div \pi \quad \div \pi$

$24 \div \pi = r^2$

$\sqrt{\quad} \quad \sqrt{\quad}$

$\sqrt{24 \div \pi} = r$

$r = 2.76$

Radius is ..... cm

26. Work out the answer.
Give your answer in standard form.

$4{\cdot}5 \times 10^{-6} \times 3{\cdot}4 \times 10^{20}$ [1]

Calculator → 1.53×10^{15}

Turn over.

Examiner only

27. *(a)*

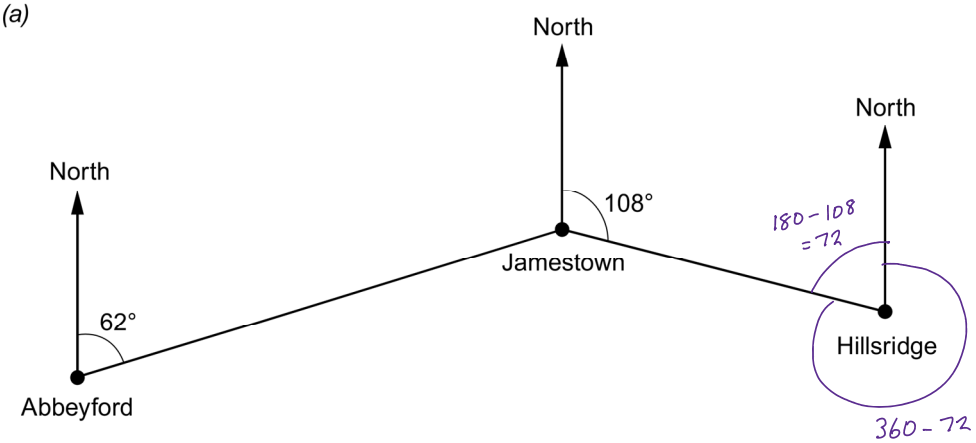


Diagram not drawn to scale

(i) What is the bearing of Jamestown from Abbeyford? [1]

062

(ii) What is the bearing of Jamestown from Hillsridge? [1]

288

(b) The actual distance between Abbeyford and Jamestown is 20 km.
On the map the distance between Abbeyford and Jamestown is 8 cm.
Work out the scale of the map.

Give your answer in the form 1 : ..... [2]

map : real life
8 cm : 20 km
÷8 ÷8
1 cm : 2·5 km
1 km = 1000 m
1 cm : 2500 m
1 m = 100 cm
1 cm : 250000 cm

Scale of map 1 : 250000

Examiner only

28. It takes 3 people 6 days to mow a grass verge.

(a) How many days would it take 9 people to mow a grass verge that is **twice as long**? [2]

For the original verge if 3 people took 6 days it would take 1 person 18 days (3 times as long). Then if the verge was twice as long it would take that person 36 days (double). However, if there are now 9 people, it will take:

$36 \div 9 = 4$

4 days

(b) State **one** assumption you have made in answering this question. [1]

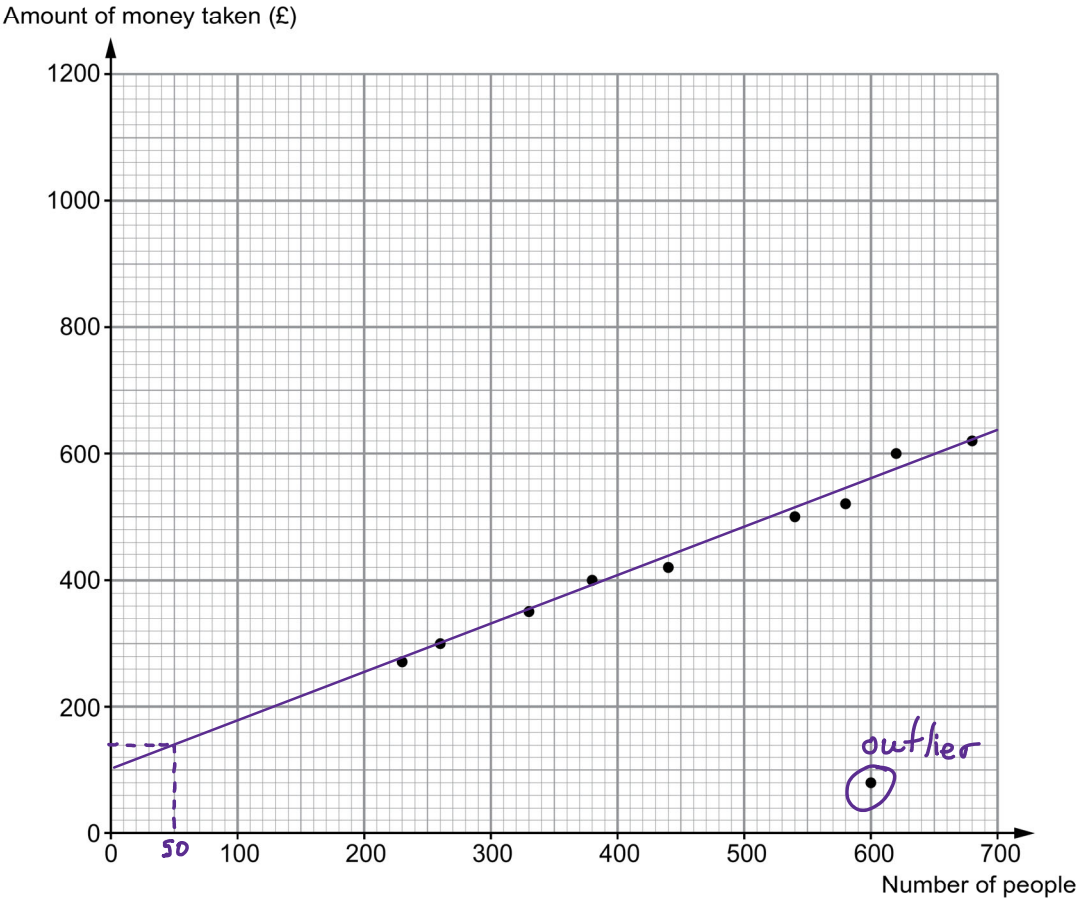
People work at the same rate

Turn over.

Examiner only

29. A festival was held over 10 days.
An ice cream van was parked on the festival site each day.

The scatter diagram shows the number of people attending the festival on each of the days and the amount of money taken by the ice cream van.



(a) It was really cold and wet on one of the days.
Although lots of people attended on this day, the amount of money taken by the ice cream van was very low.

On this cold and wet day:

- how many people attended the festival?
- what was the amount of money taken by the ice cream van? [1]

Number of people ..... 600 .....

Amount of money taken £ ..... 80 .....

Examiner only

(b) Ignoring the outlier, draw a line of best fit on the scatter diagram. [1]

(c) (i) Estimate the amount of money that the ice cream van may have taken at the festival had only 50 people attended on a particular day. [1]

Estimate is £ 140

(ii) Why is this estimate unlikely to be accurate? [1]

The data starts at 230 people, to estimate so far below this is extrapolation and is unreliable.

(d) Estimate how much each person attending the festival spends at the ice cream van. You must give the unit of your answer. [1]

$\text{gradient} = \frac{\text{change in } y}{\text{change in } x} = \frac{630 - 100}{700} = 0.76$

Estimate is £0.76 per person

30. Expand and simplify $(2x + 3)(x - 5)$. [2]

	$2x$	$+3$
$2x$	$2x^2$	$3x$
-5	$-10x$	-15

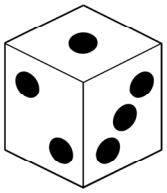
$= 2x^2 + 3x - 10x - 15$

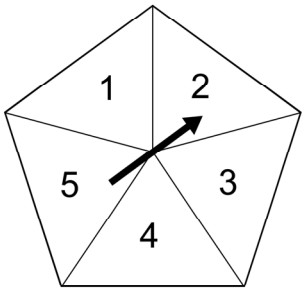
$= 2x^2 - 7x - 15$

Turn over.

Examiner only

31. Huw and Catrin are playing a game where Huw rolls an ordinary six-sided dice and Catrin spins a fair five-sided spinner, numbered 1, 2, 3, 4 and 5 as shown.





Show that the probability that they both show the same number is $\frac{1}{6}$. [3]

6 x 5 = 30 possible combinations

[1,1] [2,2] [3,3] [4,4] [5,5]

5 of the same combinations

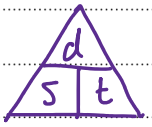
$\frac{5}{30} = \frac{1}{6}$

Examiner only

32. Rosa starts a 27 km cycle race at 14:20.
She finishes the cycle race at 16:00.
Rosa set herself a target of achieving an average speed of 20 km per hour for the race.

(a) Did Rosa achieve her target?
You must show all your working. [3]

16:00 → 14:20 difference of 1hr 40mins
= 1.6̇ hrs



$S = \frac{d}{t} = \frac{27}{1.6\dot{}}$

= 16.2 km/hr

16.2 is less than 20 so Rosa did not achieve her target.

(b) During the cycle race Rosa stopped for 25 minutes to mend a puncture.
Had she not needed to stop to mend her puncture, how would this have impacted on her
- average speed and
- achieving her target?

You must show all your working. [2]

Now actual time cycling would be 1hr 15mins
= 1.25hrs

$S = \frac{d}{t} = \frac{27}{1.25}$

= 21.6 km/hr

Higher average speed, target would be achieved.

Turn over.

Examiner only

33. The table shows rainfall, for each day during a month.

Rainfall, r (mm)	mid point	Number of days			
$0 \leqslant r < 4$	2	×	2	=	4
$4 \leqslant r < 8$	6	×	7	=	42
$8 \leqslant r < 12$	10	×	10	=	100
$12 \leqslant r < 16$	14	×	8	=	112
$16 \leqslant r < 20$	18	×	3	=	54
		+	30		312

Calculate an estimate for the mean daily rainfall. [4]

mean estimate $= \frac{312}{30}$

$= 10.4$ mm

END OF PAPER