Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2019

Mathematics

StemUp Model Solution

Unit M1
(With calculator)
Foundation Tier



[GMC11]

GMC11

TUESDAY 21 MAY, 9.15am–11.00am

TIME

1 hour 45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all twenty-seven** questions.
All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

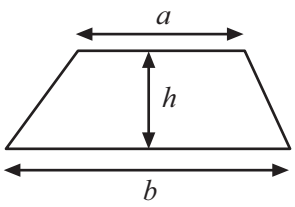
INFORMATION FOR CANDIDATES

Functional Mathematics is assessed in this unit.
The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

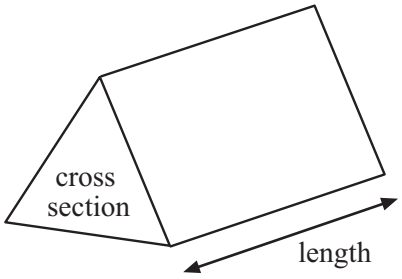
11932

Formula Sheet

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

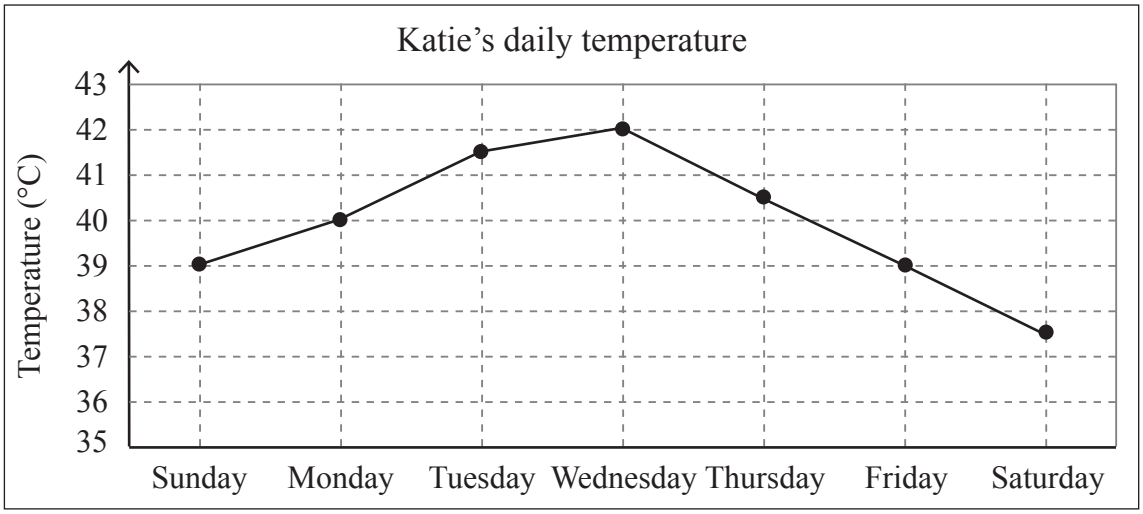


Volume of prism = area of cross section × length



11932

1 When Katie was in hospital her temperature was recorded each day.



(a) On which day was Katie's temperature 40°C?

Answer Monday [1]

(b) By how many degrees did Katie's temperature rise between Sunday and Wednesday?

42 − 39 = 3

Answer 3 °C [1]

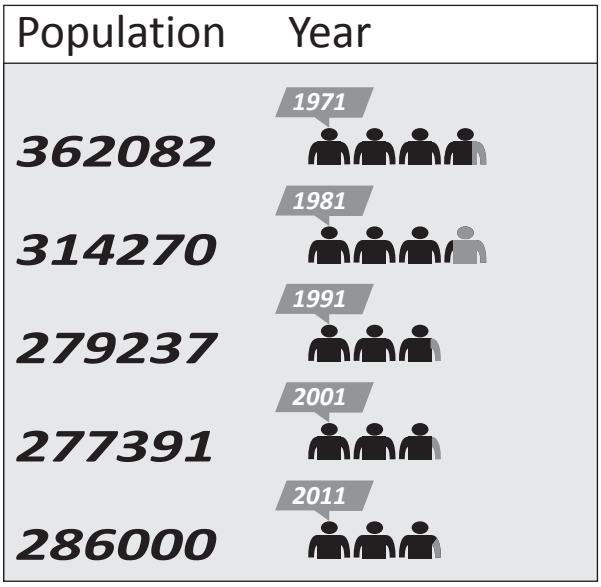
(c) Katie went home on Saturday when her temperature reached normal body temperature.

What temperature is this?

Answer 37.5 °C [1]

[Turn over

2 The chart shows the population of Belfast for some years.



(a) Which year on the chart has the lowest population?

Answer 2001 [1]

(b) By how much has the population fallen between 1971 and 2011?

362082 – 286000 = 76082

Answer 76082 [1]

(c) How many people are represented by this symbol?



Answer 100000 people [1]

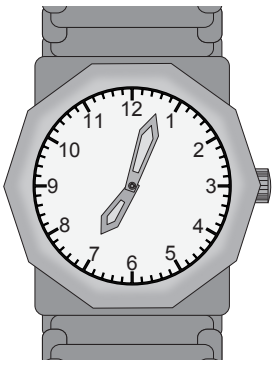
11932

3 **(a)** Kevin is at the airport in the morning.

His watch is 7 minutes fast.

What is the correct time?

Watch shows 7.03
7.03 – 7 min
= 6.56 a.m.



Answer 6.56 a.m. [2]

(b) Kevin's suitcase weighs 15.6 kg.

The maximum weight allowed is 20 kg.

How much less than the maximum weight allowed does Kevin's suitcase weigh?

20 – 15.6 = 4.4

Answer 4.4 kg [1]

(c) The plane holds 97 530 litres of fuel.

Round 97 530 to the nearest **thousand** litres.

Answer 98000 litres [1]

[Turn over

(d) Kevin buys a coffee on the plane.



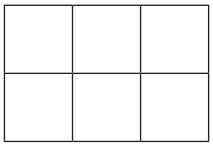
Estimate the capacity of the coffee cup.

Circle the correct answer.

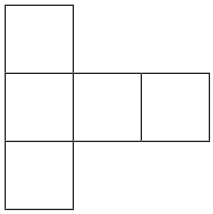
40 ml 3 litres 950 g (340 ml) 2 kg [1]

4 Which two of these are nets of cubes?

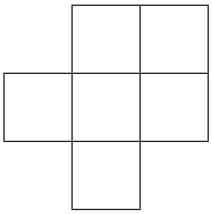
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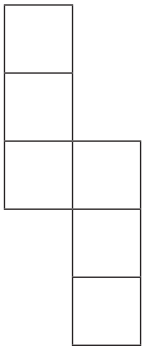


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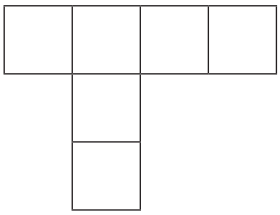


C

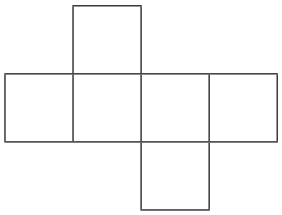




D



E



F

Answer D, F [2]

5

Rex Cinema Ticket Prices	
Adult	£7.15
Senior	£5.00
Student	£5.50
Child	£4.75

(a) Kim buys one adult and two child tickets.

Work out the total cost.

7.15 + 2 × 4.75
= 7.15 + 9.50 = 16.65

Answer £ 16.65 [2]

(b) The film starts at 6.40 p.m.

It lasts 95 minutes.

What time does the film end?

95 min = 1 hr 35 min
6.40 p.m. + 1 hr = 7.40 p.m.
7.40 p.m. + 35 min = 8.15 p.m.

Answer 8.15 p.m. [2]

[Turn over

6 Tony is a delivery driver.

He uses the formula below to work out the delivery cost.

Delivery cost = number of miles × rate per mile + fixed charge

The fixed charge is £2.25

The rate per mile is £0.60

How much does it cost to deliver a package 12 miles away?

Cost = 12 × 0.60 + 2.25
= 7.20 + 2.25
= 9.45

Answer £ 9.45 [2]

7 Paul is checking his gas bill.

On January 1st the meter reading was 1880 units.

On April 1st the meter reading was 2305 units.

Gas costs 16p per unit used.

(a) Calculate the cost of gas used from 1st January to 1st April.

Units used = 2305 − 1880 = 425
Cost = 425 × 16p = 6800p
= £68.00

Answer £ 68.00 [4]

(b) Cooking makes up 10% of Paul's gas use.

What is 10% of the cost of his gas bill?

10% of £68 = 68 ÷ 10
= £6.80

Answer £ 6.80 [2]

[Turn over

8 **(a)** Four fifths of 2900 bus journeys left on time.

How many journeys left on time?

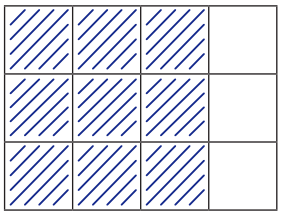
2900 ÷ 5 = 580

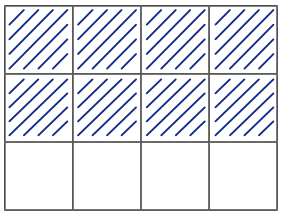
580 × 4 = 2320

Answer 2320 journeys [2]

(b) Which fraction, $\frac{3}{4}$ or $\frac{2}{3}$, is larger?

The grids can be used to explain your answer.





$\frac{3}{4} = \frac{9}{12}$ $\frac{2}{3} = \frac{8}{12}$

Answer $\frac{3}{4}$ is larger because $\frac{3}{4} = \frac{9}{12}$ which is larger than $\frac{2}{3} = \frac{8}{12}$

(9 twelfths is more than 8 twelfths) [2]

(c) Sara says $\frac{3}{4} + \frac{2}{3} = \frac{5}{7}$

Tanya says $\frac{3}{4} + \frac{2}{3} = \frac{17}{24}$

Una says $\frac{3}{4} + \frac{2}{3} = \frac{17}{12}$ $\frac{3}{4} + \frac{2}{3} = \frac{9}{12} + \frac{8}{12} = \frac{17}{12}$

Which girl is correct?

Answer Una [1]

11932

9 Tickets for a show are priced as shown:

Adult £14	Senior Citizen £8	Child £5

Mrs Evans spent £57 on 6 tickets.

She bought 1 Child ticket.

How many Adult and Senior Citizen tickets did she buy?

£57 − £5 = £52 for the other 5 tickets
Try 2 Adult and 3 Senior Citizen:
2 × £14 = £28
3 × £8 = £24
£28 + £24 = £52 ✓

Answer Adult 2

Senior Citizen 3 [3]

10 Insert < or > or = in the boxes to make each statement correct.

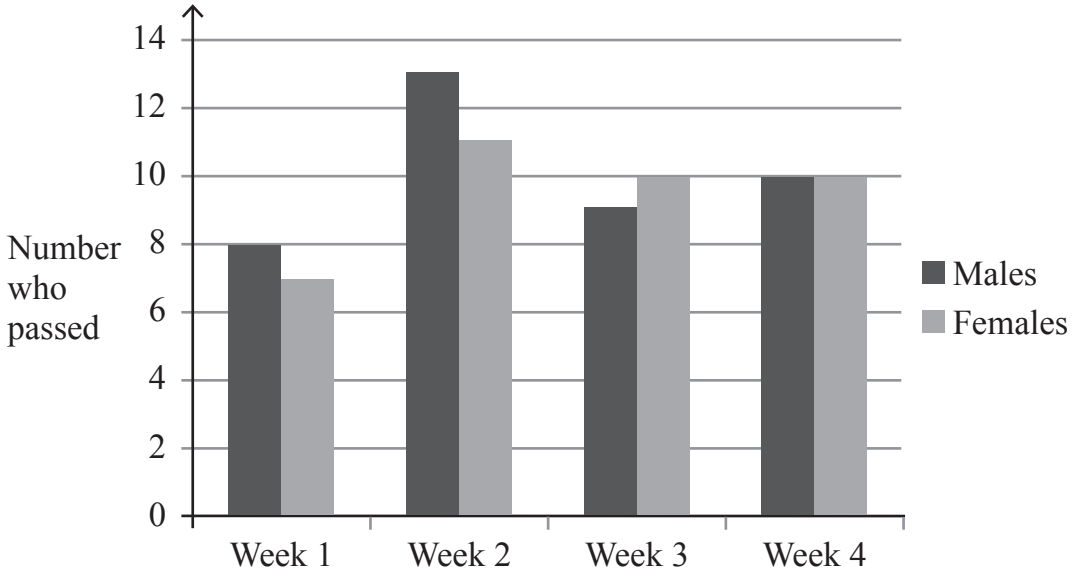
$\frac{1}{5}$ [<] 25% 1 ÷ 5 = 0.2 = 20%

0.3 [>] 3% 0.3 = 30%

[2]

[Turn over

11 A driving instructor recorded the number of males and females who passed their driving test.



(a) How many more males than females passed their driving test in Week 2?

13 − 11 = 2

Answer 2 [1]

(b) The driving instructor says "Those who pass their test are more likely to be female than male."

Does the data in the bar chart support this statement?

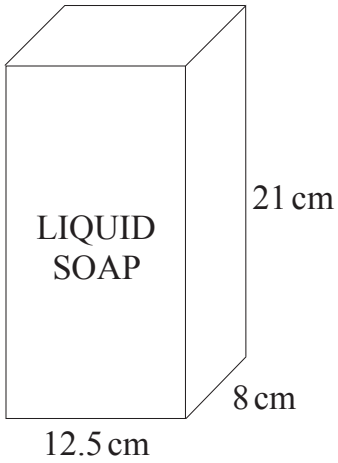
Give a reason for your answer.

Males: 8 + 13 + 9 + 10 = 40
Females: 7 + 11 + 10 + 10 = 38

Answer No because 40 males passed but only 38 females, so more males than females passed (2 more males). [2]

12 Each soap dispenser in a restaurant is in the shape of a cuboid.

The measurements are shown in the diagram below.



(a) Work out the volume of the soap dispenser.

State the units of your answer.

$V = 21 \times 8 \times 12.5$
$= 2100$

Answer 2100 cm^3 [3]

(b) The manager of the restaurant buys 15 litres of liquid soap.

How many soap dispensers will he be able to fill?

15 litres = 15000 cm^3
15000 ÷ 2100 = 7.142...
so 7 full dispensers

Answer 7 [2]

[Turn over

13 **(a)** Simplify $2c + 5e + 8c - 2e$

$2c + 8c = 10c, \quad 5e - 2e = 3e$

Answer $10c + 3e$ [2]

(b) Solve $w + 13 = 27$

$w = 27 - 13$

Answer $w =$ 14 [1]

(c) Solve $\frac{m}{3} = 15$

$m = 15 \times 3$

Answer $m =$ 45 [1]

(d) Given that $t = 4$ and $r = 7$

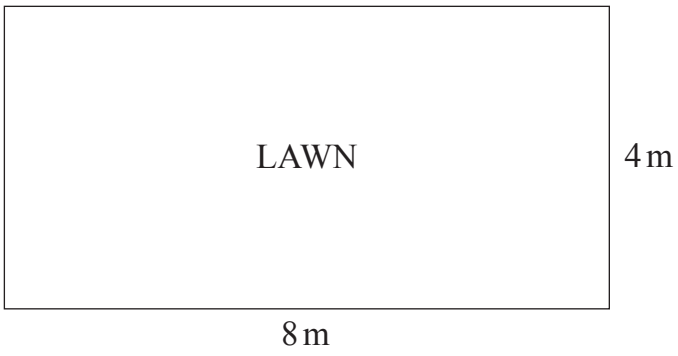
find the value of $5t - 2r$

$5 \times 4 - 2 \times 7$
$= 20 - 14 = 6$

Answer 6 [2]

14 Jim, who runs a gardening business, cuts the grass on lawns.

The measurements of one lawn are shown in the diagram below.



Jim charges £2 per square metre for cutting grass.

How much does he charge to cut the grass on the lawn?

Area = 8 × 4 = 32 m^2
Cost = 32 × £2 = £64

Answer £ 64 [2]

[Turn over

15 Gary asked some people how many times they went to the cinema last month.

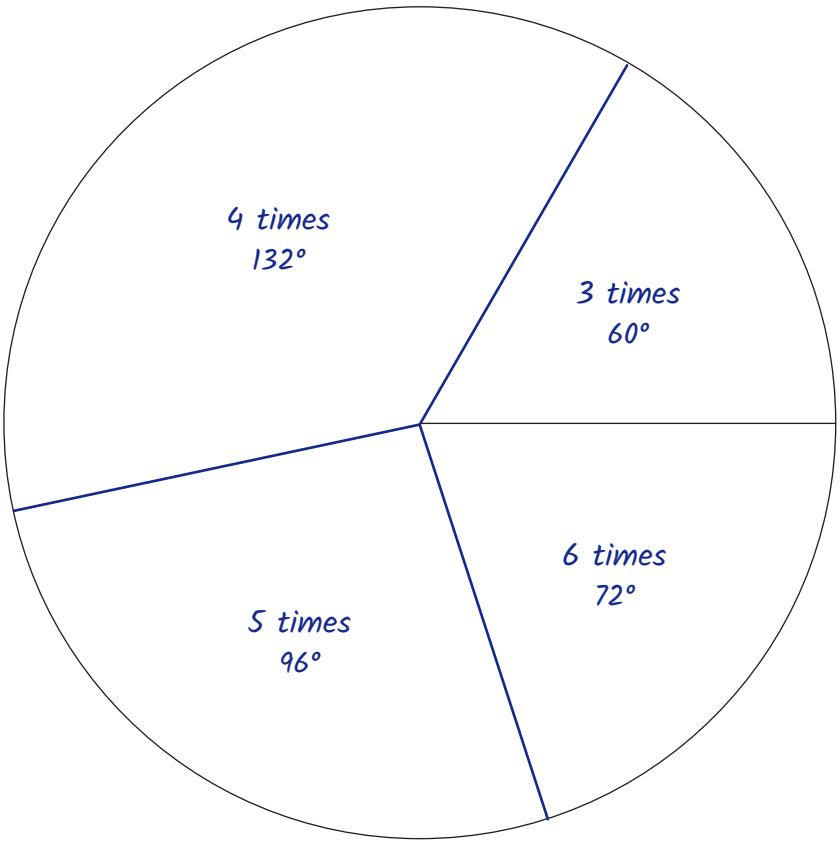
Number of times	Number of people
Less than 3	0
3	5
4	11
5	8
6	6
More than 6	0

(a) How many people did he ask?

Answer 30 [1]

(b) Draw a fully labelled pie chart to show the information in the table.

360 ÷ 30 = 12°
3: 5 × 12 = 60°
4: 11 × 12 = 132°
5: 8 × 12 = 96°
6: 6 × 12 = 72°



[4]

(c) What was the modal number of times for these people?

Answer 4 [1]

(d) How many times did these people go in total?

$3 \times 5 + 4 \times 11 + 5 \times 8 + 6 \times 6$
$= 15 + 44 + 40 + 36$
$= 135$

Answer 135 [2]

[Turn over



16 Steven wants to get a T-shirt printed for each member of his running club.

The printer charges a fee of £25 to set up the machine.

He then charges £1.20 per T-shirt for the printing.

The total bill from the printer was £67

How many people are in the running club?

£67 − £25 = £42 for printing
£42 ÷ £1.20 = 35

Answer 35 [3]

17 Jenny opens a "Charity Bank Account". Any interest gained goes to a local charity.

It pays 2% per annum simple interest.

She puts £1500 into the account.

She does not make any deposits or withdrawals.

How much interest will the charity have received after 3 years?

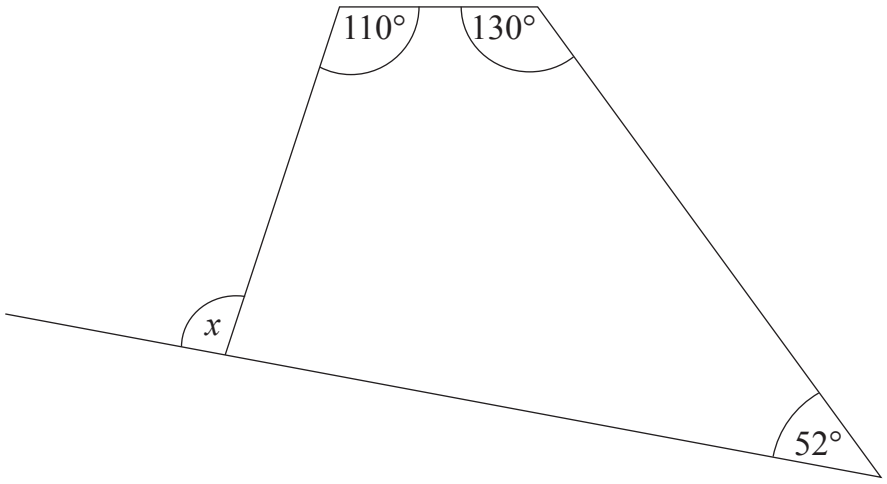
2% of £1500 = 0.02 × 1500 = £30 per year
Interest for 3 years = 3 × £30
= £90

Answer £ 90 [3]

[Turn over



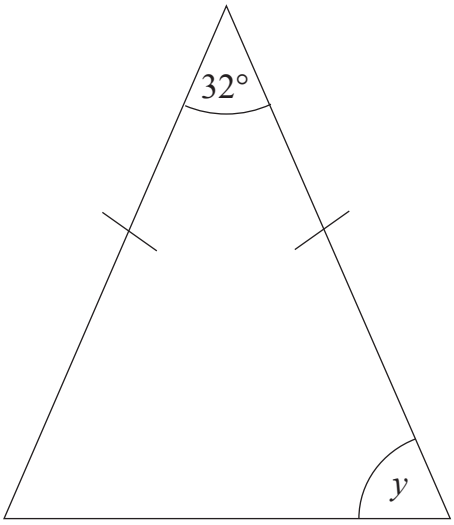
18 (a) Work out the size of the angle x in the diagram below.



Angles in a quadrilateral add up to 360°
360 − (110 + 130 + 52) = 360 − 292 = 68°
Angles on a straight line add up to 180°
x = 180 − 68 = 112°

Answer 112 ° [3]

(b) Work out the size of the angle y in the diagram below.



Isosceles triangle, so base angles are equal
$y = (180 - 32) \div 2$
$= 148 \div 2 = 74°$

Answer 74 ° [2]

[Turn over

19 Peter buys mince and potatoes.

Mince costs £6 per kg.

Peter buys 3.2 kg of mince and 1.8 kg of potatoes.

The total cost is £20.46

How much does it cost for 1kg of potatoes?

Mince: 3.2 × £6 = £19.20
Potatoes: £20.46 − £19.20 = £1.26
1 kg potatoes: £1.26 ÷ 1.8 = £0.70
= 70p

Answer 70 p [4]

20 Holly did three exams.

Her results were:

Geography	28 out of 40
Music	16 out of 25
English	34 out of 50

Her Mum says "English was your best subject."

Is her Mum right?

You must show your working and explain your answer.

Geography: 28 ÷ 40 × 100 = 70%
Music: 16 ÷ 25 × 100 = 64%
English: 34 ÷ 50 × 100 = 68%

Answer No because Geography 70% is higher than English 68%, so Geography was her best subject. [3]

[Turn over

21 The price of a sofa was £880

It is reduced by 35%.

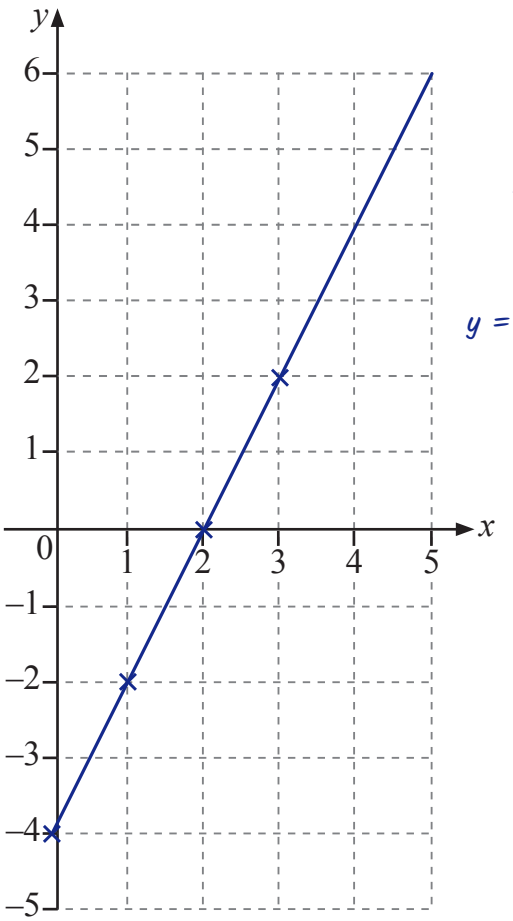
Joanna says "The sofa now costs only £570"

Is she correct? Explain your answer.

35% of £880 = 0.35 × 880 = £308
New price = £880 − £308 = £572
£572 is not £570
No, she is not correct.
The sofa now costs £572, not £570.

[3]

22 Draw the graph of $y = 2x - 4$ on the grid below.



x 0 1 2 3
y −4 −2 0 2

y = 2x − 4

[3]

[Turn over

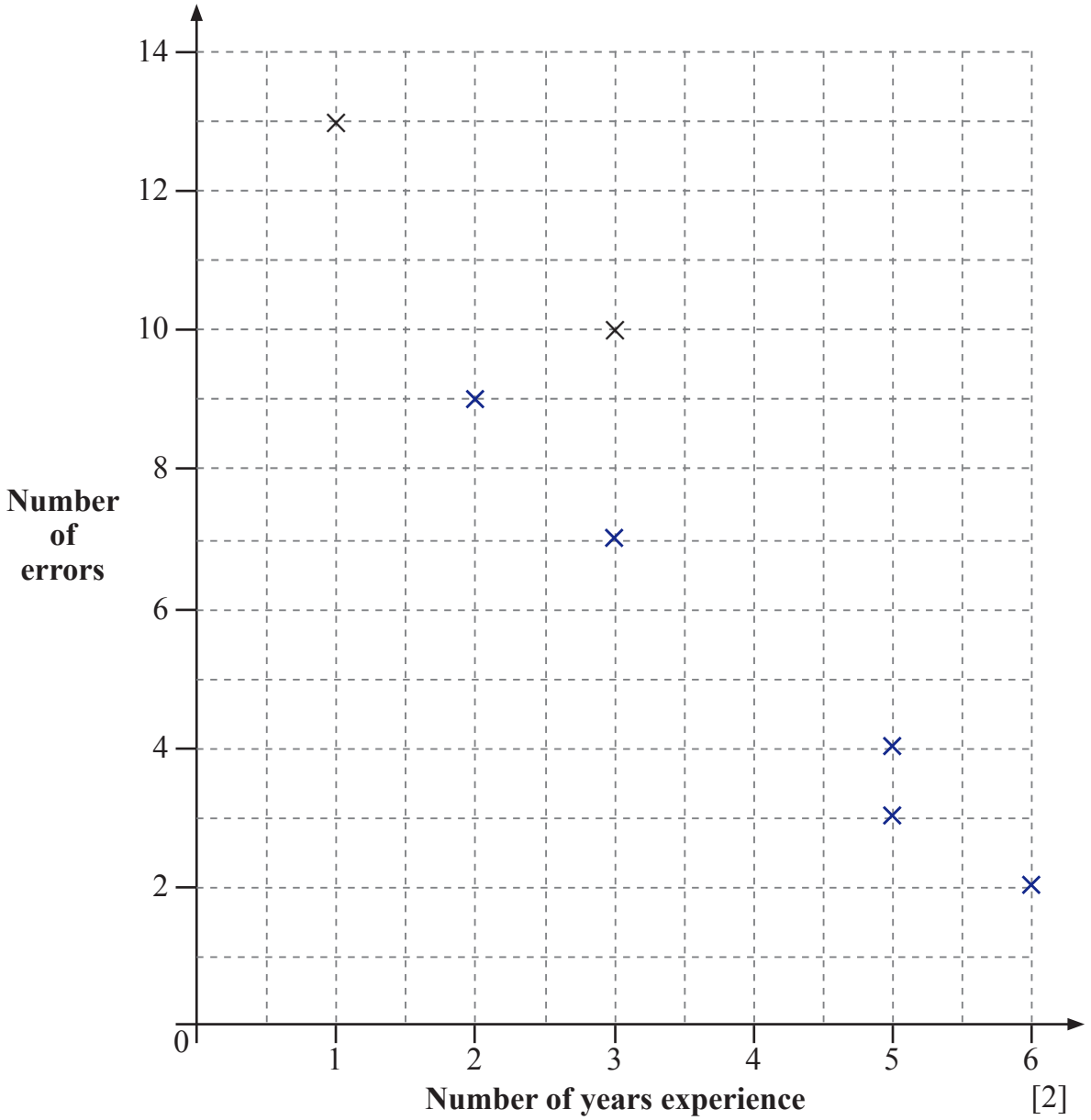
23 Seven rugby matches were watched to see how many errors the referee made.

The number of years experience for each referee is also shown.

Referee	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Number of years experience	**3**	**1**	5	2	6	5	3
Number of errors made	**10**	**13**	4	9	2	3	7

(a) Plot this information on the scatter graph below.

The first two points have been done for you.



[2]

(b) Complete the following sentence.

The graph suggests that the more experience a referee has, the

_____*fewer*_____ errors will be made. [1]

[Turn over

24 Alice has five cards each with a number on them. Three of the numbers are shown.

3	8	5	5	9

The mode of the five numbers on the cards is 5

The mean of the five numbers on the cards is 6

Work out the range of the five numbers on the cards.

You must show your working.

Mode is 5, so another card is 5
Mean is 6, so total = 5 × 6 = 30
Last card = 30 − (3 + 8 + 5 + 5)
= 30 − 21 = 9
Cards: 3, 5, 5, 8, 9
Range = 9 − 3 = 6

Answer 6 [4]

25 The number of absences in a month for workers was recorded.

Number of absences	Frequency
0	10
1	8
2	6
3	5
4	1

Calculate the mean number of absences.

0×10 + 1×8 + 2×6 + 3×5 + 4×1
= 0 + 8 + 12 + 15 + 4 = 39
Total frequency = 30
Mean = 39 ÷ 30 = 1.3

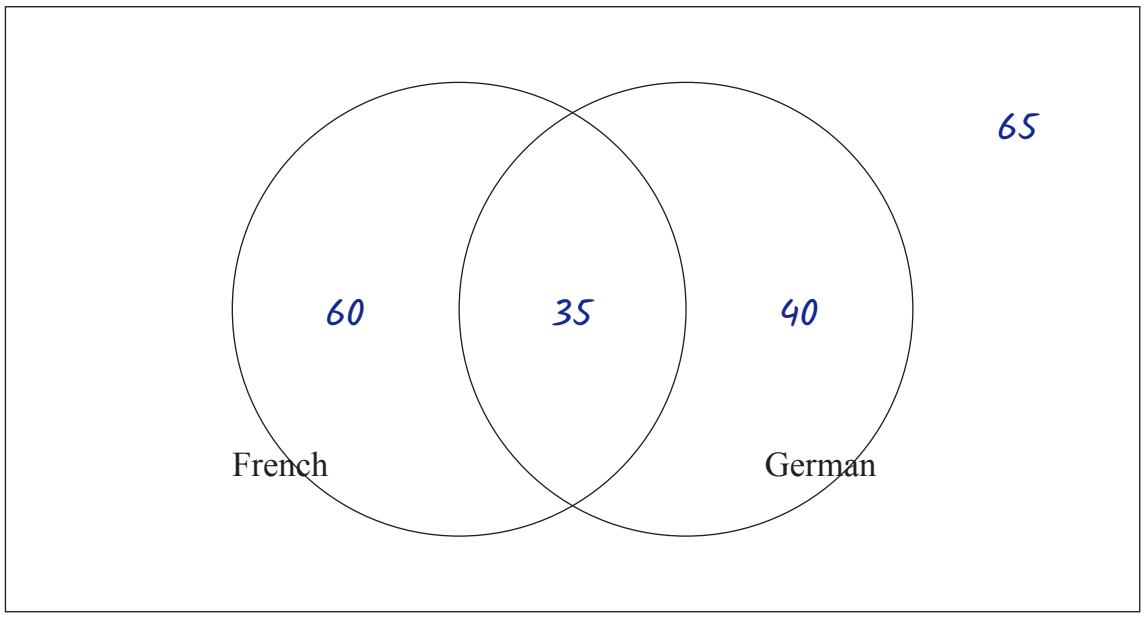
Answer 1.3 [3]

[Turn over

26 In Year 11 there are 200 students.
Students can choose to study French, German, both languages or no language.

95 students study French.
75 students study German.
35 students study both languages.

By completing the Venn diagram below, calculate how many students in Year 11 study no languages.



French only = 95 − 35 = 60
German only = 75 − 35 = 40
None = 200 − (60 + 35 + 40)
= 200 − 135 = 65

Answer 65 [4]

27

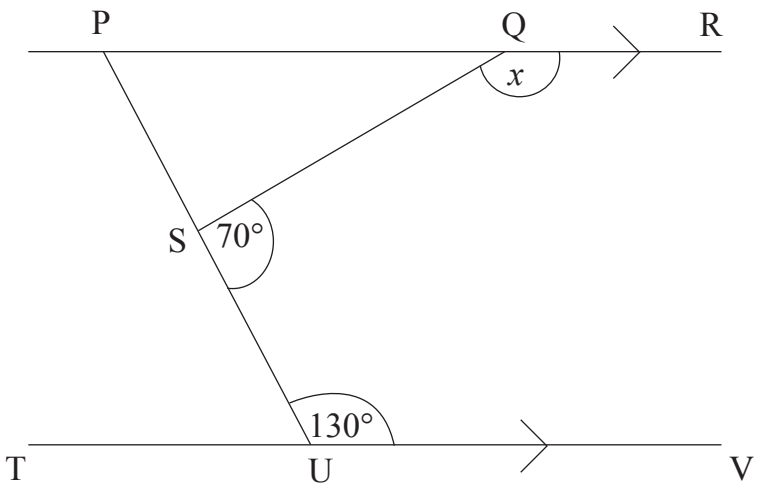


diagram
not drawn
accurately

PR and TV are parallel lines.

Calculate the size of angle x.

Angle PSQ = 180 – 70 = 110° (angles on a straight line)
Angle PUT = 180 – 130 = 50° (angles on a straight line)
Angle QPS = angle PUT = 50° (alternate angles)
Angle PQS = 180 – (110 + 50) = 20° (angles in a triangle)
x = 180 – 20 = 160° (angles on a straight line)

Answer 160 ° [3]

THIS IS THE END OF THE QUESTION PAPER

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Question Number	**Marks**
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Examiner Number

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