Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
November 2024

Mathematics

StemUp Model Solution

Unit M1
(With calculator)

Foundation Tier

[GMC11]



GMC11

TUESDAY 19 NOVEMBER, 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.**
Questions which require drawing or sketching should be completed using an HB pencil.
All working **must** be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.
Answer **all thirty-two** questions.

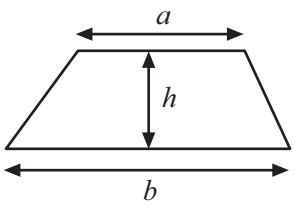
INFORMATION FOR CANDIDATES

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.

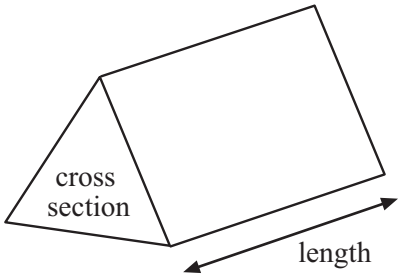
14861

Formula Sheet

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



Volume of prism = area of cross section × length



14861

1 Lunchtime Specials cost £2.75 each.

Paul bought five Lunchtime Specials.

How much change did he get from £20?

$5 \times 2.75 = 13.75$

$20 - 13.75 = 6.25$

Answer £ 6.25 [2]

[Turn over

2 A washing machine was on offer in two different shops.

Shop **A** was offering a discount of $\frac{1}{4}$

Shop **B** was offering a discount of 20%

Explain which shop was offering the greater percentage discount.

$\frac{1}{4} = 1 \div 4 = 0.25 = 25\%$

$25\% > 20\%$

Answer Shop A because 1/4 = 25% and 25% > 20%

so Shop A gives the greater percentage discount [2]

3 Insert **factor** or **multiple** to make each statement correct.

14 is a multiple of 7 [1]

14 is a factor of 28 [1]

4 The prices of some items in a shop are shown below.

Chicken fillets	£6.50 per kg
Roast potatoes	£2.30 per kg
Pepper sauce	£1.80 per tub

A customer bought
2 kg of chicken fillets
3 kg of roast potatoes
1 tub of pepper sauce

The shop has a loyalty scheme which gives 1 loyalty point for every £5 spent.

How many loyalty points will this customer get?

Show your working out clearly.

Chicken: 2 × 6.50 = £13.00

Potatoes: 3 × 2.30 = £6.90

Sauce: 1 × 1.80 = £1.80

Total = 13.00 + 6.90 + 1.80 = £21.70

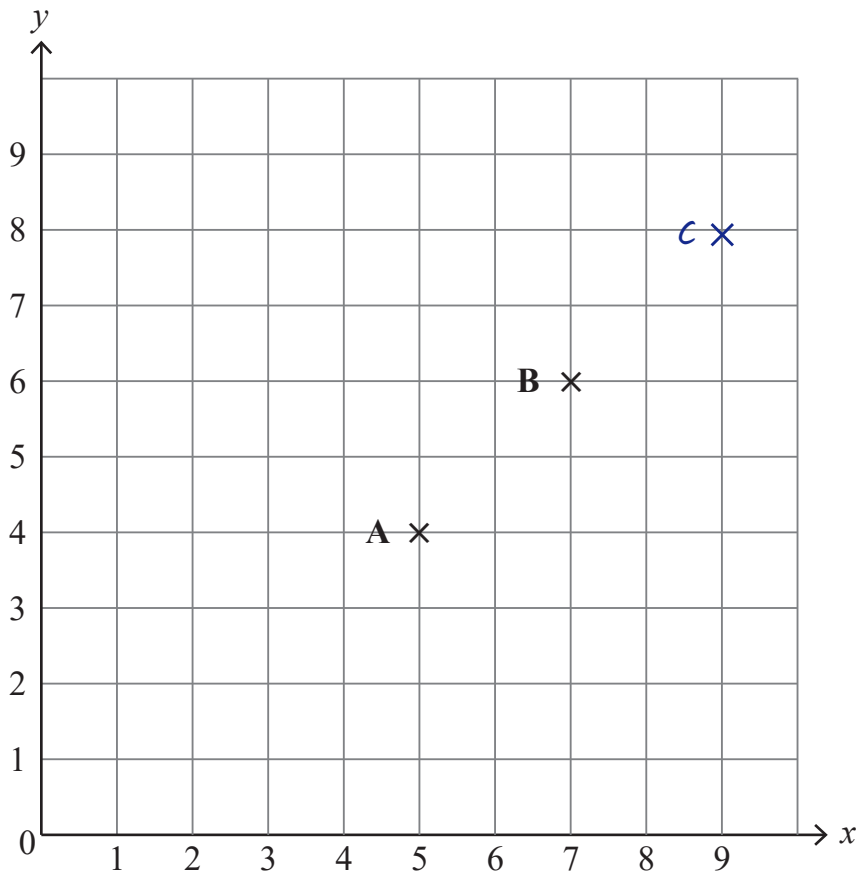
21.70 ÷ 5 = 4.34

so 4 complete lots of £5

Answer 4 loyalty points [4]

[Turn over

5 The points A(5, 4) and B(7, 6) are plotted on the grid below.



Points **A**, **B** and **C** all lie in a straight line and are the same distance apart.

(a) Plot point **C** on the grid above. [1]

(b) Write down the coordinates of point **C** which you plotted.

Answer (9 , 8) [1]

6 Choose the most appropriate metric unit from the box to complete the sentences.

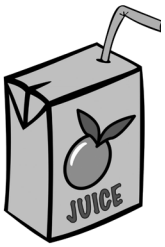
m^3	kg	m
km	ml	cm^2



(a) The length of a road is 6 ___km___ [1]



(b) The volume of a shipping container is 50 ___m^3___ [1]



(c) A carton of juice contains 250 ___ml___ [1]

[Turn over

7 Jonny was born on 15 April 1992

(a) How many years old is he now?

2024 − 1992 = 32

Answer 32 years old [1]

Kerry is exactly 5 years older than Jonny.

(b) In which year was she born?

1992 − 5 = 1987

Answer 1987 [1]

Les is 13 months younger than Jonny.

(c) In which month was he born?

April 1992 + 13 months = May 1993

Answer May [1]

8 Carl is planning to buy a used car.

The table below shows his options.

Car	Price (£)	Age (years)	Mileage	Engine size (litres)	Transmission	Fuel type
SUV	20 499	6	77 896	1.7	Manual	Diesel
Crossover	8 999	7	90 000	2.0	Manual	Petrol
Hatch	14 299	5	57 300	1.6	Manual	Petrol
GT	10 999	7	73 210	2.0	Automatic	Diesel
4WD	29 499	5	42 185	2.8	Automatic	Diesel
Sports	10 199	6	20 177	2.0	Automatic	Petrol

(a) Which diesel car has least mileage?

Diesel: SUV 77 896, GT 73 210, 4WD 42 185

Answer 4WD [1]

(b) Which is the cheapest car with an engine size of 2 litres and automatic transmission?

2.0 litre automatic: GT £10 999, Sports £10 199

Answer Sports [1]

(c) Carl decides to buy a car costing less than £20 000 that is 5 or 6 years old.

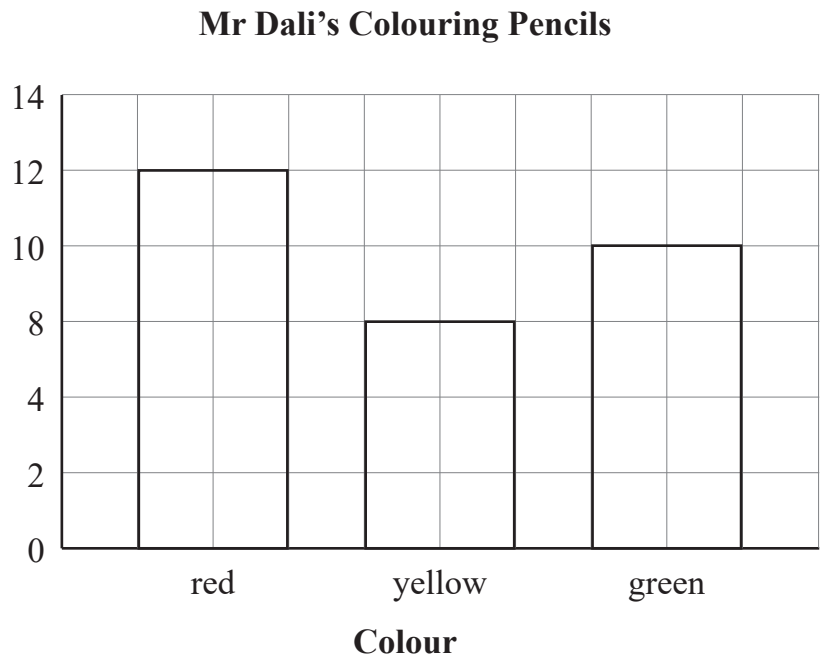
Which two cars can he buy?

Hatch £14 299 (5 years), Sports £10 199 (6 years)

Answer Hatch or Sports [1]

[Turn over

9 **(a)** Write down **two** things which are wrong with this bar chart.



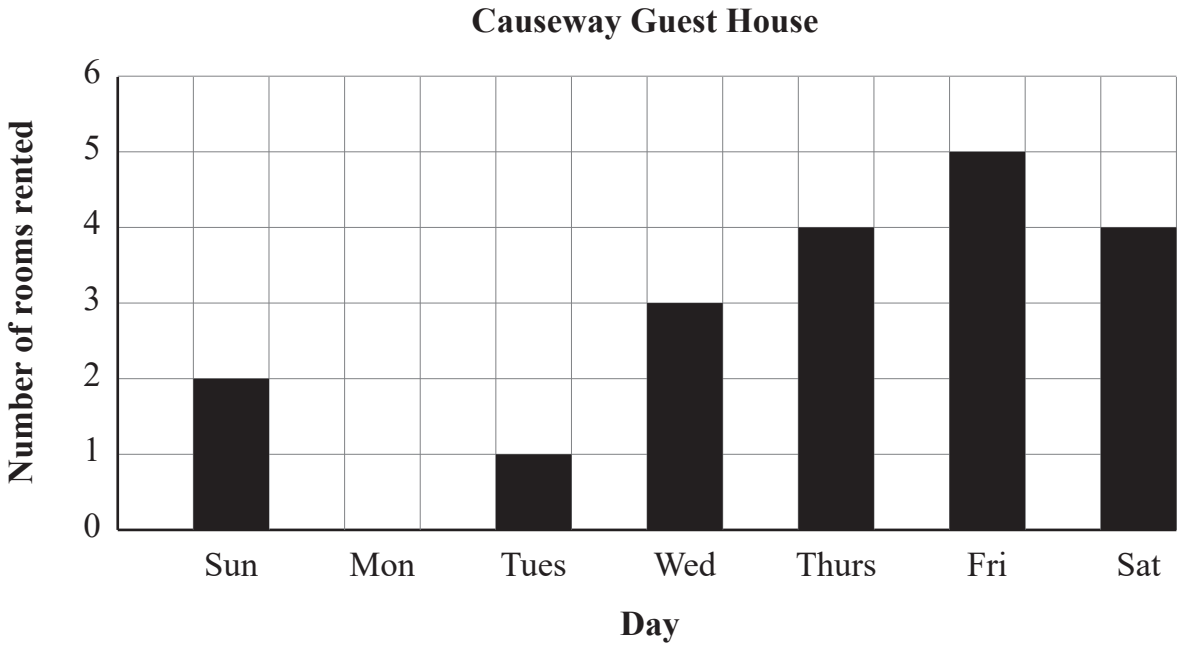
Answer

1. *The vertical axis has no label.*

2. *The vertical scale is wrong; it jumps from 4 to 8.* [2]

(b) The number of rooms rented during one week in the Causeway Guest House are shown in the bar chart below.

Monday's information is missing.



23 rooms in total were rented.

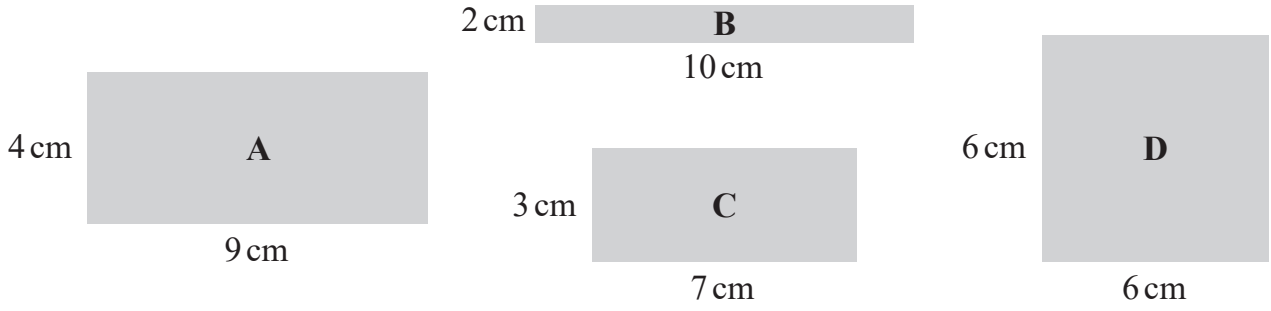
How many rooms were rented on Monday?

Sun + Tue + Wed + Thu + Fri + Sat
= 2 + 1 + 3 + 4 + 5 + 4 = 19
Monday = 23 − 19 = 4

Answer 4 rooms [2]

[Turn over

10 **(a)** Four shapes are shown.



(i) What is the perimeter of rectangle **C**?

7 + 3 + 7 + 3 = 20

Answer 20 cm [1]

(ii) Which two shapes have the same area?

A = 9 × 4 = 36, B = 10 × 2 = 20,
C = 7 × 3 = 21, D = 6 × 6 = 36

Answer Shapes A and D [1]

(b) A rectangle, **E**, has an area of 42 cm^2

It has a length of 6 cm.

What is the perimeter of this rectangle?

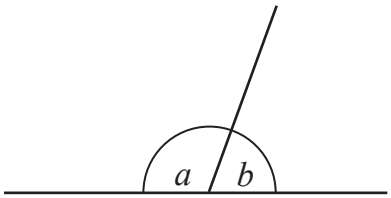
width = 42 ÷ 6 = 7 cm
perimeter = 7 + 6 + 7 + 6 = 26

Answer 26 cm [2]

11 Angle a is twice the size of angle b.

The diagram is not drawn accurately.

What size is angle a?



$a + b = 180°$ (angles on a straight line)

$a = 2b$ so $3b = 180$

$b = 180 \div 3 = 60°$

$a = 60 \times 2 = 120°$

Answer $a =$ 120 ° [2]

[Turn over

12 The weights, in kg, of rugby players are shown below.

125	111	125	117	116	108	105	107

(a) What is the range of the weights?

125 − 105 = 20

Answer 20 kg [1]

(b) Calculate the mean weight.

125 + 111 + 125 + 117 + 116 + 108 + 105 + 107 = 914

914 ÷ 8 = 114.25

Answer 114.25 kg [3]

(c) Find the median weight.

105, 107, 108, 111, 116, 117, 125, 125

(111 + 116) ÷ 2 = 227 ÷ 2 = 113.5

Answer 113.5 kg [2]

13 The final scores in a golf competition are shown below.

Team Europe		Team USA	
Rory	+ 7	James	– 2
Tommy	– 3	Jordan	+ 4
Justin	– 5	Scottie	– 6
Seve	+ 2	Patrick	+ 1

(a) The best player was the player with the **lowest** score.

Who was the best player?

Answer Scottie [1]

(b) What was the difference between the scores for Rory and Justin?

$+7 - (-5) = 7 + 5 = 12$

Answer 12 [1]

(c) The team with the **lowest total** score won the competition.

Which team won the competition?

Show your working out clearly.

Team Europe: $7 - 3 - 5 + 2 = +1$

Team USA: $-2 + 4 - 6 + 1 = -3$

Answer Team USA because USA total −3, Europe total +1 and −3 is lower than +1 [2]

[Turn over

14 $\frac{2}{3}$ of the students in a school were entitled to free school meals.

There were 741 students in the school.

How many students were entitled to free school meals?

$\frac{2}{3}$ of 741

741 ÷ 3 = 247

247 × 2 = 494

Answer 494 [2]

15 Two shops were offering money off a games console.

Shop	Price	Discount
Play Away	£580	15%
Game Garden	£560	20%

Which shop offered more money off?

Show your working out clearly.

Play Away: 15% of 580 = 0.15 × 580 = £87

Game Garden: 20% of 560 = 0.20 × 560 = £112

£112 > £87

Answer Game Garden [3]

16 Maisie has 33 vitamin tablets.

She takes 7 vitamin tablets each week.

How many vitamin tablets will she have left over after 4 weeks?

$4 \times 7 = 28$

$33 - 28 = 5$

Answer 5 [2]

17 Damian is a delivery driver for a food takeaway.

He is paid £3 for each local delivery (L) and £5 for each non-local delivery (N).

To calculate the total amount of money (T) he is paid, Damian uses the formula

$$\mathbf{T = 3L + 5N}$$

Use the formula to calculate the total amount he is paid when he makes 8 local deliveries and 5 non-local deliveries.

$T = 3 \times 8 + 5 \times 5$

$T = 24 + 25 = 49$

Answer £ 49 [2]

[Turn over

18 Matthew, Karen and Jamie were trying to work out the value of 5^3

Matthew thought it was 15

Karen thought it was 125

Jamie thought it was 8

Who was correct?

Explain your answer clearly.

$5^3 = 5 \times 5 \times 5$

$= 25 \times 5 = 125$

Answer Karen was correct because $5 \times 5 \times 5 = 125$

5^3 means 5 multiplied by itself 3 times, not 5×3 [2]

19 Ciara and Len were each given £40 as a Christmas present.

Ciara spent $\frac{17}{20}$ of the money she was given.

Len spent 80% of the money he was given.

Who spent more of their money?

Explain your answer clearly.

$\frac{17}{20} \times 100 = 85\%$

$17 \div 20 \times 40 = £34$, 80% of $40 = £32$

Answer Ciara because she spent 17/20 = 85% of her money and 85% > 80% (£34 > £32) [2]

[Turn over

20 At a paint shop

Emulsion paint costs £4.25 per litre

Gloss paint costs £6 per litre

Masonry paint costs £10.50 per litre

Orla bought 12 litres of emulsion paint, 2.5 litres of gloss paint and some masonry paint.

She paid £134.25 in total.

How many litres of masonry paint did she buy?

Emulsion: 12 × 4.25 = £51

Gloss: 2.5 × 6 = £15

Masonry: 134.25 − 51 − 15 = £68.25

68.25 ÷ 10.50 = 6.5 litres

Answer 6.5 litres [4]

21

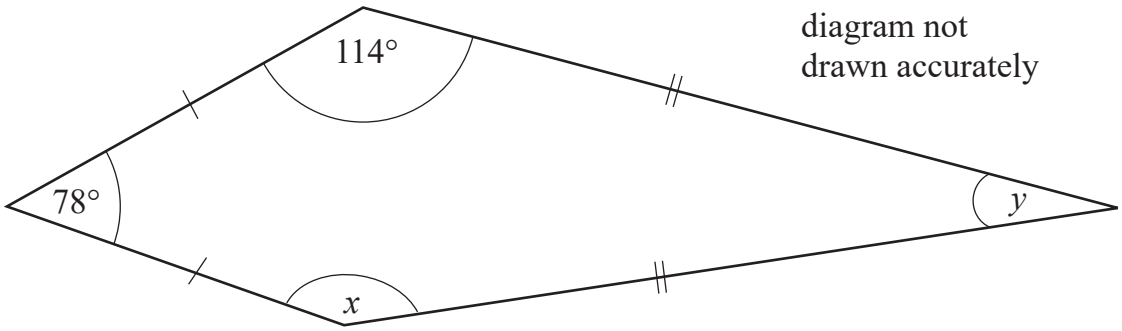


diagram not drawn accurately

The diagram shows the size of two angles in a kite.

Find the size of

(a) angle x

$x = 114°$ (a kite has one pair of equal angles)

Answer 114 ° [1]

(b) angle y

angles in a quadrilateral add to 360°

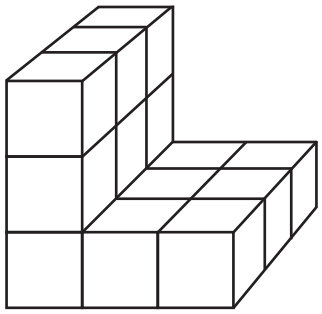
$y = 360 - (78 + 114 + 114)$

$y = 360 - 306 = 54°$

Answer 54 ° [2]

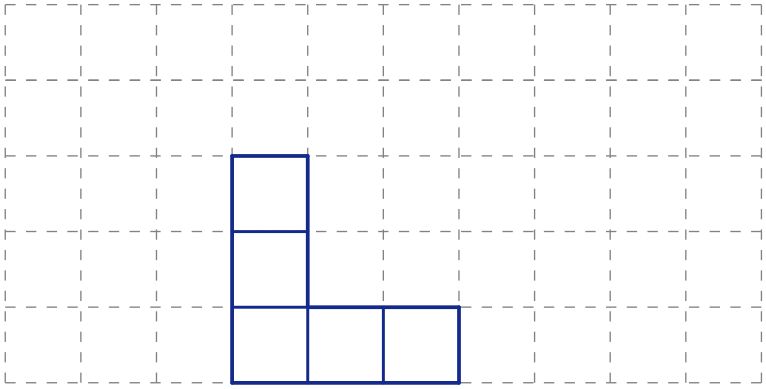
[Turn over

22 The diagram below shows a 3D shape made with centimetre cubes.

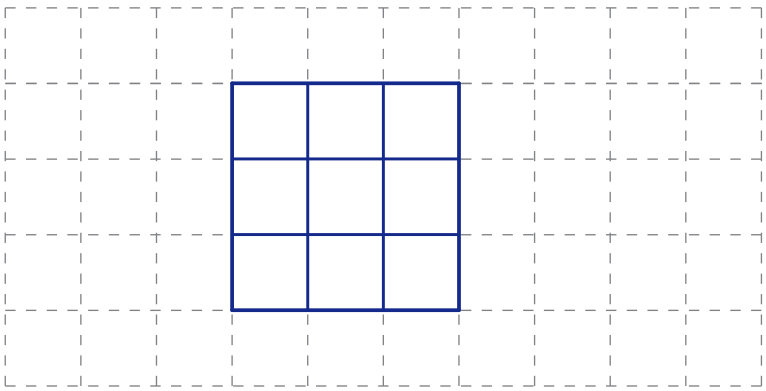


FRONT

(a) On the centimetre square grid below, draw the front elevation of the shape. [2]



(b) On the centimetre square grid below, draw the plan of the shape. [1]



23 The incomplete two-way table shows some information about cinema-goers one Saturday.

	Child	Adult	Senior citizen
Male	42	33	18
Female	78	27	12

(a) Use the following information to complete the two-way table.

In total there were 30 senior citizens.

There were 4 times as many children as senior citizens. [2]

female senior = 30 − 18 = 12
children = 4 × 30 = 120, male child = 120 − 78 = 42

(b) A child ticket is £3, an adult ticket is £7 and a senior citizen ticket is £5.50

The manager claims there was over £1000 in ticket sales.

Is he correct?

Show your working out clearly.

Children: 120 × £3 = £360
Adults: (33 + 27) = 60, 60 × £7 = £420
Senior citizens: 30 × £5.50 = £165
Total = 360 + 420 + 165 = £945

Answer No because the ticket sales were only £945 which is less than £1000 [2]

[Turn over

24 A group of people were surveyed about the number of driving lessons they had before passing their driving test.

The results are shown in the stem and leaf diagram.

1	2	3	5	5	8	KEY: 3 | 6 = 36 lessons
2	0	3	5	9		
3	1	6				
4	4					
5	0	1				

(a) How many people were asked?

5 + 4 + 2 + 1 + 2 = 14

Answer 14 [1]

(b) What is the range?

51 − 12 = 39

Answer 39 [1]

(c) Find the median.

7th and 8th values are 23 and 25
(23 + 25) ÷ 2 = 24

Answer 24 [1]

25 **(a)** Simplify $7g - 5h - 2g + 8h$

$7g - 2g = 5g, \quad -5h + 8h = 3h$

Answer $5g + 3h$ [2]

(b) Solve $4f + 9 = 37$

$4f + 9 = 37$

$4f = 37 - 9 = 28$

$f = 28 \div 4 = 7$

Answer $f =$ 7 [2]

(c) Expand $3(4e + 5)$

$3 \times 4e + 3 \times 5$

Answer $12e + 15$ [1]

(d) Factorise $18c - 30$

HCF of 18 and 30 is 6

Answer $6(3c - 5)$ [1]

[Turn over

26 A club has 160 members.

104 members attended an event.

(a) What **percentage** of club members attended the event?

$\frac{104}{160} \times 100 = 65$

Answer 65 % [2]

(b) The cost per ticket to attend the event last year was £7.50

This year it increased by 18%

How much did it cost per ticket to attend the event this year?

18% of 7.50 = 7.50 ÷ 100 × 18 = 1.35

7.50 + 1.35 = 8.85

Answer £ 8.85 [3]

27 Astrid says $\sqrt{16} + 3$ can equal 7 or -1

Explain why she is correct.

$\sqrt{16}$ can be 4 or -4

because $4 \times 4 = 16$ and $-4 \times -4 = 16$

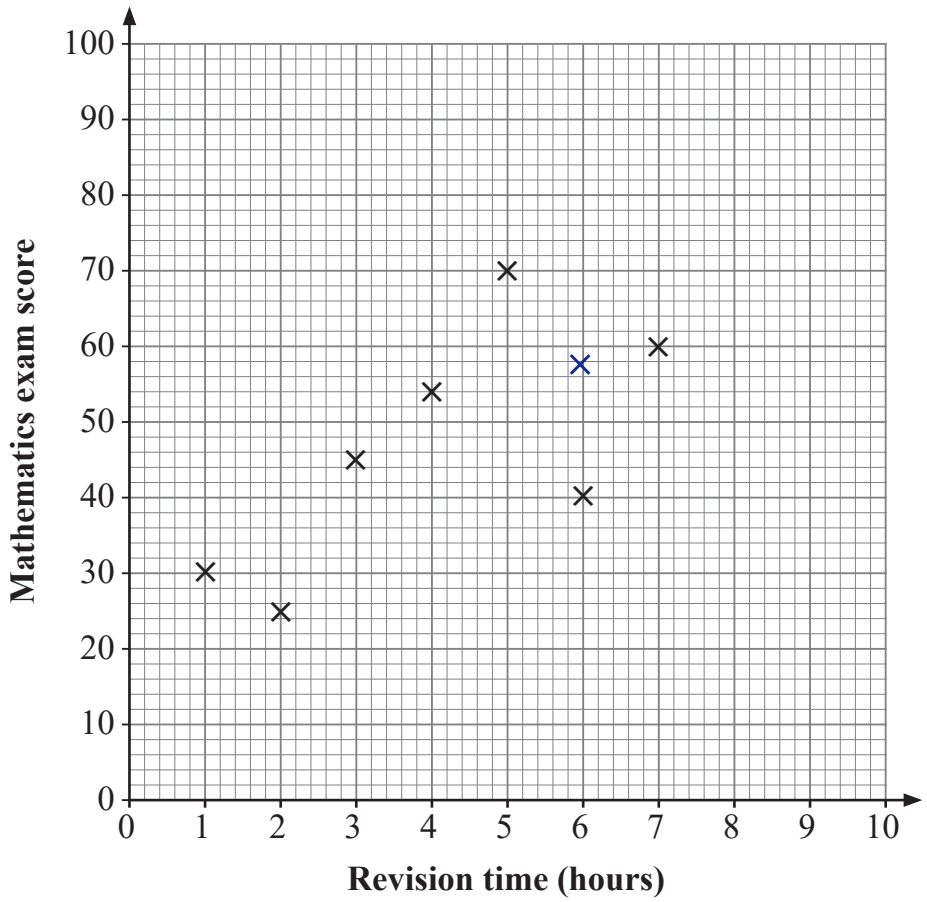
so $\sqrt{16} + 3 = 4 + 3 = 7$

or $\sqrt{16} + 3 = -4 + 3 = -1$

[2]

[Turn over

28 The scatter graph shows the number of hours of revision completed by seven students and their Mathematics exam scores.



(a) Jake sat the exam late and his data was not recorded on the graph.

He spent 6 hours revising and scored 58

Plot Jake's point on the scatter graph. [1]

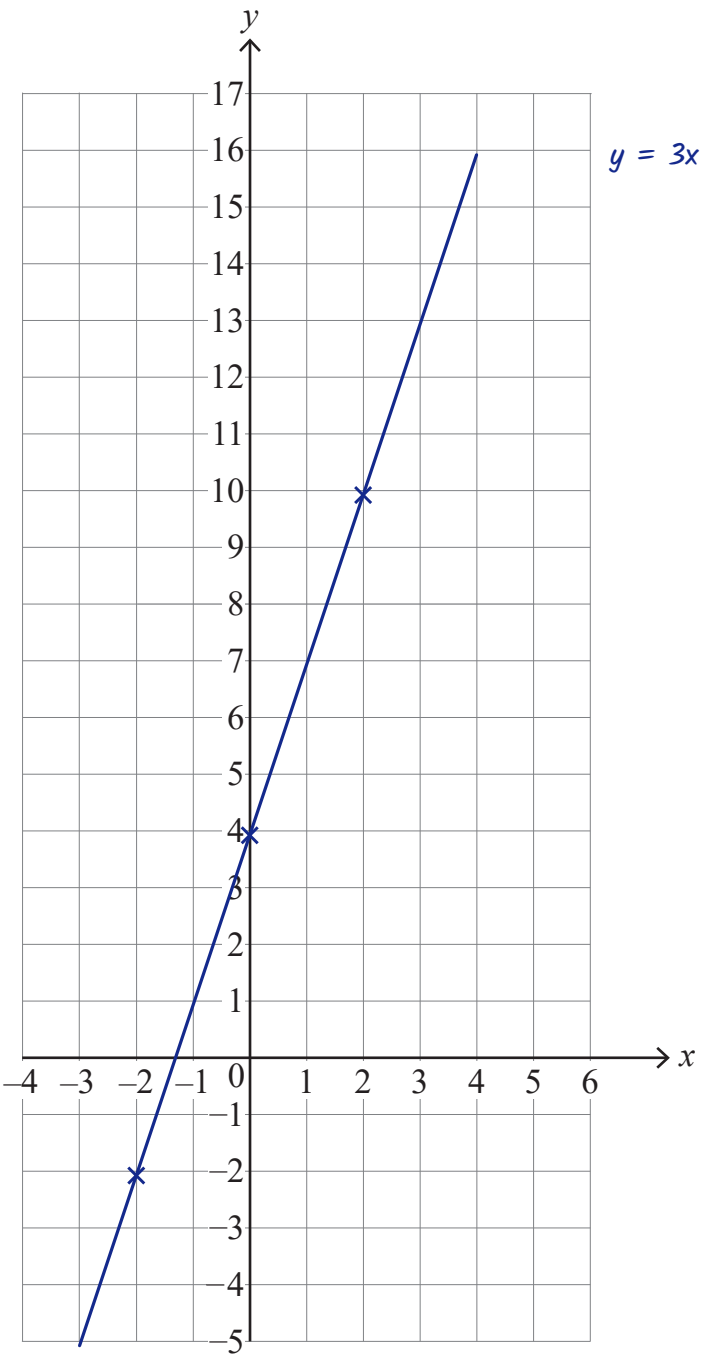
(b) Describe the relationship between the revision time in hours and the score in the Mathematics exam.

Answer *Positive correlation: the more hours spent revising,*

the higher the Mathematics exam score. [1]

29 Draw the graph of $y = 3x + 4$ on the grid below.

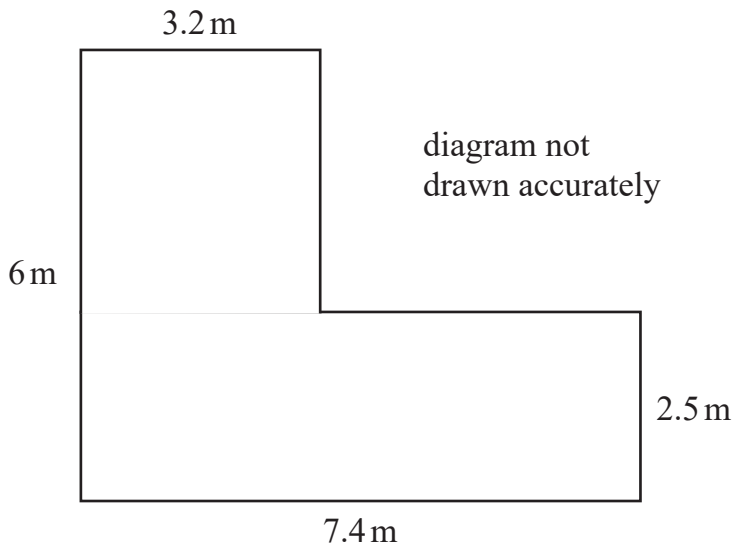
x	-2	0	2
y	-2	4	10



[3]

[Turn over

30 The diagram shows a sketch of a garden.



Rolls of grass are to be bought to cover the garden.

Each roll covers 1 square metre.

Each roll costs £4.50

Only **complete** rolls can be bought.

How much will it cost to buy enough rolls to cover the garden?

Show your working out clearly.

$6 \times 3.2 = 19.2$

$(7.4 - 3.2) \times 2.5 = 4.2 \times 2.5 = 10.5$

Area $= 19.2 + 10.5 = 29.7\ m^2$

so 30 rolls are needed

$30 \times 4.50 = £135$

Answer £ 135 [4]

31

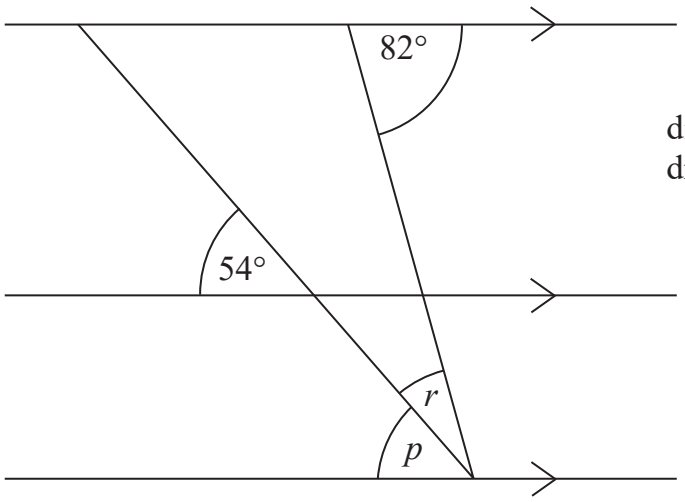


diagram not drawn accurately

Find

(a) angle p

$p = 54°$ (corresponding angles)

Answer 54 ° [1]

(b) angle r

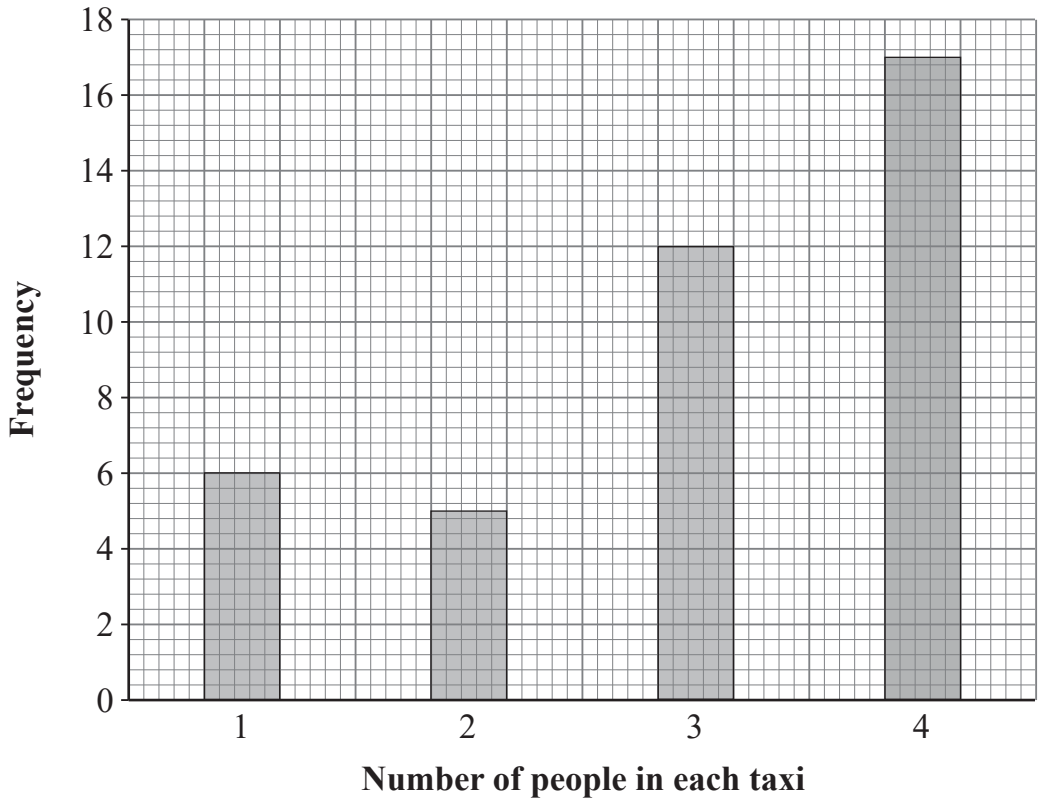
$p + r = 82°$ (alternate angles)

$r = 82 - 54 = 28°$

Answer 28 ° [2]

[Turn over

32 The bar chart shows the number of people in each taxi booked from a taxi company one Saturday night.



Calculate the mean number of people in each taxi.

Show your working out clearly.

Frequencies: 6, 5, 12, 17, total = 40 taxis

People = (1 × 6) + (2 × 5) + (3 × 12) + (4 × 17)

= 6 + 10 + 36 + 68 = 120

Mean = 120 ÷ 40 = 3

Answer 3 [4]

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