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New Specification

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education

2018

Mathematics

Unit M2 **(With calculator)**

Foundation Tier

MV18

[GMC21]

THURSDAY 24 MAY, 9.15am–11.00am

Time

1 hour 45 minutes, plus your additional time allowance.

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 on blank pages.

Complete in black ink only.

All working should be clearly shown since marks may be awarded for partially correct solutions.

When rounding is necessary give answers to **2 decimal places** unless stated otherwise.

Answer **all twenty-seven** questions.

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Information for Candidates

Functional Mathematics is assessed in this unit.
The total mark for this paper is 100.
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.
You may use a calculator.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 3.

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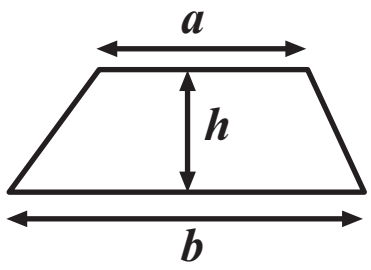
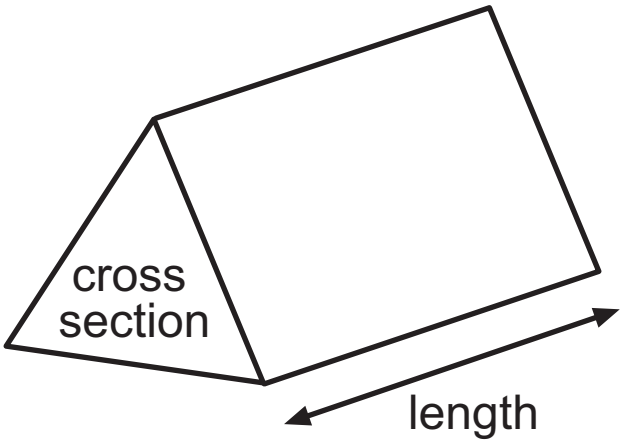
Formula Sheet

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



Volume of prism = area of cross section × length



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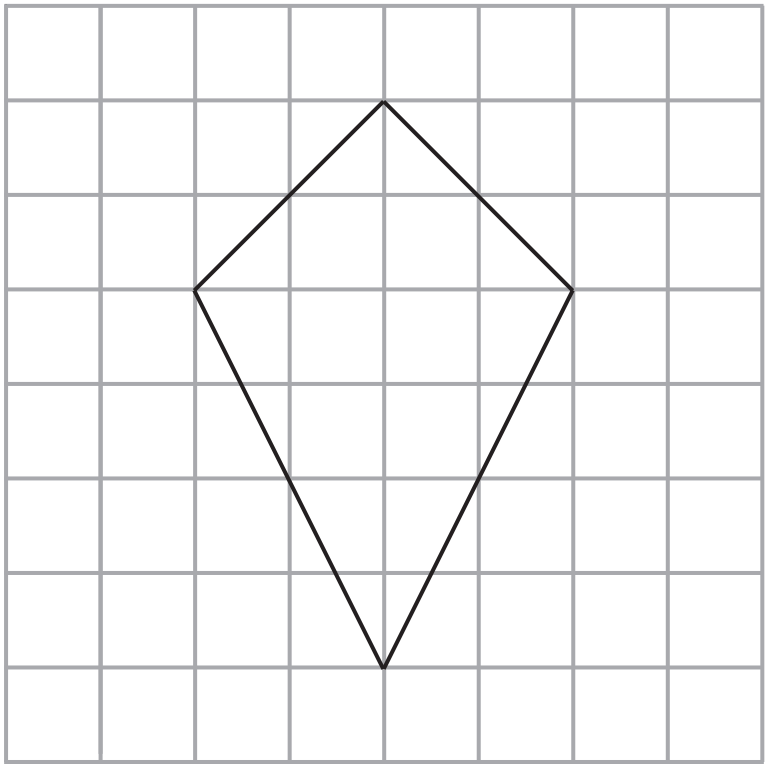
1 The diagram below shows a kite, drawn on a centimetre squared grid.



(a) Work out the area of the kite. [1 mark]

Answer _____ cm^2

(b) Draw a line of symmetry on the kite. [1 mark]

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2 The temperature in some cities is shown in the table below.

Riga	–3 °C
Helsinki	–11 °C
Toronto	–6 °C
Moscow	–8 °C
Stockholm	–1 °C

(a) List the temperatures in **ascending** order. [2 marks]

Answer

_____ , _____ , _____

_____ , _____

(b) How much warmer is Moscow than Helsinki? [1 mark]

Answer _____ °C

(c) What is the difference in temperature between Helsinki and Stockholm? [1 mark]

Answer _____ °C

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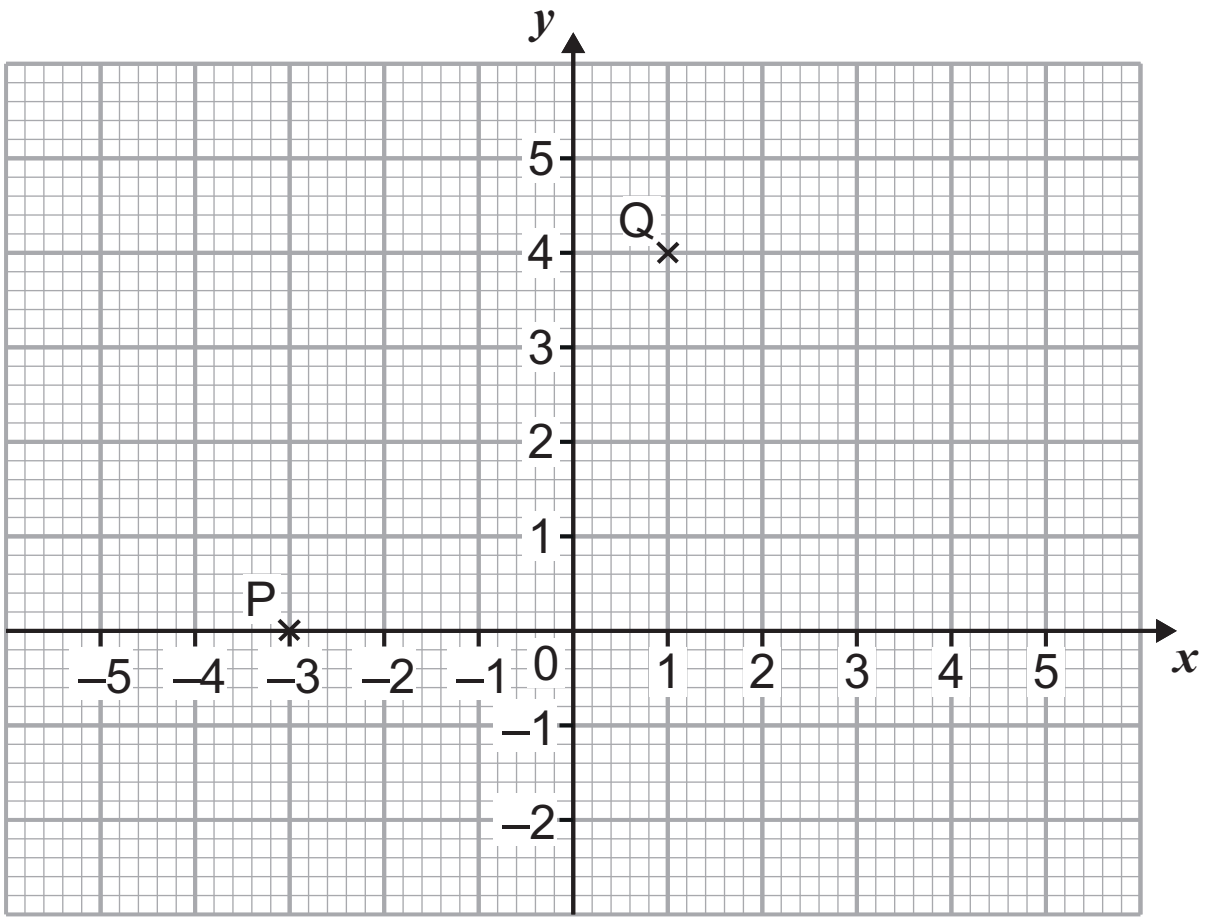
3



What are the co-ordinates of the midpoint of PQ?
[2 marks]

Answer (_____ , _____)

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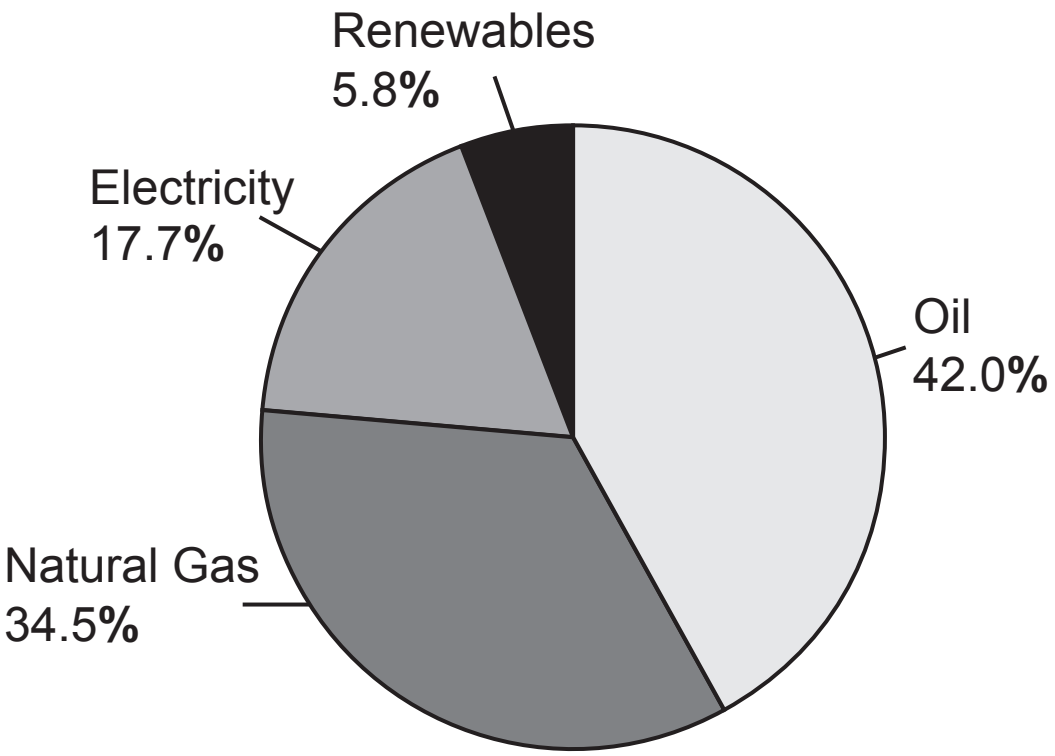
4 This pie chart shows energy use by type of fuel.



(a) Which type of fuel is used most? [1 mark]

Answer _____

(b) **Measure** the angle for electricity. [1 mark]

Answer _____ °

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(c) Sean thinks about $\frac{3}{4}$ of energy use comes from oil and natural gas.

Explain why Sean is correct. [1 mark]

Answer _____

_____

(d) Complete the statement below with a suitable number in the box. [1 mark]

The fraction $\frac{\text{renewables}}{\text{electricity}}$ is about $\frac{1}{\square}$.

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5 The total population of Great Britain and Ireland is 70 million.

Information about this population is given in the table.

England	54.9 million
Northern Ireland	1.9 million
Republic of Ireland	4.6 million
Scotland	5.5 million
Wales	

(a) What is the population of Wales? [2 marks]

Answer _____ million

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(b) Sue thinks the population of Northern Ireland and Republic of Ireland makes up more than 10**%** of the total population of Great Britain and Ireland.

Do you agree?

Explain your answer. [2 marks]

Answer _____ because _____

_____

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6 **(a)** Work out the size of the angle marked x. [1 mark]

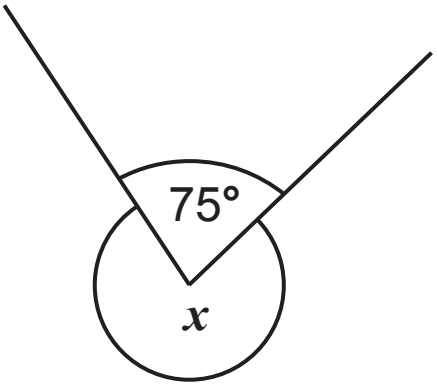

diagram not
drawn accurately

Answer _____ °

(b) Circle the name of the quadrilateral with rotational symmetry of order 2 [1 mark]

square

kite

parallelogram

trapezium

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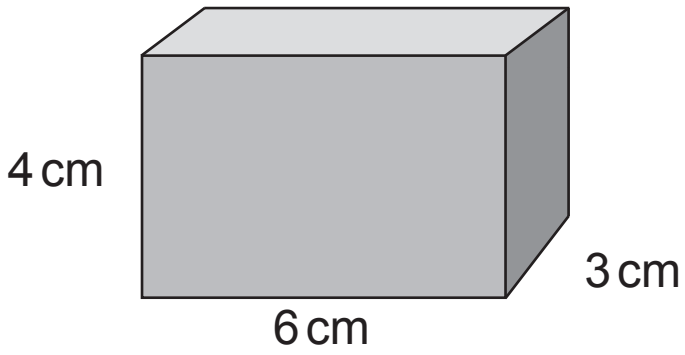
Look at the box below.

(c) (i) How many 1 cm cubes are needed to fill this box?
[1 mark]



Answer _____ cubes

(ii) What is the perimeter of the top face of the box?
[1 mark]

Answer _____ cm

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7 **(a)** Seven factory workers and their manager earn these weekly wages:

£294

£245

£300

£288

£300

£259

£290 and

£850

What is the **median** weekly wage? [2 marks]

Answer **£** _____

(b) The manager's weekly wage is increased to **£**900 from **£**850

Which of these is not affected by the change? [1 mark]

range

median

mean

mode

Answer _____ and _____

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8 **(a)** I think of a number, multiply it by 3 and then add 1

The answer is 28

What was the number? [2 marks]

Answer _____

(b) I think of a number, subtract 1 from it and then divide by 4

The answer is 3

What was the number? [2 marks]

Answer _____

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9 **(a)** Write 2 **prime** numbers between 60 and 70 [2 marks]

Answer _____ and _____

(b) Which of these is both a **square** number and a **cube** number? [1 mark]

8

16

36

64

100

Answer _____

(c) Write $\frac{3}{8}$ as a decimal. [1 mark]

Answer _____

(d) What percentage is **£**9 of **£**16? [2 marks]

Answer _____ **%**

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10 (a) Bikes normally cost **£b** each.

In a sale they are each reduced by **£**30

Write an expression for the cost of a bike in the sale.
[1 mark]

Answer _____

(b) Cycling helmets normally cost **£h** each.

In a sale they are each reduced to half-price.

Write an expression for the cost of a cycling helmet in the sale. [1 mark]

Answer _____

(c) Write an expression for the total cost of 4 bikes and 4 cycling helmets in the sale. [2 marks]

Answer _____

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11 Solve the equation $5y + 4 = 24$ [2 marks]

Answer _____

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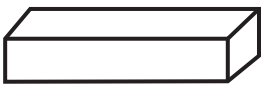
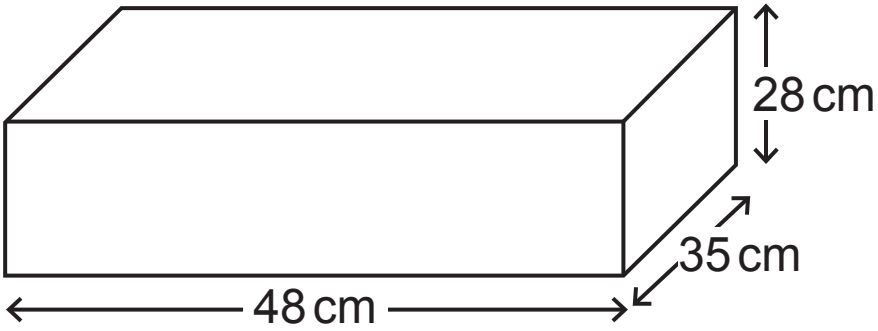
12 The packaging for a tube of toothpaste is a cuboid measuring 16 cm × 5 cm × 4 cm.



The manufacturer wants to be able to pack 150 of these tubes into a cardboard box.
The box is a cuboid.
The box measures 48 cm × 35 cm × 28 cm.



Will the box be big enough to hold 150 tubes of toothpaste in their packaging? [3 marks]
You must show working to explain your answer.

Answer _____

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13 Male and female care assistants work in a nursing home.

Some can work weekdays only, some can work weekends only and some can work both.

(a) Complete the two-way table below. [2 marks]

	Weekdays only	**Weekends only**	**Both**	**Total**
Male	1			8
Female		3		
Total	3		10	21

(b) How many male care assistants can work on weekends? [1 mark]

Answer _____

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14 John has a telephone with the following costs.

Line rental: £18.99 per month
Call charge: 5.8p per minute

Last month John made calls lasting 385 minutes.

Work out his telephone bill for last month. [3 marks]

Answer £ _____

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15

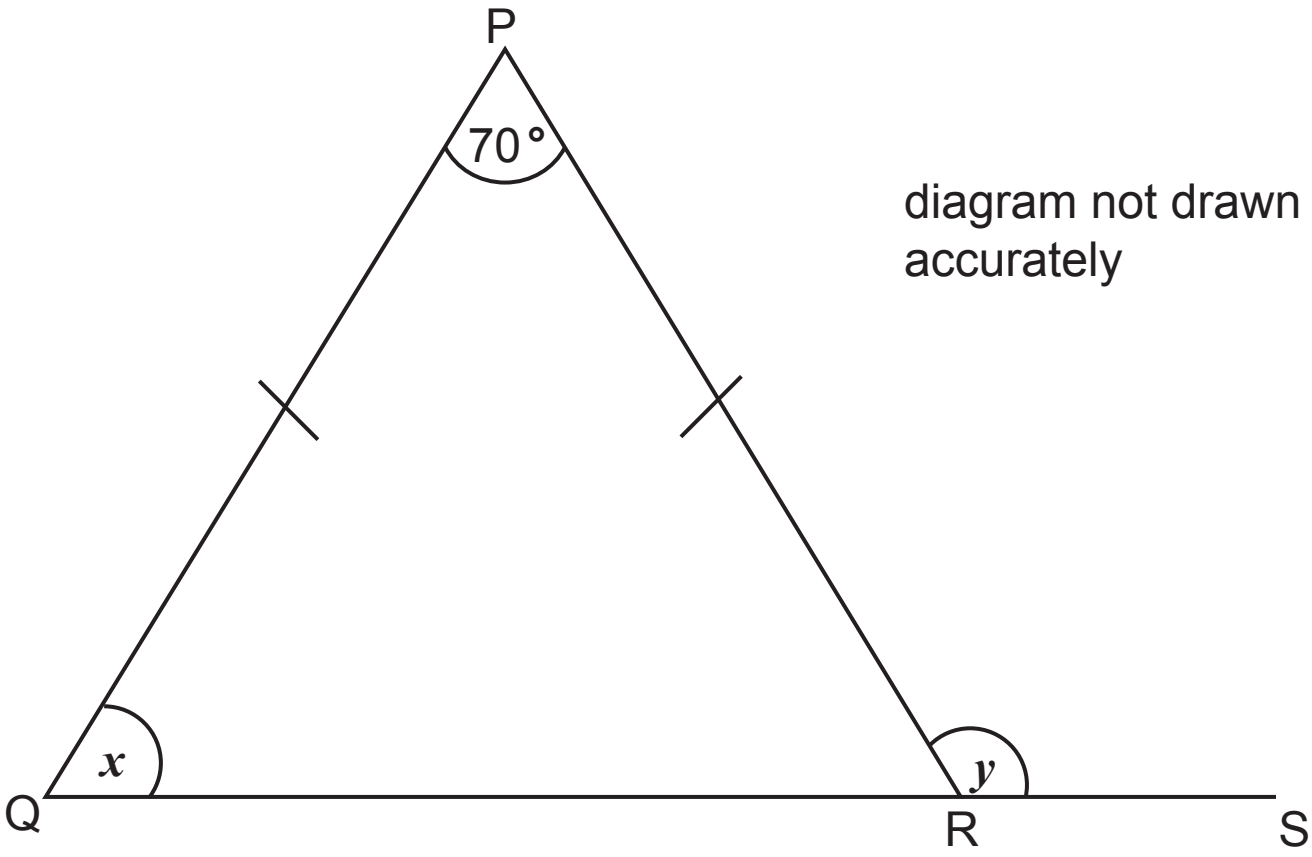

diagram not drawn accurately

PQR is an isosceles triangle with PQ = PR.
QRS is a straight line.

(a) Work out the size of the angle marked x. [2 marks]

Answer _____ °

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(b) Work out the size of the angle marked y. [1 mark]

Answer _____ °

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16 The life expectancy for males in 12 countries in Africa for 2015 is shown in the following stem and leaf diagram.

4	9
5	0 5 5 6 8 8
6	0 2 4
7	1 3

Key: 5 | 3 means 53 years

(a) How many of these countries had a life expectancy for males of less than 58 years? [1 mark]

Answer _____

(b) For the above data work out

(i) the median, [1 mark]

Answer _____ years

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(ii) the range. [1 mark]

Answer _____ years

(c) In **1975** the life expectancy for males in the same 12 countries had a median of 49 years and a range of 30 years.

Compare the life expectancy for males in these 12 countries in **2015** with the life expectancy for males in **1975** [2 marks]

_____

_____

_____

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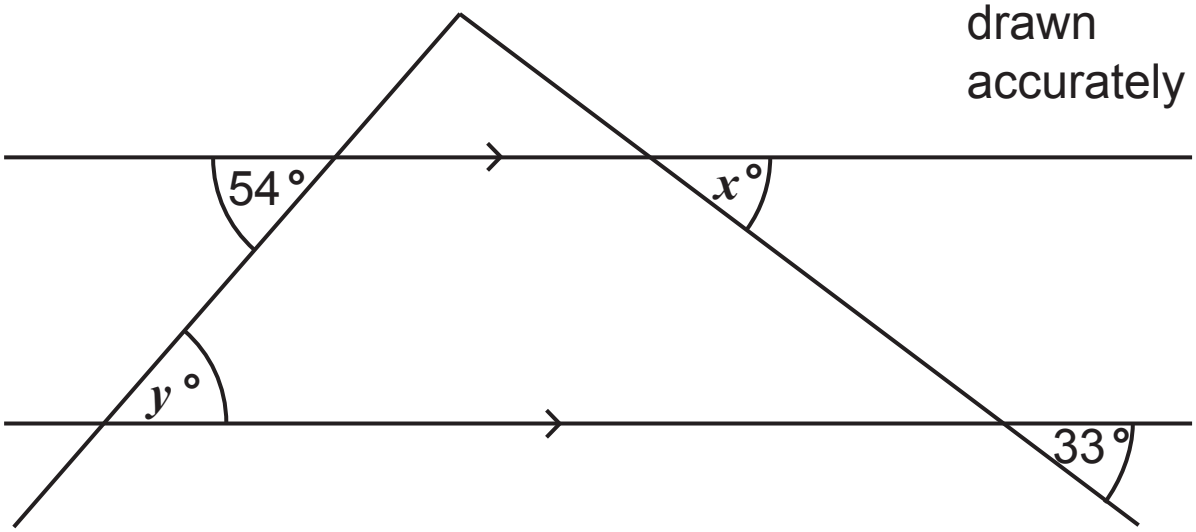
17

diagram not drawn accurately



Write down the values of x and y. [1 mark for each]

Answer x = _____

Answer y = _____

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18 Calculate $\dfrac{\sqrt{1.1 \times 4.4}}{(3.2 - 2.65)}$ [2 marks]

Answer _____

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19 (a) Pat buys 30 boxes of crisps.

Each **box** contains 48 **packets** of crisps.

He sells 80**%** of the crisps at 60p a packet.

(i) How many packets does he sell at this price?
[2 marks]

Answer _____

(ii) How much in total does he sell them for?
[1 mark]

Answer **£** _____

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(b) He sells the rest at 20p a packet.
Pat paid £25 for each box of crisps.

Does Pat make a profit or loss, and how much is this profit or loss? [3 marks]

Answer Pat makes a _____ of £ _____

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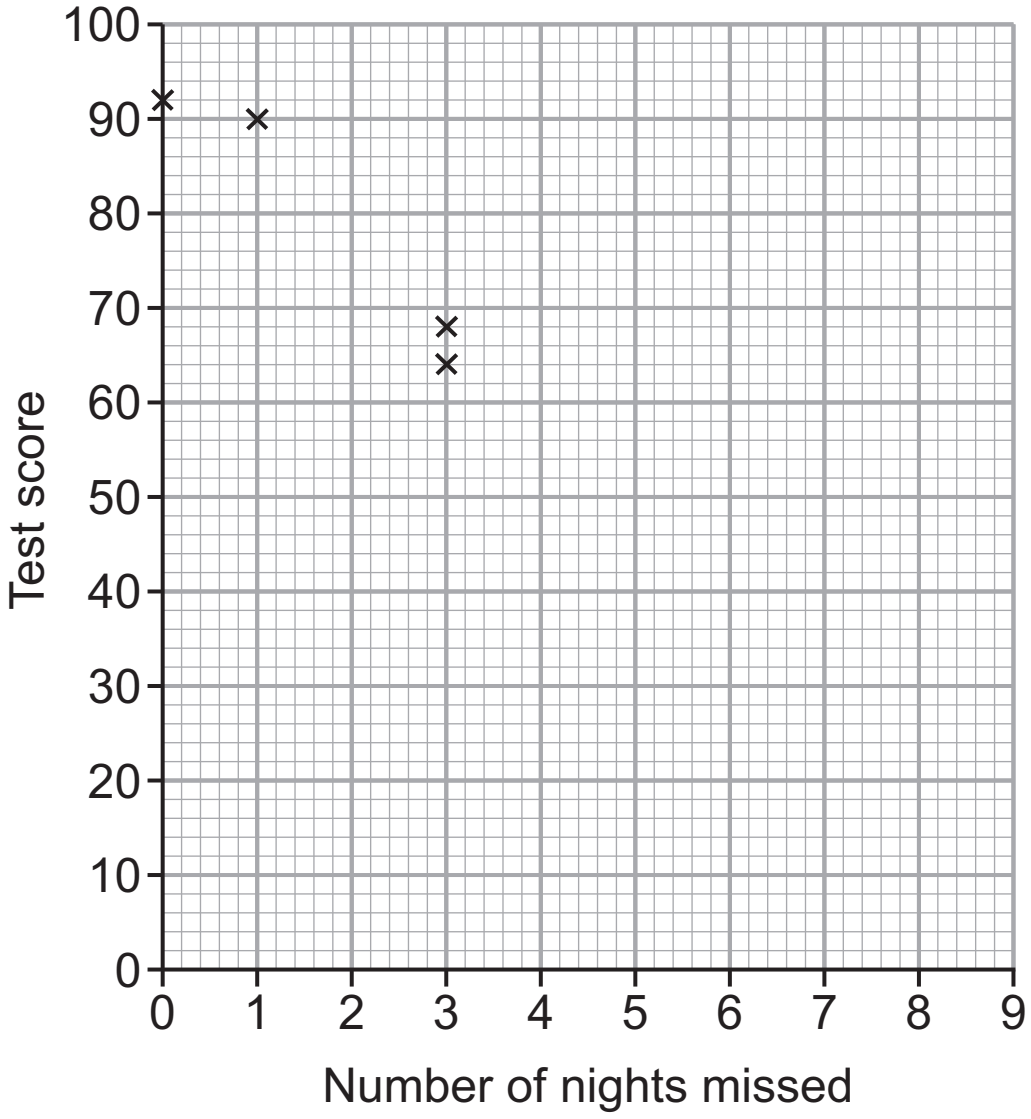
20 A group of pupils do a first aid course over 8 nights.
There is a test at the end of the course.

The table shows the number of nights each pupil misses and their test score.

Pupil	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Number of nights missed	**0**	**3**	**1**	**3**	2	1	0	5	1	5
Test score	**92**	**64**	**90**	**68**	80	82	86	42	76	46

(a) The first 4 points are plotted on the scatter graph.
Plot the last 6 points. [2 marks]



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(b) Draw the line of best fit. [1 mark]

(c) Another pupil missed 4 nights of the course.
Use the graph to estimate their test score. [1 mark]

Answer _____

(d) What type of correlation does your graph show?
[1 mark]

Answer _____

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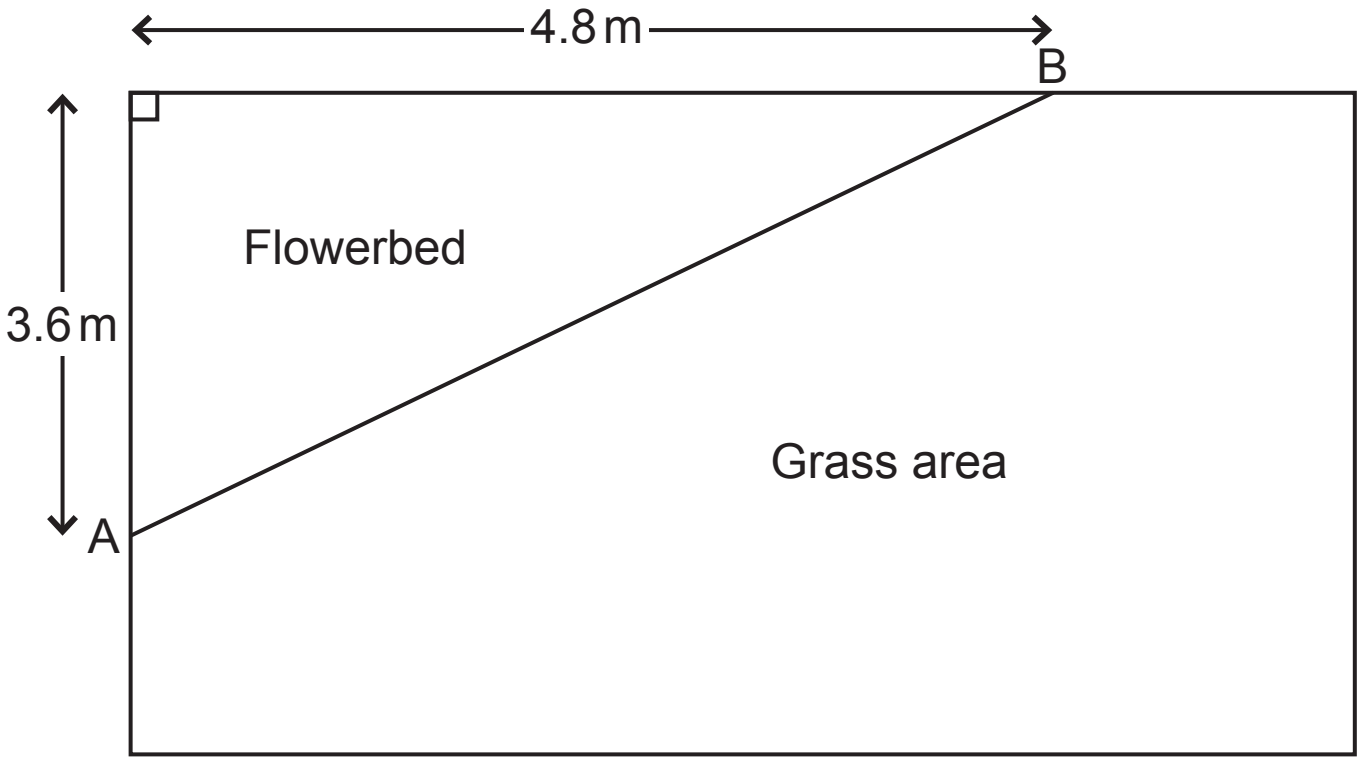
21 A garden has a flowerbed in the corner.

A diagram of the garden is shown below.



(a) Calculate the area of the flowerbed. [2 marks]

Answer _____ m^2

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(b) There is a fence along the line AB separating the flowerbed from the grass area.

How long is the fence? [3 marks]

Answer _____ m

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22 Last year a company spent a total of **£**2400 on advertising.

This year they spent **£**2796

What was the percentage increase in their spending on advertising? [3 marks]

Answer _____ **%**

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23 Best Bank offers a 3 year investment account with a fixed compound interest rate of 1.75**%** per annum.

Mr Lucas invests £8000 in this account.

What is the value of his investment at the end of the 3 year period? [4 marks]

Answer **£** _____

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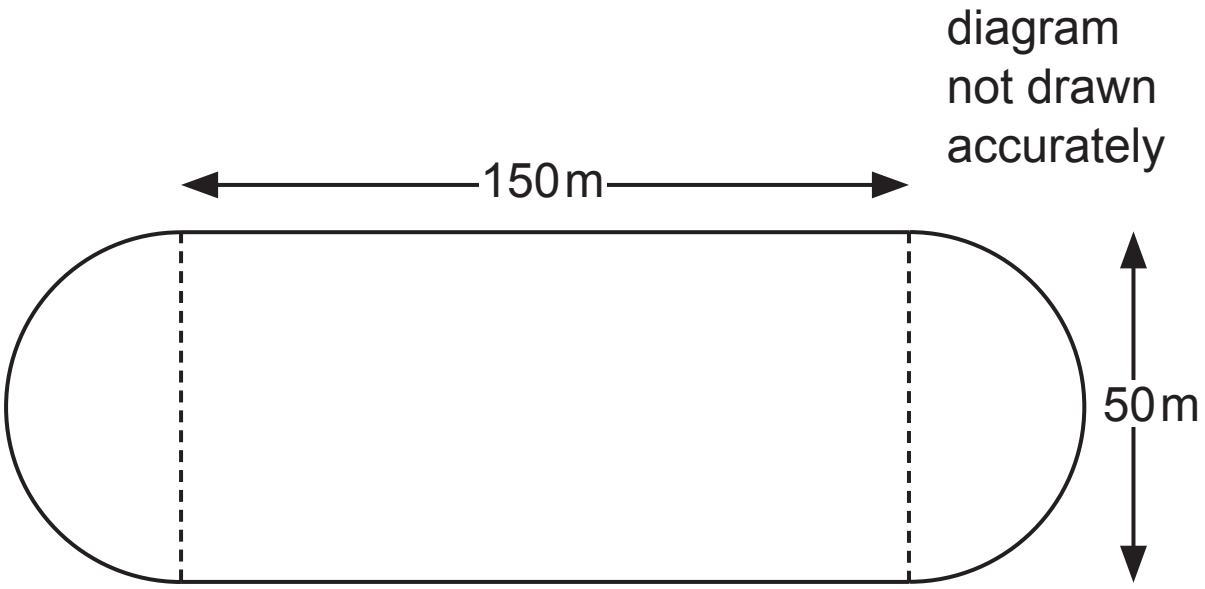
24 Sue is training to compete in a 10 km walk.

A diagram of her local athletics track is shown below.

The track consists of a rectangle and two semicircles.



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How many complete laps are needed to ensure she walks 10 km? [4 marks]

You must show all your working.

Answer _____

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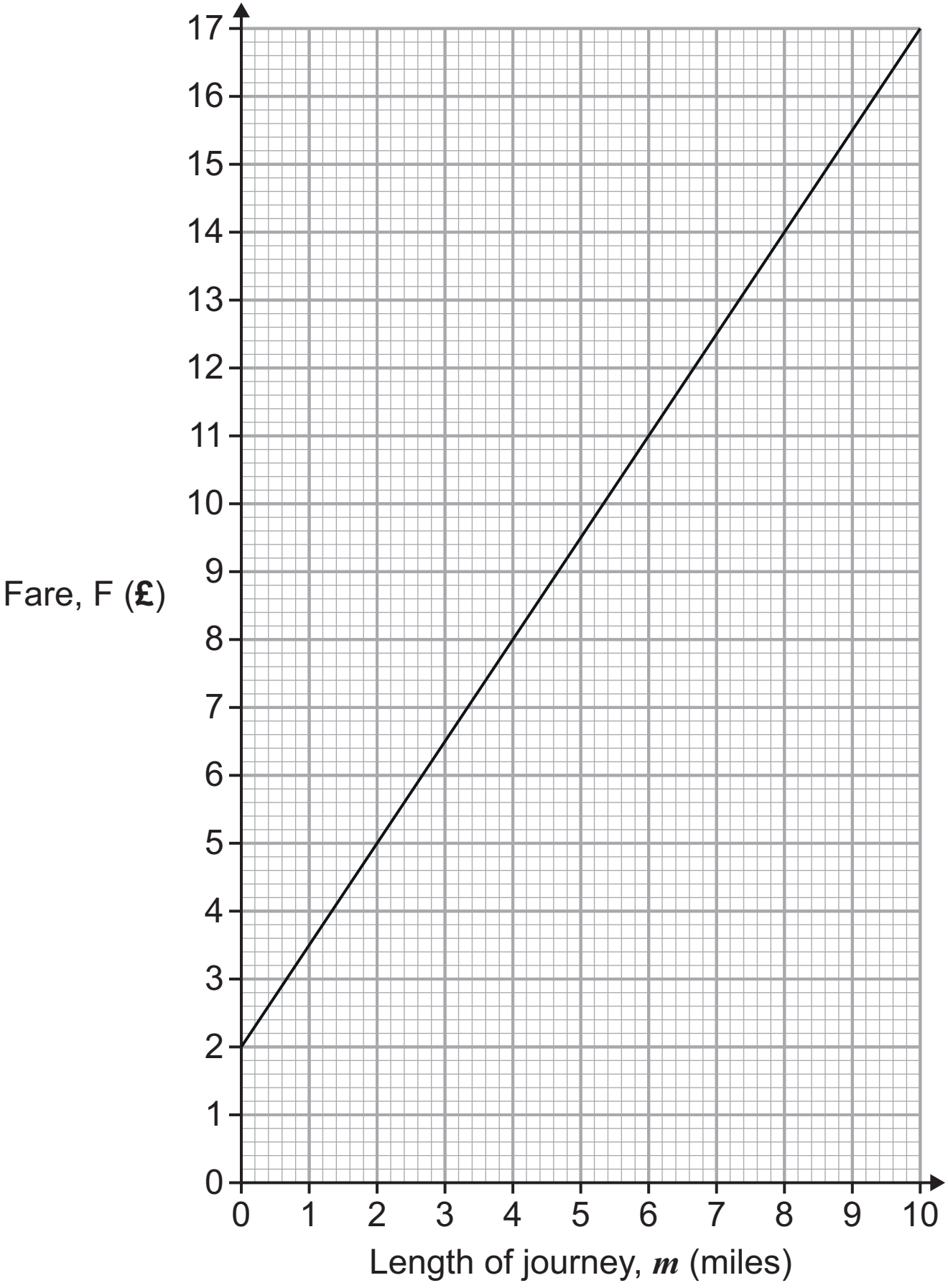
25 The graph shows the fare, F (£), for a taxi journey of m miles with Trusty Taxis.



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(a) Calculate the gradient of the straight line. [2 marks]

Answer _____

(b) Give a real life meaning to the value you found in part **(a)**. [1 mark]

Answer _____

(c) Classy Cabs charge a minimum fare of **£**4 plus **£**1 for each mile travelled.

Draw a graph for the cost of a taxi journey with Classy Cabs on the same grid as Trusty Taxis. [1 mark]

(d) Use your graphs to work out the length of the journey that will cost the same with both companies. [1 mark]

Answer _____ miles

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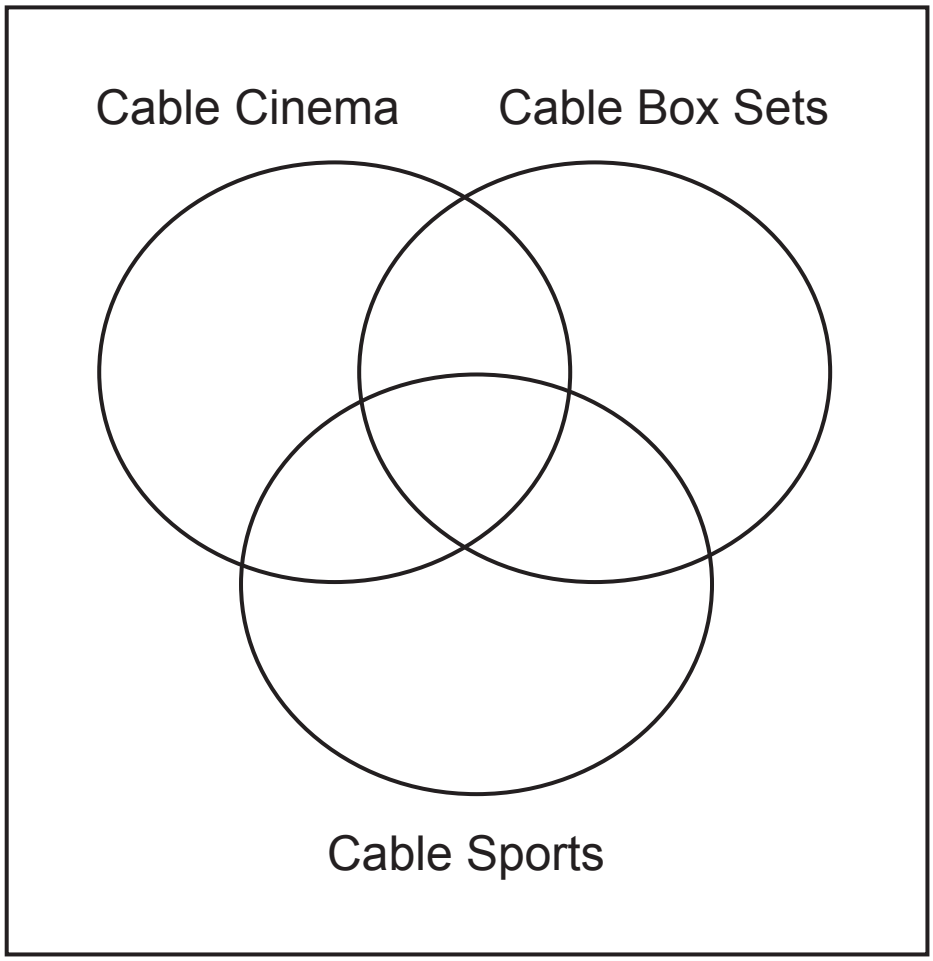
26 (a) 80 Cable TV customers were asked whether they had a subscription for Cable Cinema, Cable Box Sets or Cable Sports.

7 had subscriptions to all 3
11 had Cable Box Sets and Cable Sports, but not Cable Cinema
14 had Cable Box Sets and Cable Cinema, but not Cable Sports
11 had Cable Cinema and Cable Sports

Show this information on the Venn diagram. [2 marks]



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(b) 36 had a subscription for Cable Cinema
48 had a subscription for Cable Box Sets
33 had a subscription for Cable Sports

Show this information on the Venn diagram. [1 mark]

(c) How many of the customers asked did not have any subscriptions? [2 marks]

Answer _____

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27 Each player in a group of 15 players scored either 2 or x goals.

Number of goals	Frequency
2	10
x	5

The mean number of goals per player was 3

Calculate x. [3 marks]

Answer $x =$ _____

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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