Attempt ALL questions

1. A wall is built using foam bricks which are 194 ± 2 mm long.

The wall is 50 bricks long.

What is the minimum length of the wall? **2**

2. Anna works as a sales person for a computer company.

She is paid a basic monthly salary of £2450 plus commission of 2·5% on her monthly sales over £3000.

(a) Calculate Anna's gross salary for April when her sales totalled £9000. **3**

In her April payslip, she has the following deductions:

- Income Tax   £334·67
- National Insurance £230·20
- Pension   £164·74

(b) Calculate her net salary for April. **2**
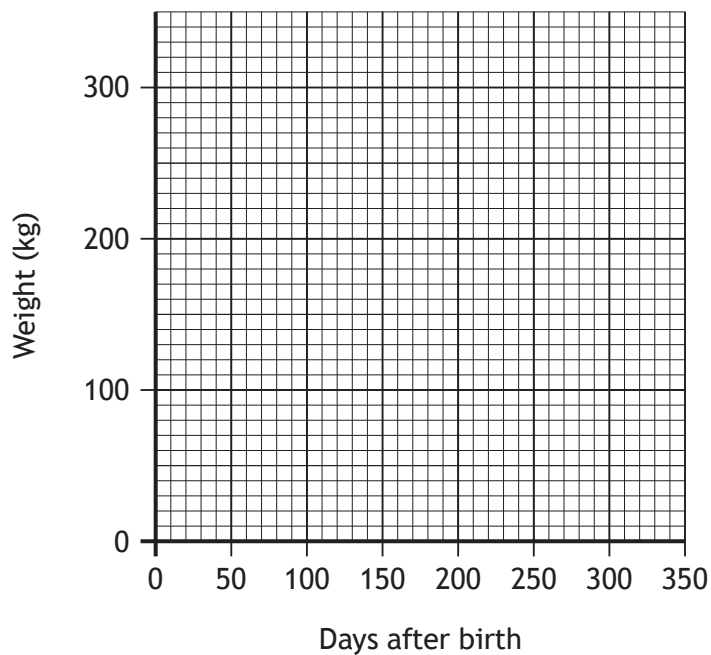
3. Scott is a farmer.

He records the weight of a calf from birth.

The weight of his calf is shown in the table below.

Days after birth	0	60	120	160	200	260
Weight (kg)	40	110	130	175	220	275

(a) On the grid below draw a scatter graph to show this data.

2

(An additional grid, if required, can be found on *Page 14*.)

Weight (kg)

300

200

100

0

0   50   100   150   200   250   300   350

Days after birth

(b) Draw a line of best fit on the diagram above.

1

(c) Use your line of best fit to estimate the **age** of this calf in days when it weighed 240 kilograms.

1

4. When classifying mountain bike trails, the gradient of the steepest section is taken into account.

Colour Grade (Difficulty)	Maximum Gradient
Green (Easy)	$\dfrac{1}{10}$
Blue (Intermediate)	$\dfrac{3}{20}$
Red (Advanced)	$\dfrac{1}{4}$
Black (Severe)	$\dfrac{1}{2}$

A new trail has been built at a mountain bike centre.

The steepest section of the new trail is shown below.
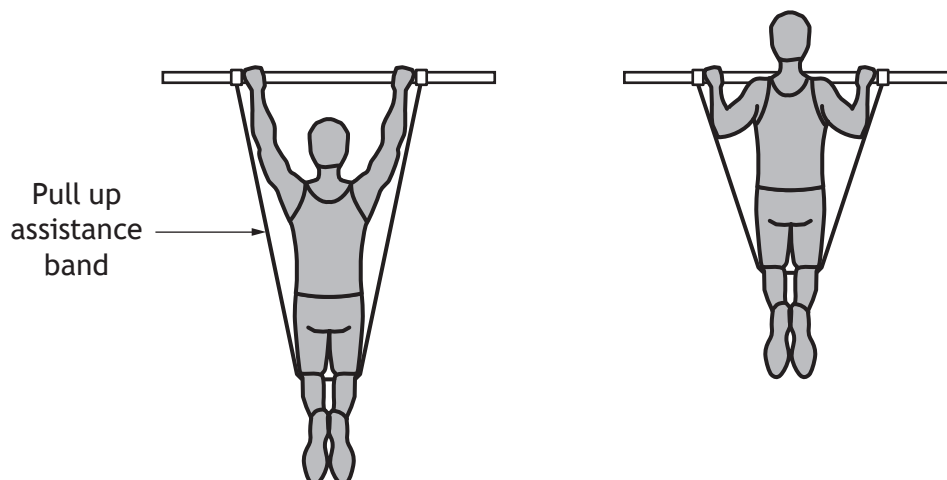

8 m

1·6 m
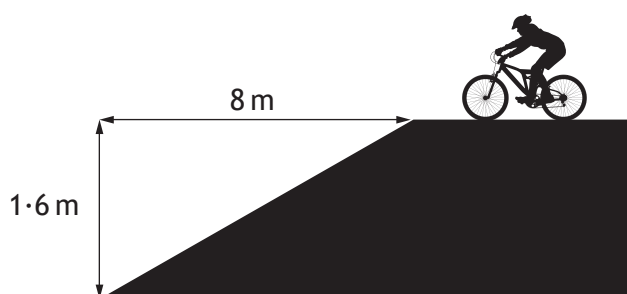
Can this be classified as a blue trail?

Use your working to justify your answer.

3

5. Jane is trying to improve the number of pull ups she can do.

She looks online for pull up assistance bands.

Pull up assistance band →

Jane finds a table explaining which type of bands she should use based on her weight and the number of unassisted pull ups she can do.

The table is shown below.

Unassisted pull ups	Body Weight (pounds)					
	90–120	121–150	151–200	201–250	251–300	300+
0–4	D	D and A	E	F	F	G and A
5–8	C and A	D	E	E	E and B	G
9–11	C	D	D and C	E	E and A	F
12–15	C	C and B	D and B	D and C	E	E and C
16–20	B	C	D	D and B	E	E

Jane weighs herself. She is 10 stone and 1 pound.

1 stone = 14 pounds

Jane can do 3 unassisted pull ups.

(a) Which band(s) does the table recommend that Jane should buy? **1**

5. (continued)

Jane's personal trainer, Lynn, wants to buy one of each band A to G.

The recommended retail prices (RRP) of the bands are shown in the table below.

Band	Colour	RRP
A	Yellow	£2·50
B	Red	£3·90
C	Black	£8·95
D	Purple	£10·95
E	Green	£14·00
F	Blue	£17·00
G	Orange	£18·50

To buy all of the bands individually, the total RRP would be £75·80.

Lynn considers the following special offers.

Shop 1   Shop 2   Shop 3

Buy orange, blue, and green bands at RRP

Get remaining four free!

SPECIAL 40% OFF RRP *OFFER*

Buy ALL bands for... £47.99

(b) Which shop offers the cheapest option for buying one of each band? **3**

Use your working to justify your answer.

6. The mathematics teachers in a school win a lottery.

They decide to share their winnings **in proportion to** the amount they each pay per week.

They each pay the following amounts per week:

Mr Jones   £0·50
Miss Smith   £2·00
Mr Ross   £2·50
Mr Young   £4·00
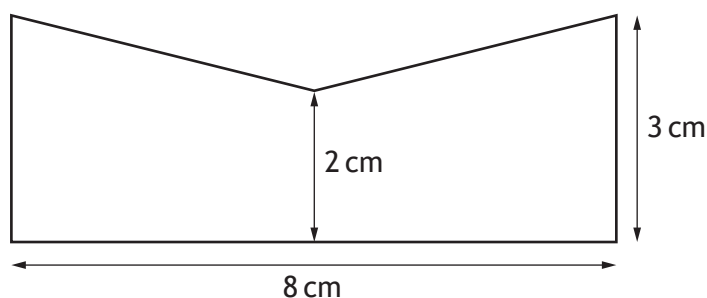
Mr Young's share is £2 794 000.

Calculate how much the teachers win in total.   **3**

7. Aneesa makes enamelled badges.

Each badge is made from metal.

The shape of the badge is shown below.

(a) Calculate the area of the front of each badge.　　　　　　　**2**

The front of each badge is covered with enamel.

The enamel that Aneesa buys costs £90 for one pack.

One pack will cover $180\,cm^2$.

She makes as many badges as possible from one pack.

The metal that she uses costs £3 for each badge.

To make a profit, Aneesa adds an extra £17 to the cost of each badge.

(b) Calculate her selling price for each badge.　　　　　　　**3**

8. Natalie is donating blood.

   Whilst donating blood she notices a chart.

   The chart states that not every blood type can be given to every patient.

   The table shows which patients each blood type can help.

   Blood type can be either positive (+) or negative (−).

Donor's Blood Type

Patient's Blood Type	O−	O+	B−	B+	A−	A+	AB−	AB+
AB+	✓	✓	✓	✓	✓	✓	✓	✓
AB−	✓		✓		✓		✓	
A+	✓	✓			✓	✓		
A−	✓				✓			
B+	✓	✓	✓	✓				
B−	✓		✓					
O+	✓	✓						
O−	✓							

For example the blood of a donor with blood type AB− can only be given safely to a patient with blood type AB+ or AB−.

Natalie then notices a graph showing the blood type of a random sample of **100** people in Scotland.

Blood Type of Random Sample of 100 People in Scotland
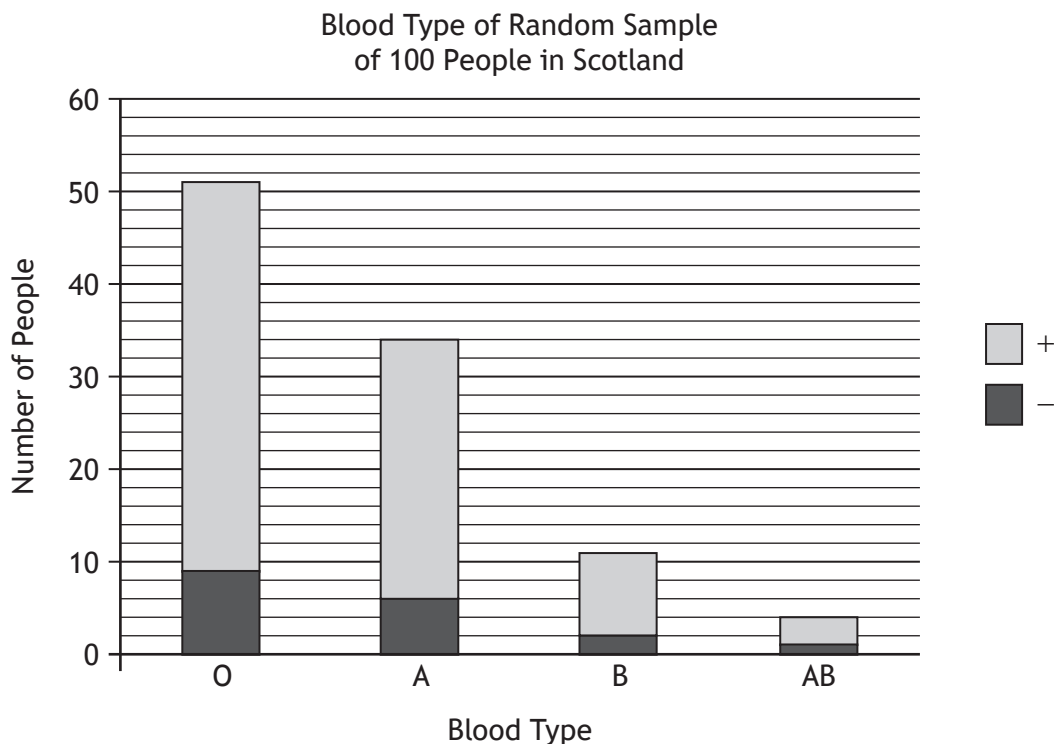
8. (continued)

Natalie's blood type is B+.
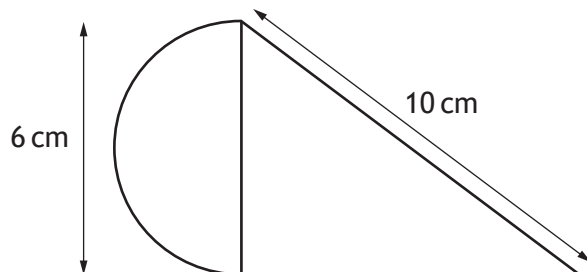
What fraction of the people sampled could safely be given Natalie's blood?   **3**

9. A new design is discussed for a glue dispenser.

It is to be made from two plates of plastic.

Each plate is in the shape of a right angled triangle and a semi-circle as shown.

(a) Calculate the perimeter of each plate.

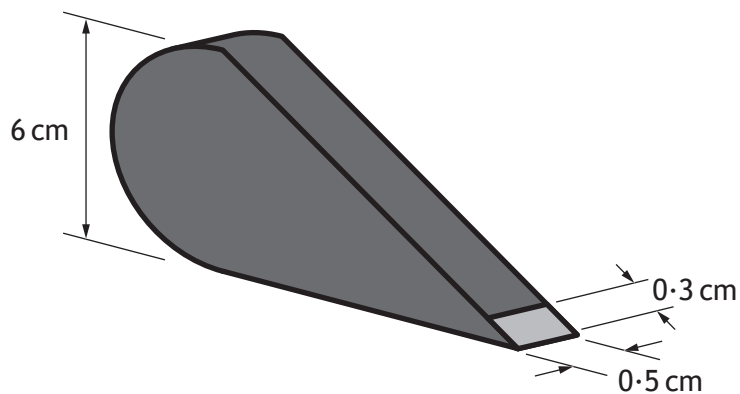Use $\pi = 3 \cdot 14$.

4

9. (continued)

A rectangular piece of plastic 0·5 cm wide is bent and wrapped around the perimeter of the two plates to join them together.

The rectangular piece of plastic will be 0·3 cm shorter than the perimeter of the shape to allow the glue to flow.

(b) Calculate the area of the **rectangular** piece of plastic required to hold the plates together.

2

[END OF QUESTION PAPER]