1 Here are the first five terms of a sequence.

2 4 7 11 16

+2 +3 +4 +5

Write down the next two terms in the sequence.

16 + 6 = 22

22 + 7 = 29

22 , 29

(Total for Question 1 is 2 marks)

2 The first term in a sequence is 3.
The term to term rule is add 5.

3 8 13 18 23 ...

Is 97 a term in the sequence?
Give a reason for your answer.

No, all terms in the sequence end in 3 or 8

(Total for Question 2 is 2 mark)

3 Here are the first five terms of a Fibonacci sequence

1 2 3 5 8

Write down the next two terms in the sequence.

5 + 8 = 13

8 + 13 = 21

13 , 21

(Total for Question 3 is 2 marks)

4 The nth term of a sequence is $4n + 3$

(a) Find the first two terms of this sequence.

4(1) + 3 = 7

4(2) + 3 = 11

7 , 11

(b) Is 35 a term in this sequence.
You must show how you get your answer.

4n + 3 = 35

4n = 32

n = 8

Yes, 35 is the 8th term in the sequence

(Total for Question 4 is 2 marks)

5 The nth term of a sequence is $n^2 + 1$

$(1)^2 + 1 = 2$

$(2)^2 + 1 = 5$

(a) Find the first two terms of this sequence.

2 , 5

(1)

(b) Is 35 a term in this sequence.
You must show how you get your answer.

$n^2 + 1 = 35$

$n^2 = 34$

$n = \sqrt{34}$ [not a whole no.]

No, 35 is not one more than a square number

(1)

(Total for Question 5 is 2 marks)

---

6 Here are the first 5 terms of a sequence.

17 14 11 8 5

(a) Find the next term of this sequence.

2

(1)

The nth term of a different sequence is $10n^2 + 5$

(b) Work out the 5th term of this sequence.

$10(5)^2 + 5$

$10(25) + 5$

$250 + 5$

255

(1)

(Total for Question 6 is 2 marks)

---

7 Here are the first four terms of a sequence.

7 13 19 25

(a) Write down the next term in the sequence.

31

(1)

(b) Explain how you got your answer

added 6 onto the previous term

(1)

(Total for Question 7 is 2 marks)

8 Here are the first four terms of a number sequence.

2 3 5 9

The rule to continue the sequence is

multiply the previous term by 2 and then subtract 1

Work out the 5th term of this sequence.

$9 \times 2 = 18$

$18 - 1 = 17$

17

(Total for Question 8 is 1 mark)

9 Here are the first 5 terms of a Fibonacci sequence.

2 2 4 6 10

Find the 8th term of this sequence.

$6 + 10 = 16$

$10 + 16 = 26$

$16 + 26 = 42$

42

(Total for Question 9 is 2 marks)

10 The nth term of a sequence is $n^2 + 3$

(a) Find the first three terms of this sequence.

$(1)^2 + 3 = 4$

$(2)^2 + 3 = 7$

$(3)^2 + 3 = 12$

4, 7, 12

(2)

(b) Find the 10th term in this sequence.

$(10)^2 + 3$

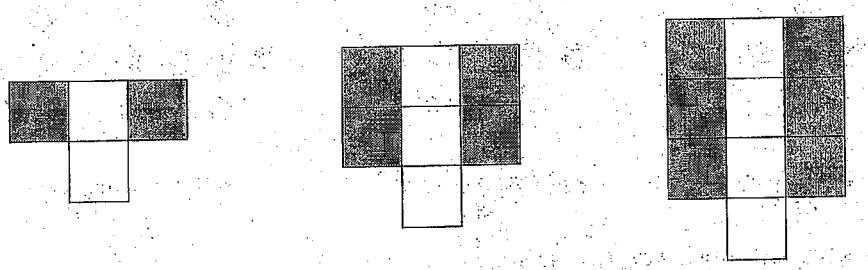
$100 + 3$

103

(1)

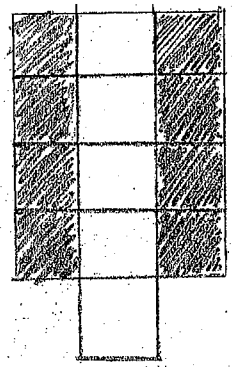
(Total for Question 10 is 3 marks)

11 Here is a sequence of patterns made from white tiles and grey tiles.



pattern number 1 pattern number 2 pattern number 3

(a) In the space below, draw pattern number 4.



(1)

(b) Work out the total number of tiles to make pattern number 7.

4 7 10 13 16 19 22

22

(2)

Kyle says
"There are 4 white tiles in pattern number 3 so there will be 8 white tiles in pattern number 6."

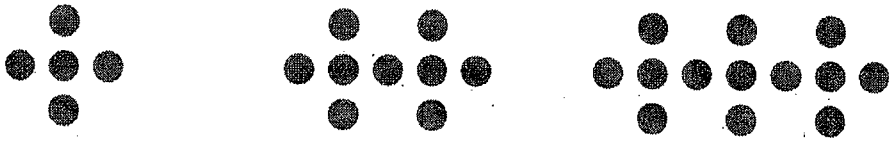
(c) Is Kyle right?
You must give a reason for your answer.

No. There will be 7 white tiles in pattern 6

(1)

(Total for Question 11 is 4 marks)

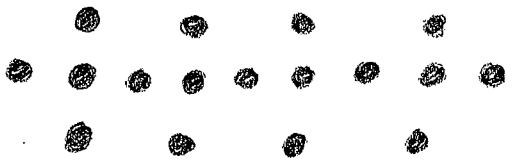
12 Here is a sequence of patterns made from grey counters.



pattern number 1 pattern number 2 pattern number 3

5 9 13

(a) In the space below, draw pattern number 4.



(b) Work out the total number of counters to make pattern number 10. (1)

	5	9	13	17
$4n$	4	8	12	16

$4n + 1$

$4(10) + 1 = 41$

41

(2)

(Total for Question 12 is 3 marks)

13 Here are the first five terms of a sequence.

31 27 23 19 15

(a) Find the first negative term in the sequence.

11 7 3 −1

−1

(2)

(b) Is –30 a term in this sequence?
Give a reason for your answer.

No. All terms in the sequence are odd

(1)

(Total for Question 13 is 3 marks)

14 Here are the first 5 terms of an arithmetic sequence.

-3 1 5 9 13

(a) Find an expression, in terms of n, for the nth term of this sequence.

4n 4 8 12 16 20

$4n - 7$

(2)

The nth term of a different arithmetic sequence is $2n - 3$

(b) Is 101 a term in this sequence?
Show how you get your answer.

$2n - 3 = 101$

$2n = 104$

$n = 52$

Yes, it is the 52nd term.

(2)

(Total for Question 14 is 4 marks)

---

15 Here are the first 5 terms of a sequence.

9 14 19 24 29

Find an expression, in terms of n, for the nth term of this sequence.

5n 5 10 15 20 25

$5n + 4$

(Total for Question 15 is 2 marks)

---

16 Here are the first 5 terms of a sequence.

25 22 19 16 13

Find an expression, in terms of n, for the nth term of this sequence.

$-3n$ -3 -6 -9 -12 -15

$-3n + 28$

(Total for Question 16 is 2 marks)

17 Here are the first four terms of an arithmetic sequence.

4 11 18 25

Write down an expression, in terms of n, for the nth term of the sequence.

7n 7 14 21 28

7n − 3

(Total for Question 17 is 2 marks)

18 Here are the first four terms of an arithmetic sequence.

35 31 27 23

Write down an expression, in terms of n, for the nth term of the sequence.

−4n −4 −8 −12 −16

−4n + 39

(Total for Question 18 is 2 marks)

19 Here are the first five terms of an arithmetic sequence.

21 27 33 39 45

Write down an expression, in terms of n, for the nth term of the sequence.

6n 6 12 18 24 30

6n + 15

(Total for Question 19 is 2 marks)

20 Here are the first five terms of an arithmetic sequence.

2 7 12 17 22

Write down an expression, in terms of n, for the nth term of the sequence.

5n 5 10 15 20 25

5n − 3

(Total for Question 20 is 2 marks)

1 Change 120 minutes to hours.

$\frac{120}{60}$

2 ..... hours

(Total for question 1 is 1 mark)

2 Change 4 hours to minutes.

4×60

240 ..... minutes

(Total for question 2 is 1 mark)

3 Work out the difference, in minutes, between 55 minutes and $1\frac{3}{4}$ hours.

1 hour 45 mins

60 + 45 = 105

105 − 55

50 ..... minutes

(Total for question 3 is 2 marks)

4 Work out the difference, in minutes, between 2 hour 25 minutes and $1\frac{1}{2}$ hours.

$2 \times 60 + 25$

$120 + 25$

$= 145$

1 hour 30 mins

$60 + 30$

$= 90$

$145 - 90$

55 ..... minutes

(Total for question 4 is 2 marks)

5 Hayley left her home at 10.40 am. +14 mins

She walked from her home to the shop.
It took her 14 minutes to walk to the shop. 10 54

Hayley was at the shop for 10 minutes. + 10 mins 11 04

Then Hayley walked from the shop to her friends house. + 22 mins
It took Hayley 22 minutes to walk to her friends house. 11 26

What time did Hayley arrive at her friends house?

11.26 am

(Total for question 5 is 2 marks)

---

6 A film starts at 7.45 pm.
The film lasts 98 minutes. 60 mins + 38 mins

What time does the film finish?

7.45 → 8.45 (+60 mins) → 9.00 (+15 mins) → 9.23 (+23 mins)

9.23pm

(Total for question 6 is 2 marks)

---

7 Natalie drives from London to Sheffield.

Natalie leaves London at 9.15 am.

Natalie drives for $2\frac{1}{4}$ hours before stopping for a break. 11.30
2 hours 15 mins

The break lasts for 20 minutes. 11.50

Natalie then takes another 85 minutes to reach Sheffield. 12.50
1 hour 25 mins

What time does Natalie arrive in Sheffield? 13.15

13.15

(Total for question 7 is 2 marks)

[1.15pm]

8 Here is part of a train timetable.

London St Pancras	0540	0618	0701	0755
Ebbsfleet	0558	-	-	0812
Ashford	0624	0655	-	-
Paris	0917	0947	1017	1117

(a) A train leaves London St Pancras at 0618, how many minutes should it take to reach Paris?

0618 → 0947

0618 → 0918 → 0947

3 hours 29 mins

180 + 29 = 209

209 minutes

(1)

(b) What is the difference, in minutes, between the time it takes for the 0540 train and the 0618 train from London St Pancras to reach Paris?

0540 → 0917

0540 → 0840 → 0917

3 hours 37 mins

3 hours 37 − 3 hours 29

8 minutes

(2)

Georgie lives in Ashford. She has to get to a meeting in Paris for 1030.

(c) What is the time of the latest train she can get from Ashford?

0655

(1)

(Total for question 8 is 4 marks)

9 Here is part of a bus timetable.

Woolwich	0717	0724	0732	0739	0746
Woolwich Arsenal	0719	0726	0734	0741	0748
Plumstead Station	0725	0732	0740	0747	0754
Plumstead Corner	0730	0737	0745	0752	0759
Upper Wickham Lane	0737	0744	0752	0759	0806
Welling Corner	0743	0750	0758	0805	0813
Bexleyheath	0754	0801	0809	0817	0825
Crayford	0803	0811	0819	0827	0835
Dartford Station	0814	0823	0831	0839	0847
Darent Valley Hospital	0824	0833	0841	0849	0857
Bluewater	0828	0837	0845	0853	0901

(a) A bus leaves Woolwich at 0724, how many minutes does this bus take to reach Bluewater?

0724 → 0837

0724 → 0824 → 0837

1 hour 13 mins

60 + 13

73 minutes

(1)

Jeff needs to get from Bexleyheath to Bluewater to start work at 9 am.
It takes Jeff 12 minutes to walk from his house to the bus stop in Bexleyheath.
It takes Jeff 8 minutes to walk from the bus station in Bluewater to his work.

(b) What is the latest time Jeff can leave his house to get to work on time?

get to Bluewater for 0852

Must arrive at Bluewater at 0845

Bexleyheath bus at 0809

−12 mins

0757

0757

(3)

(Total for question 9 is 4 marks)

7.57 am

10 Here is part of a train timetable.

London Marylebone	1410	1440	1510	1540
High Wycombe	1433	-	1534	-
Banbury	1506	1541	1608	1639
Leamington Spa	1524	1559	1626	1657
Warwick Parkway	1530	1606	1631	1705
Solihull	1544	1622	1644	1721
Birmingham Moor Street	1556	1632	1653	1735

(a) A train leaves London Marylebone at 1440, what time does it arrive in Birmingham Moor Street?

1632

(1)

(b) How many minutes should the 1410 train take to get from London Marylebone to Birmingham Moor Street?

1410 → 1510 → 1556
1 hour 46 mins

60 + 46 = 106 106 minutes

(1)

Millie goes from Banbury to Birmingham Moor Street on the train.

Millie takes 16 minutes to get from her house to the train station in Banbury.
She takes 20 minutes to get from Birmingham Moor Street station to her meeting.

Millie needs to get to the meeting by 5 pm.
Millie leaves her home at 3.15 pm.

(c) Does Millie get to her meeting by 5pm?
You must show all your working.

3.15 → 3.31 TRAIN AT 1541 ARRIVES AT 1632

+16 mins

1632 → 1652

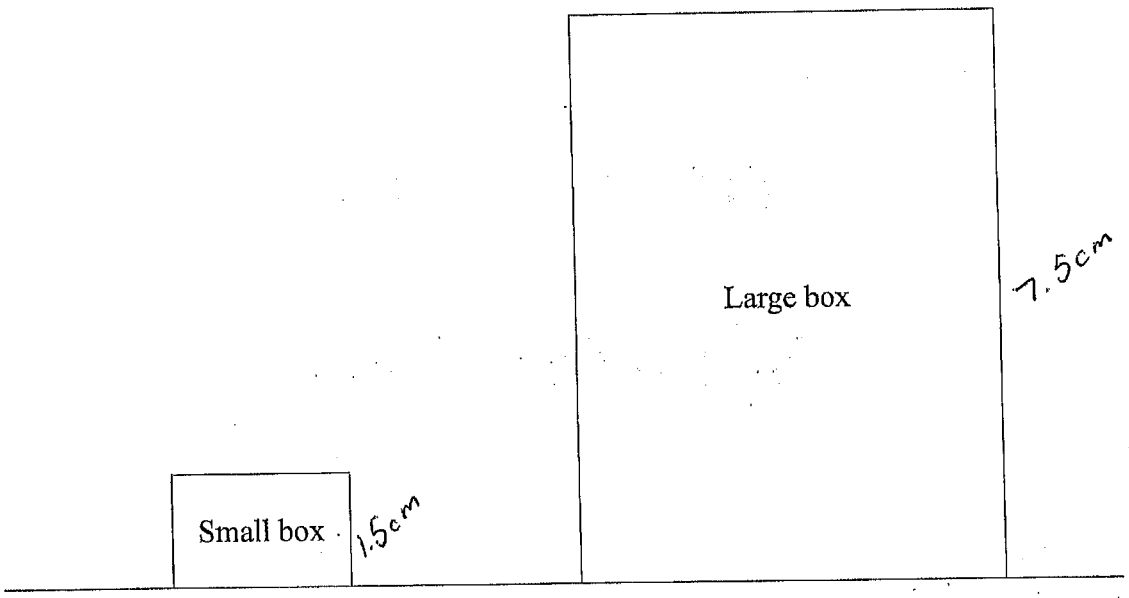
+20 mins

Yes she arrives at 1652 minutes

(3)

(Total for question 10 is 5 marks)

1 The accurate scale drawing shows a small box and a large box



The small box has a real height of 20 centimetres.

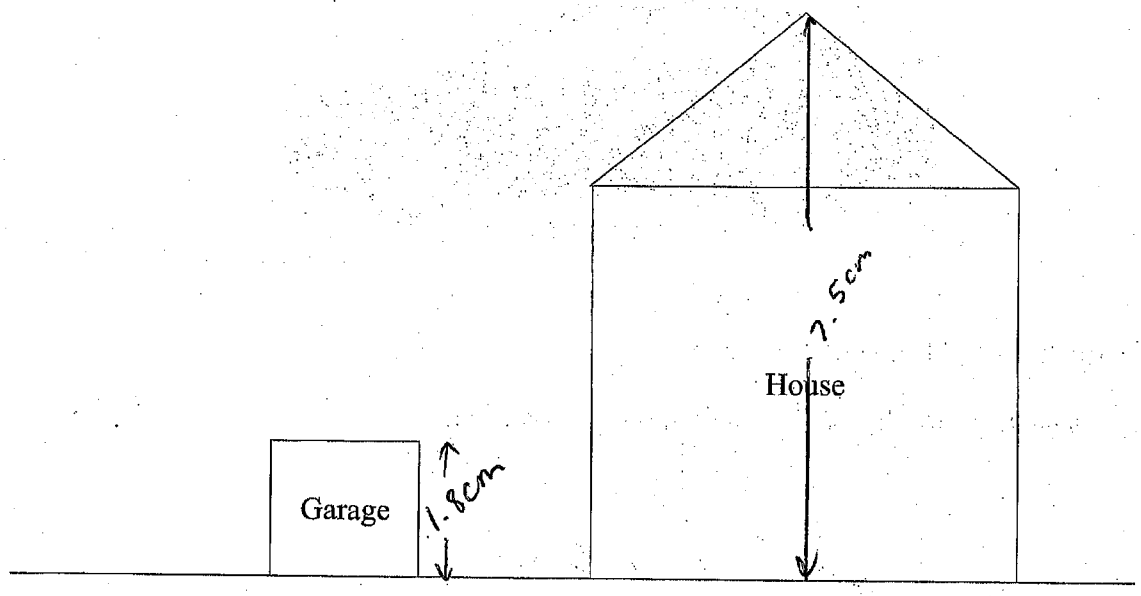
Find an estimate for the real height of the large box.

1.5 cm = 20 cm
×5 ×5 [5 times taller]
7.5 cm = 100 cm
OR 1 m

100 cm

(Total for question 1 is 2 marks)

2 The accurate scale drawing shows a garage and a house.



The garage has a real height of 2.4 metres.

Find an estimate for the real height, in metres, of the house.

×4/3

1.8 cm = 2.4 m

7.5cm = 10m

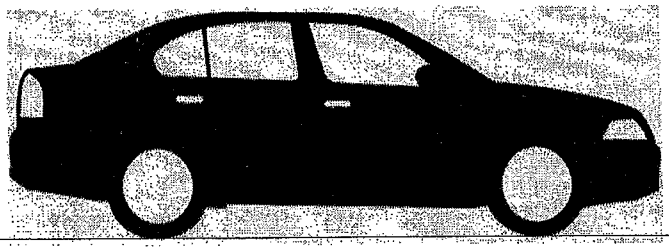
$\left[\frac{7.5 \times 4}{3} = \frac{30}{3} = 10\text{ m}\right]$

.....10..... metres

[ACCEPT 9.6 to 10.8]

(Total for question 2 is 2 marks)

3 The accurate scale drawing shows a car.



The car has a real height of 1.5 metres.

Find an estimate for the real length, in metres, for the car.

÷2

3cm = 1.5m

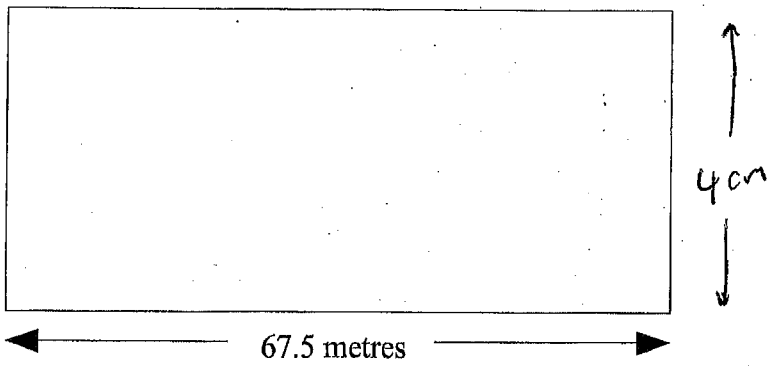
8.8cm = 4.4m

4.4 metres

ACCEPT 4.5

(Total for question 3 is 2 marks)

4 The accurate scale drawing shows a field.



The field has a real length of 67.5 metres

Find an estimate for the real perimeter of the field.

9cm = 67.5 m

÷9 ÷9

1cm = 7.5 m

4cm = 30 m

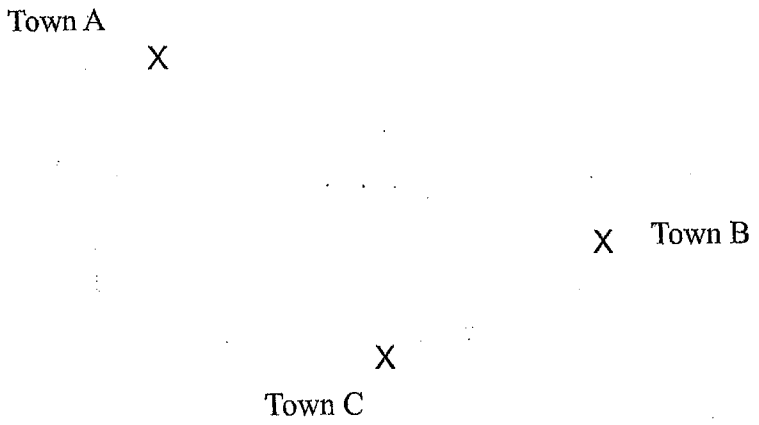
perimeter = 2(67.5) + 2(30)

= 195

195 m

(Total for question 4 is 3 marks)

5 The accurate scale drawing shows three towns, Town A, Town B and Town C.



The scale is 1:50000

a) Find the real distance between Town A and Town B, in kilometres.

6.5 cm

$6.5 \times 50000 = 325000$ cm

$= 3250$ m

$= 3.25$ km

3.25 km

(3)

b) Find the real distance between Town A and Town C, in kilometres.

5 cm

$5 \times 50000 = 250000$ cm

$= 2.5$ km

2.5 km

(3)

(Total for question 5 is 6 marks)

6 A model car has the length of 8cm.

The scale of the model is 1:50

Work out the length of the real car.
Give your answer in metres.

$8 \times 50 = 400$ cm

4 m

(Total for question 6 is 2 marks)

7 A map has the scale of 1:50000

The distance between two points on the map is 10 cm.

Work out the real distance between the two points. Give your answer in kilometres.

$10 \times 50000 = 500000$ cm

$= 5000$ m

$= 5$ km

5 km

(Total for question 7 is 3 marks)

8 A model plane has the length of 20cm.

The scale of the model is 1:380

Work out the length of the real plane.
Give your answer in metres.

$20 \times 380 = 7600 \text{ cm}$

$= 76 \text{ m}$

76 m

(Total for question 8 is 2 marks)

9 A map has the scale of 1:75000

The distance between two points on the map is 12 cm.

Work out the real distance between the two points. Give your answer in kilometres.

$12 \times 75000 = 900000 \text{ cm}$

$= 9000 \text{ m}$

$= 9 \text{ km}$

9 km

(Total for question 9 is 3 marks)

1 Write 0.29 as a percentage.

0.29 x 100

29 %

(Total for Question 1 is 1 mark)

---

2 Write $\frac{5}{100}$ as a decimal.

5 ÷ 100

0.05

(Total for Question 2 is 1 mark)

---

3 Write 0.3 as a percentage.

0.3 x 100

30 %

(Total for Question 3 is 1 mark)

---

4 Write 18% as a decimal.

18 ÷ 100

0.18

(Total for Question 4 is 1 mark)

---

5 Write 4% as a decimal.

4 ÷ 100

0.04

(Total for Question 5 is 1 mark)

---

6 Write 0.3 as a fraction.

$\frac{3}{10}$

(Total for Question 6 is 1 mark)

7 Write $\frac{2}{5}$ as a decimal.

$\frac{2}{5} = \frac{4}{10} = 0.4$

0.4

(Total for Question 7 is 1 mark)

---

8 Write 0.03 as a fraction.

$\frac{3}{100}$

(Total for Question 8 is 1 mark)

---

9 Write 23% as a fraction.

$\frac{23}{100}$

(Total for Question 9 is 1 mark)

---

10 Write 0.79 as a percentage.

0.79×100

79 %

(Total for Question 10 is 1 mark)

---

11 Write 17% as a fraction.

$\frac{17}{100}$

$\frac{17}{100}$

(Total for Question 11 is 1 mark)

---

12 Write 0.25 as a fraction.

$\frac{25}{100}$ or $\frac{1}{4}$

$\frac{1}{4}$

(Total for Question 12 is 1 mark)

13 Write $\frac{3}{50}$ as a percentage.

$\frac{3}{50} = \frac{6}{100}$

6 %

(Total for Question 13 is 1 mark)

14 Write 0.06 as a percentage.

0.06×100

6 %

(Total for Question 14 is 1 mark)

15 Write 0.11 as a fraction.

$\frac{11}{100}$

(Total for Question 15 is 1 mark)

16 Write 0.9 as a percentage.

0.9×100

90 %

(Total for Question 16 is 1 mark)

17 Write 0.19 as a percentage.

0.19×100

19 %

(Total for Question 17 is 1 mark)

18 Write 0.025 as a fraction.

$\frac{25}{1000}$ or $\frac{5}{200}$ or $\frac{1}{40}$

any equivalent

$\frac{25}{1000}$

(Total for Question 18 is 1 mark)

19 Write $\frac{12}{100}$ as a decimal.

12 ÷ 100

0.12

(Total for Question 19 is 1 mark)

---

20 Write $\frac{7}{10}$ as a decimal.

7 ÷ 10

0.7

(Total for Question 20 is 1 mark)

---

21 Write 0.003 as a fraction.

$\frac{3}{1000}$

(Total for Question 21 is 1 mark)

---

22 Write 0.3 as a percentage.

0.3 × 100

30 %

(Total for Question 23 is 1 mark)

---

23 Write $\frac{9}{20}$ as a percentage.

$\frac{9}{20} = \frac{45}{100}$

45 %

(Total for Question 23 is 1 mark)

---

24 Write 0.06 as a fraction.

$\frac{6}{100}$

(Total for Question 24 is 1 mark)

25 Dean says that 13% is greater than 0.1

Is Dean correct?
Give a reason for your answer.

YES : either $13\% = 0.13$ and $0.13 > 0.1$
or $0.1 = 10\%$ and $13\% > 10\%$

(Total for Question 25 is 1 mark)

26 Tom and Jerry both earn the same monthly salary.

Each month:

Tom saves 35% of his salary.

Jerry spends $\frac{3}{5}$ of his salary and saves the rest of his salary.

Work out who saves the most money each month.
You must show your working.

Jerry saves $\frac{2}{5} = 40\%$

$40\% > 35\%$

Jerry saves more money.

(Total for Question 26 is 2 marks)

27 Write the following numbers in order of size.
Start with the smallest number.

75% $\frac{7}{10}$ 0.72 0.9 $\frac{4}{5}$

0.75 0.7 0.8

$\frac{7}{10}$ 0.72 75% $\frac{4}{5}$ 0.9

(Total for Question 27 is 2 marks)

28 Write the following numbers in order of size.
Start with the smallest number.

0.3 $\frac{1}{3}$ 21% $\frac{1}{4}$ 0.205

30% 33.3% 25% 20.5%

0.205 21% $\frac{1}{4}$ 0.3 $\frac{1}{3}$

(Total for Question 28 is 2 marks)

1 Emma buys a house for £201 500
She sells the house for £213 590

Calculate the percentage profit Emma makes.

$$\frac{\text{change}}{\text{original}} \times 100$$

$$\frac{213590 - 201500}{201500} \times 100$$

$$= 6\%$$

.....6.....%

(Total for question 1 is 3 marks)

---

2 Mel buys a house for £352 000
She sells the house for £325 600

Calculate the percentage loss Mel makes.

$$\frac{\text{change}}{\text{original}} \times 100$$

$$\frac{325600 - 352000}{352000} \times 100$$

$$= -7.5\%$$

.....7.5.....%

(Total for question 2 is 3 marks)

3 Last year Geri's council tax bill was £1815

This year she has to pay £1906 for her council tax.

Work out the percentage increase in her council tax bill.

Give your answer to 1 decimal place.

$$\frac{1906 - 1815}{1815} \times 100$$

$$5.01377... \%$$

5.0 ..... %

(Total for question 3 is 3 marks)

4 Last year Victoria paid £354 for her car insurance.

This year she has to pay £329 for her car insurance.

Work out the percentage decrease in her car insurance.

Give your answer to 1 decimal place.

$$\frac{329 - 354}{354} \times 100$$

$$= -7.06214... \%$$

7.1 ..... %

(Total for question 4 is 3 marks)

5 In 2000, the world population was 6.1 billion.
In 2015, the world population was 7.3 billion.

Work out the percentage increase in population.
Give your answer correct to 1 decimal place.

$$\frac{7.3 - 6.1}{6.1} \times 100$$

$19.6721...\%$

19.7 %

(Total for question 5 is 3 marks)

---

6 Banana computers sold 19.3 million computers in 2017.

In 2018, they sold 18.2 million computers.

Work out the percentage decrease in the number of computers sold.

Give your answer to three significant figures.

$$\frac{18.2 - 19.3}{19.3} \times 100$$

$= -5.69948...\%$

5.70 %

(Total for question 6 is 3 marks)

7 Last year Patrick paid £2534 for his annual train ticket.
This year he has to pay £2612 for his annual train ticket.

Work out the percentage increase in the cost of his train ticket.
Give your answer correct to 3 significant figures.

$$\frac{2612 - 2534}{2534} \times 100$$

$$3.078137\ldots\ \%$$

3.08 %

(Total for question 7 is 3 marks)

8 The average house price in London in 2017 was £474902
The average house price in London in 2018 was £469538

Calculate the percentage change in house prices between 2017 and 2018.
Give your answer correct to 1 decimal place.

$$\frac{469538 - 474902}{474902} \times 100$$

$$= -1.129496\ldots\ \%$$

−1.1 %

(Total for question 8 is 3 marks)

9 Richard buys a car for £13 500
He sells the car for £9 500

Work out Richard's percentage loss.
Give your answer correct to three significant figures.

$$\frac{9500 - 13500}{13500} \times 100$$

$$= -29.6296...\%$$

29.6 %

(Total for question 9 is 3 marks)

10 Lottie buys a pack of 50 cans of lemonade.
She pays £17 for the cans.

Lottie sells 32 of the cans for 50p each.
She sells the remaining cans for 20p each.

$32 \times 0.5 = 16$
$18 \times 0.2 = 3.6$
£19.60

Work out Lottie's percentage profit.
Give your answer correct to three significant figures.

$$\frac{19.60 - 17}{17} \times 100$$

$$= 15.2941...\%$$

15.3 %

(Total for question 10 is 3 marks)

11 Karen buys a pack of 8 bottles of water.
The pack costs £1.25

Karen sells all 8 bottles of water for 50p each. $8 \times 0.5 = 4$

Work out Karen's percentage profit.

$$\frac{4 - 1.25}{1.25} \times 100$$

.....220..... %

(Total for question 11 is 3 marks)

12 Theo buys 24 packs of crisps.
He pays £3 for the crisps.

Theo sells each pack of crisps for 50p. $24 \times 0.5 = 12$

Work out Theo's percentage profit.

$$\frac{12 - 3}{3} \times 100$$

.....300..... %

(Total for question 12 is 3 marks)

13 Donald buys a pack of 9 chocolate bars.
The pack costs £2.50

Donald sells all 9 chocolate bars for 45p each. $9 \times 0.45 = 4.05$

Work out Donald's percentage profit.

$$\frac{4.05 - 2.50}{2.50} \times 100$$

62 %

(Total for question 13 is 3 marks)

---

14 Alan buys 1.2 kg of sweets. 1200 g
He pays £2.25 for the sweets.

Alan puts the sweets into bags.
He puts 150g of sweets in each bag.
He sells each bag of sweets for 30p.

$\frac{1200}{150} = 8$ bags

Work out Alan's percentage profit.

$8 \times 0.3 = 2.4$

$$\frac{2.4 - 2.25}{2.25} \times 100$$

$6.\dot{6}\%$

6.6 %
[or 6.7% / 6.67%]

(Total for question 14 is 4 marks)

1 The value of a house increased by 6%.
The house then had a value of £265 000

Work out the value of the house before the increase.

$x \times 1.06 = 265\,000$

$x = \frac{265\,000}{1.06}$

$= 250000$

OR

265000 = 106%

÷106 ÷106

2500 = 1%

×100 ×100

250000 = 100%

£ 250000

(Total for Question 1 is 2 marks)

---

2 In a sale, the normal price of a book is reduced by 20%.
The sale price of the book is £4.80

Work out the normal price of the book.

$x \times 0.8 = 4.80$

$x = \frac{4.80}{0.8}$

$= 6$

£ 6

(Total for Question 2 is 2 marks)

---

3 The value of a litre of petrol increased by 8%.
A litre of petrol then cost £1.62

Work out the price of a litre of petrol before the increase.

$x \times 1.08 = 1.62$

$x = \frac{1.62}{1.08}$

$= £1.50$

£ 1.50

(Total for Question 3 is 2 marks)

4 In a sale, normal prices are reduced by 25%.
The normal price of a coat is reduced by £12

Work out the normal price of the coat.

$12 = 25\%$

$\times 4 \quad \times 4$

$48 = 100\%$

£ 48

(Total for Question 4 is 2 marks)

---

5 In a sale, the normal price of a TV is reduced by 20%.
The sale price of the TV is £660

Work out the normal price of the TV.

$x \times 0.8 = 660$

$x = \frac{660}{0.8}$

$= 825$

£ 825

(Total for Question 5 is 2 marks)

---

6 The cost of a council tax bill increased by 5%.
The council tax bill increased by £62.

Work out the cost of the council tax bill before the increase

$62 = 5\%$

$\times 20 \quad \times 20$

$1240 = 100\%$

£ 1240

(Total for Question 6 is 2 marks)

7 The price of a train season ticket increased by 4%.
The price of the ticket increased by £152.20

Work out the price of the train ticket before the increase.

152.20 = 4%
×25 ×25
3805 = 100%

£ 3805

(Total for Question 7 is 2 marks)

8 In a sale, the normal price of a car is reduced by 30%.
The sale price of the car is £6300

Work out the normal price of the car.

6300 = 70%
÷7 ÷7
900 = 10%
×10 ×10
9000 = 100%

£ 9000

(Total for Question 8 is 2 marks)

9 In a sale, normal prices are reduced by 15%.
The normal price of a pen is reduced by £1.20

Work out the normal price of the pen.

1.20 = 15%
÷3 ÷3
0.40 = 5%
×20 ×20
8 = 100%

£ 8

(Total for Question 9 is 2 marks)

1 Write down the ratio of 350 cm to 25 cm.
Give your answer in its simplest form.

350 : 25
÷25 ÷25
14 : 1

14 : 1

(Total for question 1 is 2 marks)

2 Write down the ratio of 220 kg to 5 kg.
Give your answer in its simplest form.

220 : 5
÷5 ÷5
44 : 1

44 : 1

(Total for question 2 is 2 marks)

3 Alex has the following coins:

Write down the ratio of the value of Alex's 20p coins to the value of Alex's 50p coins.

40 : 150
4 : 15

4 : 15

(Total for question 3 is 2 marks)

4 (a) Write the ratio 32 : 24 in its simplest form

÷8 ÷8

4 : 3

4 : 3

(1)

(b) $\frac{1}{9}$ of people in a class are left handed.

Write the ratio of left handed people to right handed people

$\frac{1}{9} : \frac{8}{9}$

1 : 8

1 : 8

(1)

(Total for question 7 is 2 marks)

---

5 (a) Write the ratio 15 : 35 in its simplest form.

÷5 ÷5

3 : 7

3 : 7

(1)

(b) There are red shapes and blue shapes in a box, $\frac{2}{3}$ of the shapes are red.

Write the ratio of red shapes to blue shapes.

$\frac{2}{3} : \frac{1}{3}$

2 : 1

2 : 1

(1)

(Total for question 9 is 2 marks)

6 (a) Write the ratio 81 : 27 in its simplest form

÷9 ÷9

9 : 3

÷3 ÷3

3 : 1

3 : 1

(1)

(b) $\frac{3}{8}$ of chocolates in a box are white chocolate, the rest are milk chocolate.

Write the ratio of white chocolates to milk chocolates.

$\frac{3}{8} : \frac{5}{8}$

3 : 5

3 : 5

(1)

(Total for question 6 is 2 marks)

---

7 (a) Write the ratio 24 : 72 in its simplest form.

÷8 ÷8

3 : 9

1 : 3

1 : 3

(1)

(b) In February, it rained on $\frac{3}{7}$ of days

Write the ratio of the days it rained to the number of days it did not rain.

$\frac{3}{7} : \frac{4}{7}$

3 : 4

3 : 4

(1)

(Total for question 9 is 2 marks)

8 Write the ratio 7.5 : 2.5 in the form n : 1

÷2.5 ÷2.5

3 : 1

3 : 1

(Total for question 8 is 1 mark)

9 Write the ratio 12 : 30 in the form 1 : n

6 : 15

2 : 5

1 : 2.5

1 : 2.5

(Total for question 9 is 1 mark)

10 There are some cubes in a bag.

$\frac{1}{6}$ of the cubes are red.

The rest of the cubes are blue.

Write the ratio of the number of red cubes to the number of blue cubes.
Give your answer in the form 1 : n

$\frac{1}{6} : \frac{5}{6}$

1 : 5

1 : 5

(Total for question 10 is 2 marks)

11 There are only blue counters, red counters and yellow counters in a bag.

B : Y
2 : 1
R : Y
3 : 1

There are twice as many blue counters as yellow counters.
There are three times as many red counters as yellow counters.

Write down the ratio of blue counters to red counters to yellow counters.

B : R : Y

2 : 3 : 1

.....

(Total for question 11 is 2 marks)

---

12 There are only green pens, black pens and red pens in a box.

There are four times as many green pens as black pens. 4 : 1
There are twice as many red pens as green pens. 4 : 8

Write down the ratio of green pens to black pens to red pens.

G : B : R

4 : 1 : 8

4 : 1 : 8

.....

(Total for question 12 is 2 marks)

13 Charlotte, Jo and Mike played a game.

Charlotte's scored four times as many points as Jo.
Mike's scored half as many points as Charlotte.

Write down the ratio of Charlotte's points to Jo's points to Mike's points

C : J : M

4 : 1 : 2

4 : 1 : 2

(Total for question 13 is 2 marks)

14 There are 120 people in a school canteen.
Half of the people in the canteen are in year 11 students. 60

The number of year 11 students in the canteen is three times the number of year 10 students.
The rest of the people in the canteen are year 9 students. $\frac{60}{3} = 20$

the number of year 9 students : the number of year 10 students = n : 1

Work out the value of n.
You must show how you get your answer.

120 − 60 − 20 = 40 YEAR 9

40 : 20

2 : 1

n = 2

(Total for question 14 is 2 marks)

15 In a bag there are blue sweets, red sweets and yellow sweets.

The number of red sweets is three times the number of blue sweets.
The number of yellow sweets is half the number of red sweets.

Write down the ratio of blue sweets to red sweets to yellow sweets.
Give your answer in the form $a : b : c$ where a, b and c are whole numbers

B : R : Y

1 : 3 : 1.5

2 6 : 3

2 : 6 : 3

(Total for question 15 is 2 marks)

16 In a bag there are blue sweets, red sweets and yellow sweets.

The number of blue sweets is four times the number of yellow sweets.
The number of red sweets is half the number of yellow sweets.

Find the percentage of sweets in the bag that are yellow.

B : R : Y

4 : 0.5 : 1

8 : 1 : 2

Yellow $\frac{2}{11}$

$\frac{2}{11} \times 100$ $\frac{200}{11}$ %

(Total for question 16 is 2 marks)

18.18%

1 A machine fills 1000 bottles in 5 hours.

Work out how many hours it would take the machine to fill 1200 bottles.

1000 bottles in 5 hours ↓ ÷5

200 bottles in 1 hour ↓ ↓ ×6

1200 bottles in 6 hours ↓

6

(Total for question 1 is 2 marks)

2 It costs £0.75 to buy 5 bananas.

Work out how much it would cost to buy 7 bananas.

£0.75 for 5 bananas ↓ ÷5

£0.15 for 1 banana ↓ ↓ ×7

£1.05 for 7 bananas ↓

£1.05

(Total for question 2 is 2 marks)

3 3 tins of beans and 4 tins of tomatoes costs £2.73.

5 tins of beans costs £1.55.

Work out how much one tin of tomatoes costs.

5 tins of beans costs £1.55

↓ ÷5

1 tin of beans costs £0.31

↓ ×3

3 tins of beans costs £0.93

2.73 − 0.93 = £1.80

£1.80 for 4 tins of tomatoes

£1.80 ÷ 4 = £0.45

£0.45

(Total for question 3 is 2 marks)

---

4 There are 500 sheets in a pack of paper. 500 sheets of paper weigh 2.5kg.

Work out the weight of 50 sheets of paper.

500 sheets weigh 2.5kg

↓ ÷10

↓

50 sheets weigh 0.25kg

0.25kg

(Total for question 4 is 2 marks)

5 It takes 2 painters 4 days to complete a job.

Inverse proportion.
More painters = Less time.

Work out how many days it would take 1 painter to complete the same job.

2 painters take 4 days

$2 \times 4 = 8$ 8 days of work needed.

8

(Total for question 5 is 2 marks)

6 It takes 3 machines 2 days to produce a batch of products

Work out how long it would take 1 machine to produce the same batch of products.

$3 \times 2 = 6$

6 days of machine work needed

6

(Total for question 6 is 2 marks)

7 It takes 3 painters 6 days to complete a job.

Work out how many days it would take 2 painters to complete the same job.

$3 \times 6 = 18$

18 days of work needed

2 painters $\frac{18}{2} = 9$ days

9

(Total for question 7 is 2 marks)

8 It takes 5 machines 6 hours to produce 1000 DVDs

Work out how long it would take 4 machines to produce 1000 DVDs.

$5 \times 6 = 30$ machine ~~days~~ hours needed

$\frac{30}{4} = 7.5$ hours

7.5 hours

(Total for question 8 is 2 marks)

9 x is inversely proportional to y.

x is given by the formula: $x = \frac{1000}{y}$

Find the value of x when $y = 50$

$$x = \frac{1000}{y}$$

$$x = \frac{1000}{50} = 20$$

$x =$ 20

(Total for question 9 is 2 marks)

---

10 y is directly proportional to x.

y is given by the formula: $y = 0.4x$

Find the value of y when $x = 6$

$$y = 0.4x$$

$$y = 0.4(6)$$

$$y = 2.4$$

$y =$ 2.4

(Total for question 10 is 2 marks)

11 The weight of a piece of wire (w grams) is directly proportional to its length (l cm).

w is given by the formula: $w = 30l$

Find the length of a wire weighing 75 grams.

$$w = 30l$$
$$75 = 30l$$
$$\frac{75}{30} = l$$
$$l = 2.5$$

$l =$ 2.5 cm

(Total for question 11 is 2 marks)

---

12 The force, F, between two magnets is inversely proportional to the square of the distance, x cm, between them.

F is given by the formula: $F = \frac{36}{x^2}$

Find the Force when two magnets are 3 cm apart.

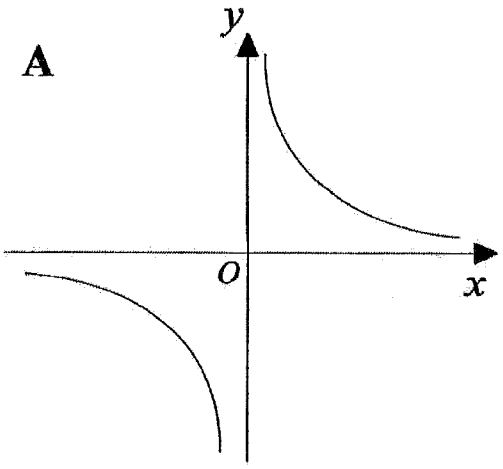
$$F = \frac{36}{x^2}$$
$$= \frac{36}{3^2}$$
$$= \frac{36}{9}$$
$$= 4$$

$F =$ 4 N

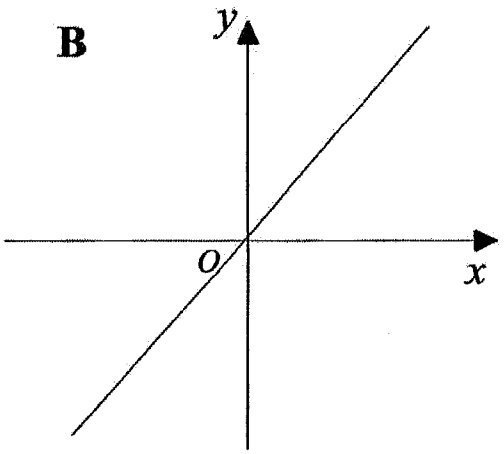
(Total for question 12 is 2 marks)

13 Here are four graphs.

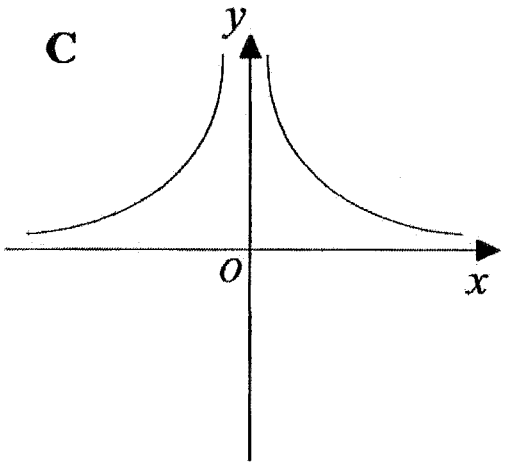
A



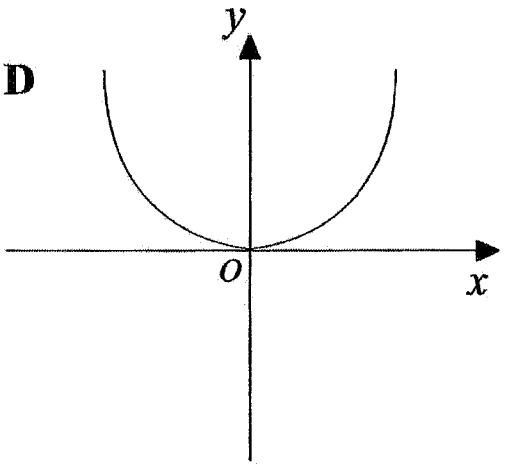
B



C



D



Match each graph with a statement in the table below.

Proportionality relationship	**Graph letter**
y is directly proportional to x	B
y is inversely proportional to x	A
y is directly proportional to x^2	D
y is inversely proportional to x^2	C

(Total for question 13 is 2 marks)

1 A sprinter runs a distance of 200 metres in 25 seconds.
Work out the average speed of the sprinter.

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{200}{25} = 8 \text{ m/s}$$

8 ..... m/s

(Total for question 1 is 1 mark)

---

2 A block exerts a force of 120 Newtons on the ground.
The block has an area of 2 m^2.

Work out the pressure on the ground.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

$$\text{pressure} = \frac{120}{2} = 60 \text{ N/m}^2$$

60 ..... N/ m^2

(Total for question 2 is 1 mark)

---

3 A piece of gold has a mass of 760 grams and a volume of 40 cm^3.
Work out the density of the piece of gold.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

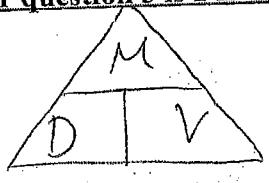
$$= \frac{760}{40} = 19 \text{ g/cm}^3$$

19 ..... g/cm^3

(Total for question 3 is 1 mark)

---

4 A rock has a mass of 56 grams and a density of 3.5 grams/cm^3.
Work out the volume of the rock.



$$\text{volume} = \frac{\text{mass}}{\text{density}}$$

$$= \frac{56}{3.5} = \frac{112}{7} = 16 \text{ cm}^3$$

16 ..... cm^3

(Total for question 4 is 1 mark)

5 A car travels a distance of 230 miles in 4 hours and 15 minutes.
Work out the average speed of the car, in miles per hour.
Give your answer to 1 decimal place.

4.25 hours

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{230}{4.25}$$

$$= 54.1 \text{ mph}$$

54.1 ..... miles/hour

(Total for question 5 is 2 marks)

6 A block exerts a force of 84 Newtons on a table.
The pressure on the table is 30 N/m^2.

Work out the area of the box that is in contact with the table.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

$$\text{area} = \frac{\text{force}}{\text{pressure}}$$

$$= \frac{84}{30} = 2.8 m^2$$

2.8 ..... m^2

(Total for question 6 is 2 marks)

7 A liquid has a density of 1.3 grams per ml.
Find the mass of 250 ml of the liquid.

$$\text{mass} = \text{density} \times \text{volume}$$

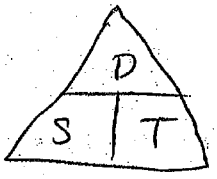
$$= 1.3 \times 250$$

$$= 325 g$$

325 ..... g

(Total for question 7 is 1 mark)

8 Dani leaves her house at 08 00.
She drives 63 miles to work.
She drives at an average speed of 27 miles per hour.
At what time does Dani arrive at work?



$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{63}{27}$$

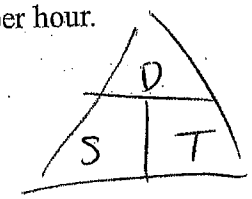
$$= 2.\dot{3} \text{ hours}$$

$$= 2 \text{ hours } 20 \text{ mins}$$

10:20 .....

(Total for question 8 is 2 marks)

9 Anthony travels from Newcastle to Manchester at an average speed of 65 miles per hour.
The journey takes him 2 hours and 15 minutes. 2.25 hours



Declan makes the same journey in 2 hours and 35 minutes.

(a) Work out Declan's average speed for the journey.

Anthony: distance = speed × time
= 65 × 2.25
= 146.25 miles

Declan: speed = distance / time
= 146.25 / 2.583
= 56.6 miles/hour (1dp)

2hrs 35 mins

$\frac{35}{60} = 0.583$ or $\frac{7}{12}$

56.6 mph

(4)

(b) If Declan ~~stopped for a break during~~ his journey, how ~~would~~ this affect your answer to part (a)?

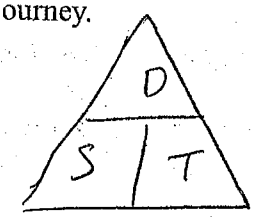
took a different roads for could

The ans: If the distance was increased the speed would be higher.
(If the distance decreased the speed would be lower) (1)

(Total for question 9 is 5 marks)

10 Rachel drives 300 miles from London to Newcastle.
She drives the first 165 miles at an average speed of 60 mph.
From this point it takes Rachel 3 hours and 15 minutes to complete her journey.

What was Rachel's average speed for the whole journey?



FIRST 165 MILES

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{165}{60} = 2.75 \text{ hours}$$

$$= 2 \text{ hours } 45 \text{ mins}$$

2 hours 45 + 3 hours 15 = 6 hours

~~135 MILES LEFT~~

$$\text{average speed} = \frac{\text{total distance}}{\text{total time}}$$

$$= \frac{300}{6}$$

$$= 50 \text{ mph}$$

50 ..... mph

(Total for question 10 is 4 marks)

11 Andrew ran 3.1 miles in 14 minutes and 35 seconds.

He assumes he can run 8 miles at the same speed.

(a) Work out how long it would take Andrew to run 8 miles.

Give your answer in minutes and seconds to the nearest second.

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{3.1}{14.583}$$

$$= 0.21257\ldots \text{ miles/min}$$

14 mins 35 secs

$= 14.583$ mins

~~distance = speed × time~~

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{8}{0.21257} = 37 \text{ mins } 38 \text{ sec}$$

37 mins 38 secs

(4)

Andrew's speed actually decreases the further he goes.

(b) How does this affect your answer to part (a)?

It would take longer to run 8 miles (the answer would be higher)

(1)

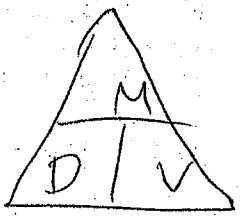
(Total for question 11 is 5 marks)

12 Liquid **A** has a density of 1.2 g/cm^3

150 cm^3 of Liquid **A** is mixed with some of Liquid **B** to make Liquid **C**.

Liquid **C** has a mass of 210 g and a density of 1.12 g/cm^3

Find the density of Liquid **B**.



Liquid A : mass = density × volume

= 1.2 × 150

= 180 g

Liquid C volume = $\frac{\text{mass}}{\text{density}}$

= $\frac{210}{1.12}$

= 187.5 cm^3

Liquid B Volume = Liquid C − Liquid A

= 187.5 − 150

= 37.5 cm^3

Liquid B mass = Liquid C − Liquid A

= 210 − ~~150~~ 180

= 30 g

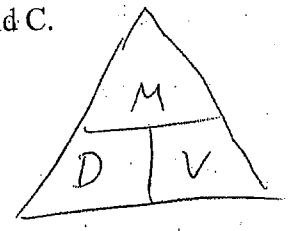
Liquid B density = $\frac{\text{mass}}{\text{volume}}$ = $\frac{30}{37.5}$ = 0.8

0.8 g/cm^3

(Total for question 12 is 3 marks)

13 100ml of liquid A and 200ml of liquid B are mixed together to make liquid C.
Liquid A has a density of 0.7g/ml.
Liquid B has a density of 1.1 g/ml.

Work the density of liquid C.



Liquid A: mass = density × volume

= 0.7 × 100

= 70 g

Liquid B: mass = 1.1 × 200

= 220 g

Liquid C density = $\frac{\text{total mass}}{\text{total volume}}$

= $\frac{70 + 220}{100 + 200}$

= $\frac{290}{300}$

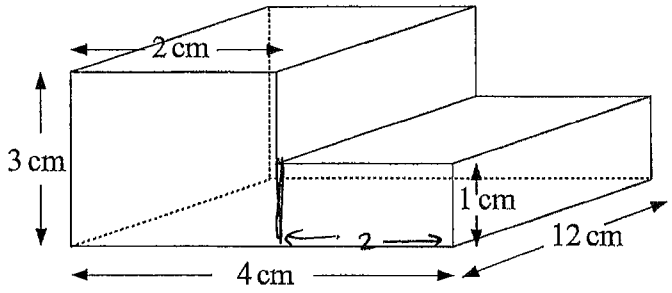
= 0.96 g/ml

0.96 ..... g/ml

(Total for question 13 is 4 marks)

[29/30]

1



The diagram shows a prism.

Work out the volume of the prism.

Area of cross section = $3 \times 2 + 2 \times 1$

$= 6 + 2$

$= 8 \text{ cm}^2$

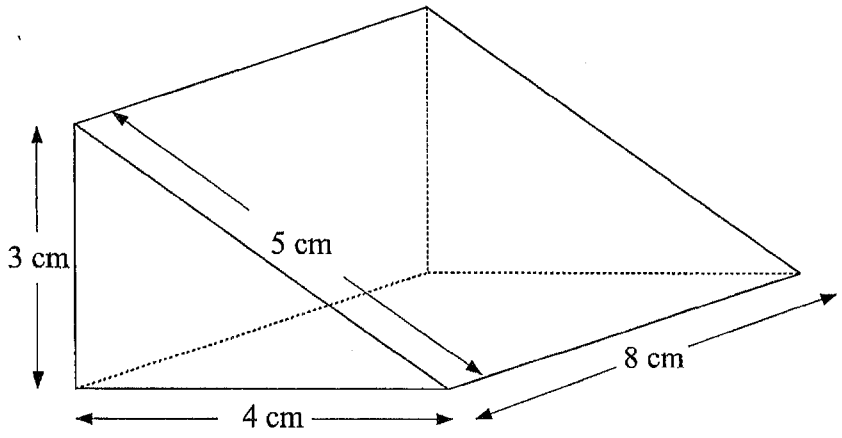
Volume = 8×12

$= 96 \text{ cm}^3$

96 ..... cm^3

(Total for question 1 is 3 marks)

2



The diagram shows a triangular prism.
The cross-section of the prism is a right angled triangle.

Calculate the volume of the prism.

Area of cross section = $\frac{3 \times 4}{2} = 6 \text{ cm}^2$

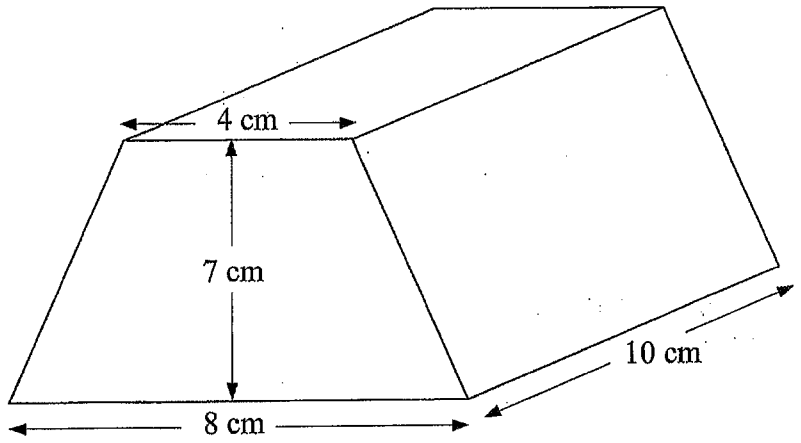
Volume = 6×8

$= 48 \text{ cm}^3$

48 ..... cm^3

(Total for question 2 is 3 marks)

3



The diagram shows a prism.
The cross-section of the prism is a trapezium.

Work out the volume of the prism.

Area of cross section = $\frac{1}{2}(4+8) \times 7$

$= 6 \times 7$

$= 42 \text{ cm}^2$

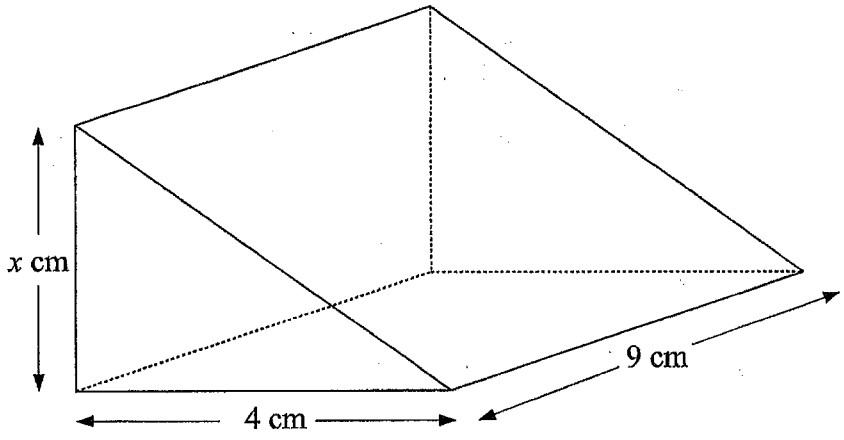
Volume $= 42 \times 10$

$= 420 \text{ cm}^3$

420 ..... cm^3

(Total for question 3 is 3 marks)

4



The diagram shows a triangular prism.
The cross-section of the prism is a right angled triangle.

The volume of the prism is 198 cm^3

Calculate the value of x

Area of cross section $= \frac{4x}{2} = 2x$

Volume $= 2x \times 9 = 18x$

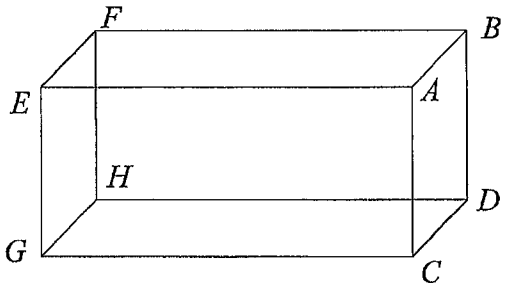
$18x = 198$

$x = \frac{198}{18} = \frac{99}{9} = 11 \text{ cm}$

11 .....

(Total for question 4 is 3 marks)

5



The diagram shows a cuboid *ABCDEFGH*
ABCD is a square with area 25cm^2.
CG = 12 cm.

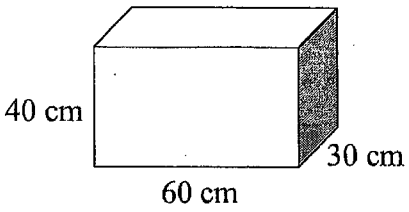
Find the volume of the cuboid.

Volume = 25 × 12
= 300 cm³

300 ..... cm^3

(Total for question 5 is 2 marks)

6 Bob has a van.
He is using the van to deliver boxes.
Each box is a cuboid, 60 cm by 30 cm by 40 cm.



The van has the space for the boxes in the shape of a cuboid with:

length 3 m 300cm
width 1.8 m 180 cm
height 2 m 200 cm

Work out how many boxes can Bob fit into the van.

Length $\frac{300}{60} = 5$

Width $\frac{180}{30} = 6$

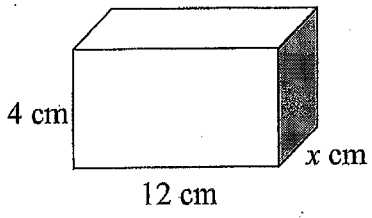
Height $\frac{200}{40} = 5$

Total boxes = 5 × 6 × 5
= 150

150 .....

(Total for question 6 is 3 marks)

7 The diagram shows a cuboid.



The volume of the cuboid is 120 cm^3

Area of cross section = 4×12
$= 48\ cm^2$

Calculate the value of x

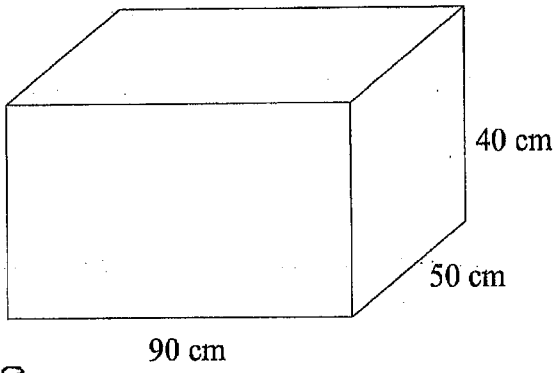
Volume = $48x$

$48x = 120$

$x = \frac{120}{48} = \frac{60}{24} = \frac{30}{12} = \frac{15}{6} = \frac{5}{2}$ 2.5

(Total for question 7 is 2 marks)

8 The diagram shows an empty water container.



Fiona is going to use a bucket to fill the container.
Each bucket can hold 12 litres of water.

How many buckets of water will be needed to fill the container?

Area of cross section = 90×50
$= 4500\ cm^2$

Volume = 4500×40
$= 180\,000\ cm^3$

1 litre = $1000\ cm^3$

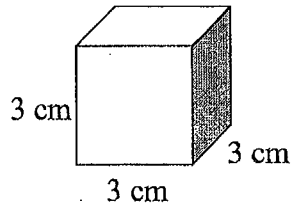
volume = 180 litres

$\frac{180}{12} = \frac{90}{6} = \frac{45}{3} = 15$

15

(Total for question 8 is 4 marks)

9 Here is a cube.



Work out the volume of five of these cubes.

$V = 3 \times 3 \times 3$

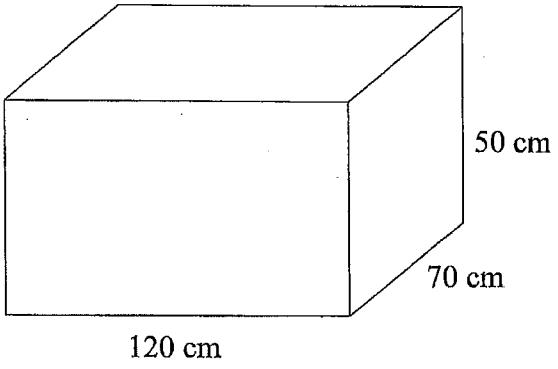
$= 27 \text{ cm}^3$

$27 \times 5 = 135$

135 ..... cm^3

(Total for question 9 is 2 marks)

10 The diagram shows an empty water container.



The container is going to be filled using a hose pipe.

The water will flow into the container at a rate of 2 litres per second.

How long will it take for the container to be filled completely?

volume $= 120 \times 70 \times 50$

$= 8400 \times 50$

$= 420000 \text{ cm}^3$

$1000 \text{ cm}^3 = 1 \text{ litre}$

$= 420 \text{ litres}$

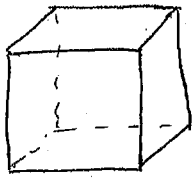
$\frac{420}{2} = 210$ seconds

210 .....

(Total for question 10 is 4 marks)

11 The total surface area of a cube is 150 cm^2.

Work out the volume of the cube.



$\frac{150}{6} = 25$ cm^2 each face 6 faces

25cm^2 $\sqrt{25} = 5$ cm

volume $= 5 \times 5 \times 5$
$= 125$ cm^3

125 cm^3

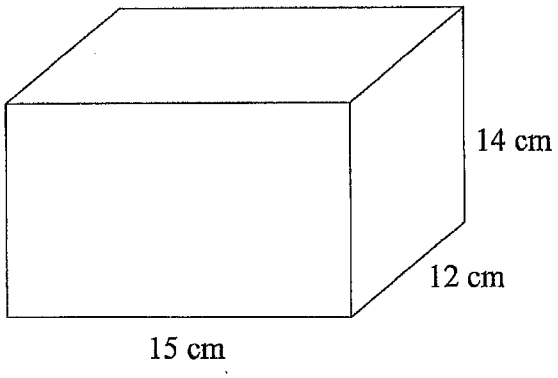
(Total for question 11 is 4 marks)

12 The diagram shows a water container.

The container is $\frac{2}{3}$ full with water.

The water is going to be used to fill cups.
Each cup golds 175 ml of water.

How many cups of water can be completely filled with water from the container



volume $= 15 \times 12 \times 14$
$= 180 \times 14$
$= 2520$ cm^3

$180 \times 10 = 1800$
$180 \times 4 = 720$
2520

$\frac{2}{3}$ $\frac{2}{3} \times 2520 = \frac{5040}{3}$

$3 \overline{)5040} = 1680$

$= 1680$ cm^3 (WATER)

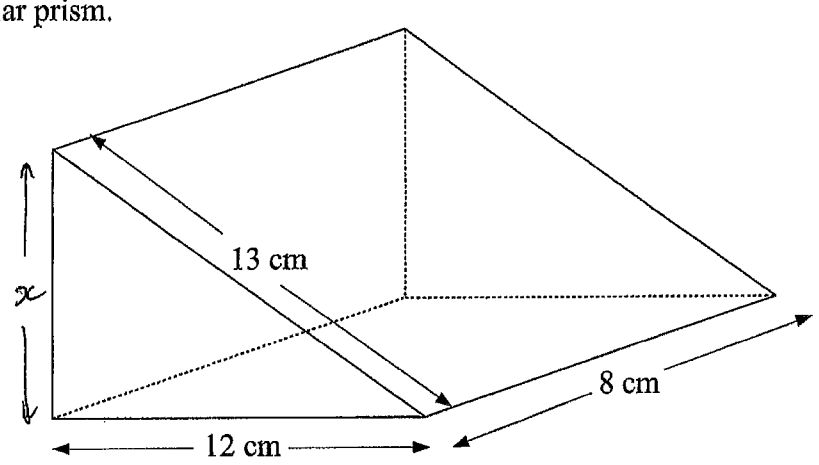
$= 1680$ ml

1750 ml = 10 cups
1575 ml = 9 cups

9

(Total for question 12 is 4 marks)

13 Here is a triangular prism.



The diagram shows a triangular prism.
The cross-section of the prism is a right angled triangle.

Calculate the volume of the prism.

$x^2 + 12^2 = 13^2$

$x^2 = 13^2 - 12^2$

$x^2 = 169 - 144$

$x^2 = 25$

$x = \sqrt{25} = 5$

Area of cross section $= \frac{5 \times 12}{2}$

$= 30 \text{ cm}^2$

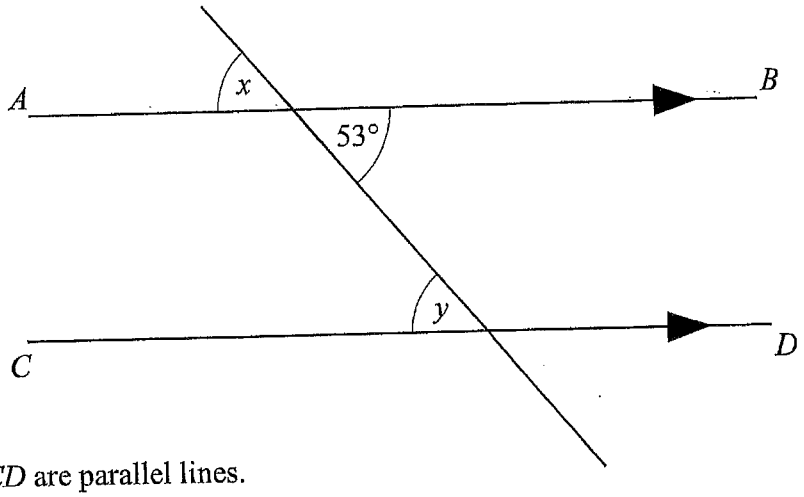
Volume $= 30 \times 8$

$= 240 \text{ cm}^3$

240 ..... cm^3

(Total for question 13 is 5 marks)

1



AB and *CD* are parallel lines.

(a) Write down the size of angle *x*.

53 °

(1)

(b) Give a reason for your answer.

(vertically) opposite angles are equal

(1)

(c) Write down the size of angle *y*.

53 °

(1)

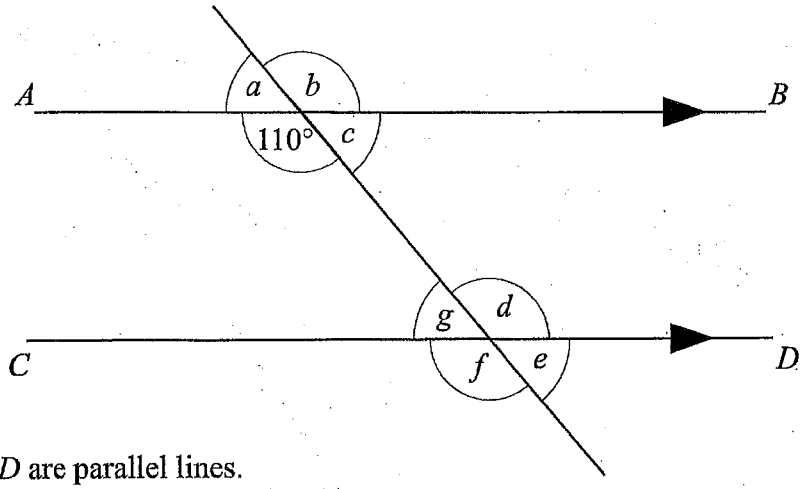
(d) Give a reason for your answer.

alternate angles are equal

(1)

(Total for question 1 is 4 marks)

2



AB and *CD* are parallel lines.
An angle of 110° is shown on the diagram.

(a) Write down the letter of one other angle of size 110°

f

(1)

(b) Give a reason for your answer.

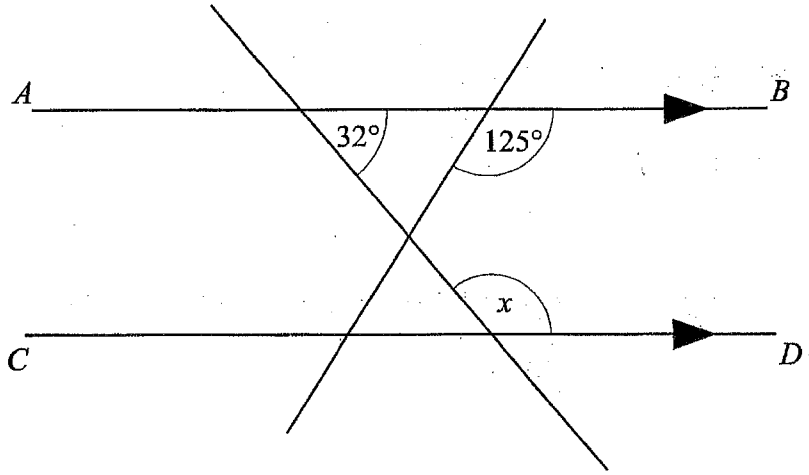
Corresponding angles are equal

[or // b: opposite angles are equal d: alternate angles equal]

(2)

(Total for question 2 is 3 marks)

3



AB and *CD* are parallel lines.

(a) Find the size of angle *x* 180 − 32 = 148

148°

(1)

(b) Give a reason for your answer.

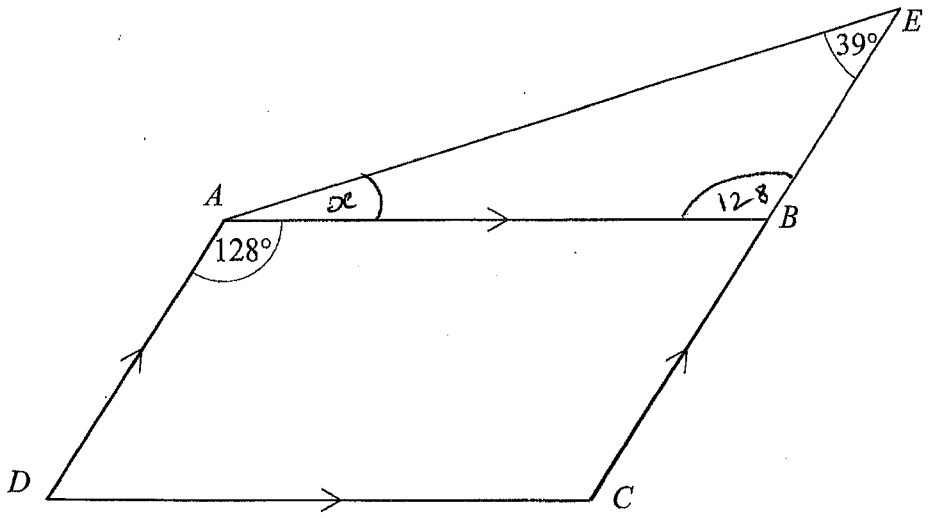
Co-interior angles add to 180°

[or // angles on a straight line add to 180° AND Corresponding / alternate angles are equal]

(2)

(Total for question 3 is 3 marks)

4



ABCD is a parallelogram.
CBE is a straight line.
Angle *BAD* = 128°
Angle *AEB* = 39°

Find the size of angle *BAE*.
Give a reason for each stage of your working.

Angle ABE = 128° Alternate angles are equal

128 + 39 = 167°

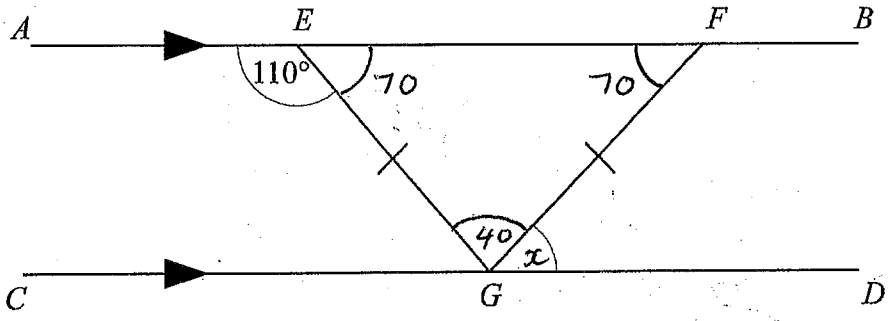
180 − 167 = 13°

BAE = 13° Angles in a triangle add to 180°

13 .....°

(Total for question 4 is 3 marks)

5



AB and *CD* are parallel lines.
EFG is an isosceles triangle

Angle *AEG* = 110°

Find the size of angle *FGD*.
Give a reason for each stage of your working.

Angle FEG = 180 − 110
= 70°

Angle EFG = 70° Angles at the base of an isosceles triangle are equal

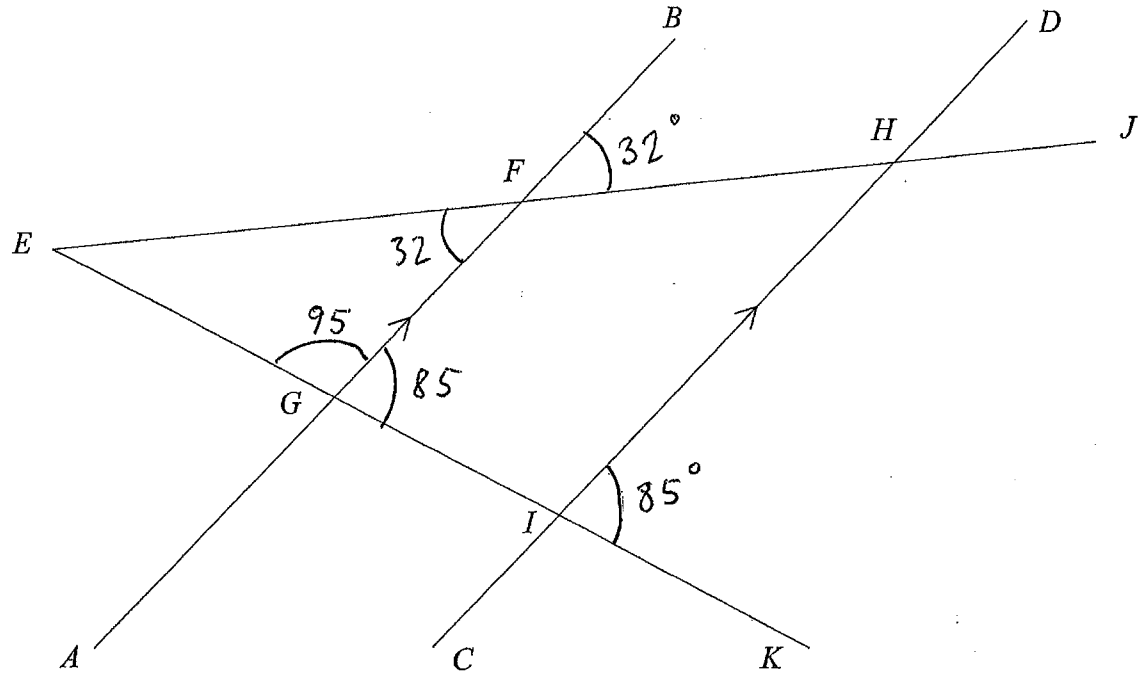
Angle EGF = 180 − 70 −70 Angles in a triangle add to 180°
= 40

FGD = 70° Alternate angles are equal

70 °

(Total for question 5 is 3 marks)

6



AB and *CD* are parallel.
Angle *HIK* = 85°
Angle *BFH* = 32°

Find the size of angle *FEG*.
You must show how you got your answer.

EFG = 32° opposite angles are equal

FGI = 85° corresponding angles are equal

EGF = 95° Angles on a straight line add to 180°.
(180 − 85 = 95)

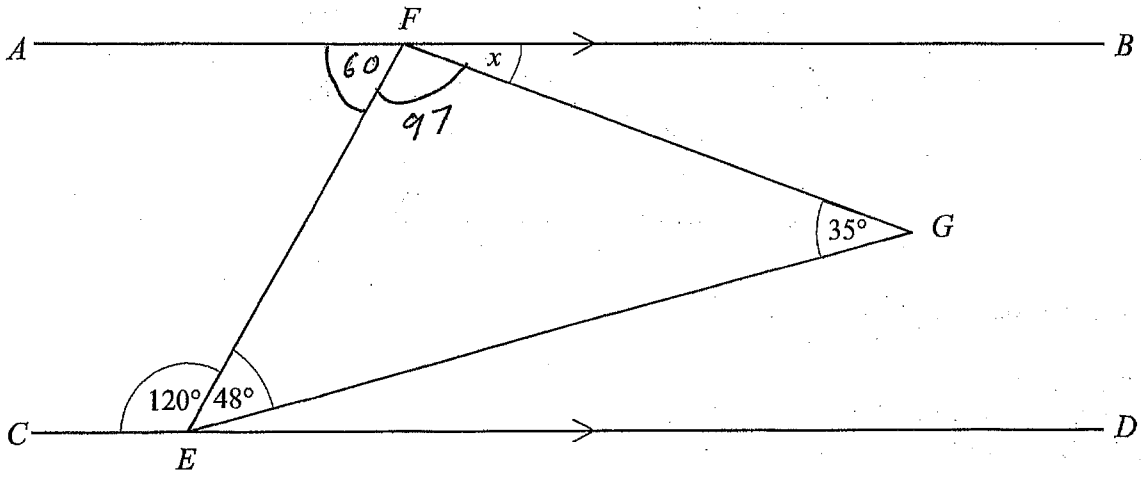
180 − 95 − 32 = 53°

FEG = 53° Angles in a triangle add to 180°

53 °

(Total for question 6 is 3 marks)

7



AB and *CD* are parallel.

Find the size of angle *x*.
Give a reason for each stage of your working.

$180 - 120 = 60$

$AFE = 60°$ Co interior angles add to $180°$

$EFG = 180 - 48 - 35 = 97°$

Angles in a triangle add to $180°$

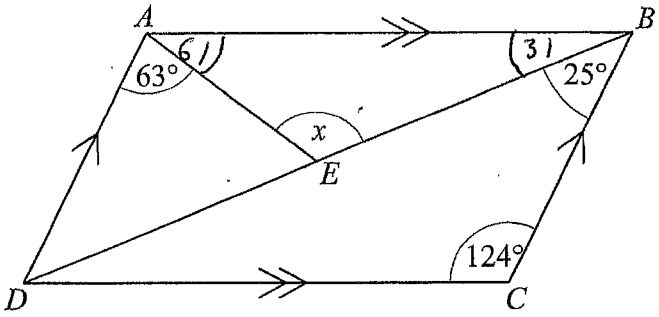
$180 - 97 - 60 = 23°$

$x = 23°$ Angles on a straight line add to $180°$

.....23.....°

(Total for question 7 is 4 marks)

8



ABCD is a parallelogram.

Angle *DAE* = 63°
Angle *BCD* = 124°
Angle *CBD* = 25°

Calculate the size of angle *x*.
Give reasons for each stage of your answer.

opposite angles in a parallelogram are equal

$\therefore$ BAD = 124°

BAE = 124 − 63 = 61°

ABC = 180 − 124 = 56° Co interior angles add to 180°

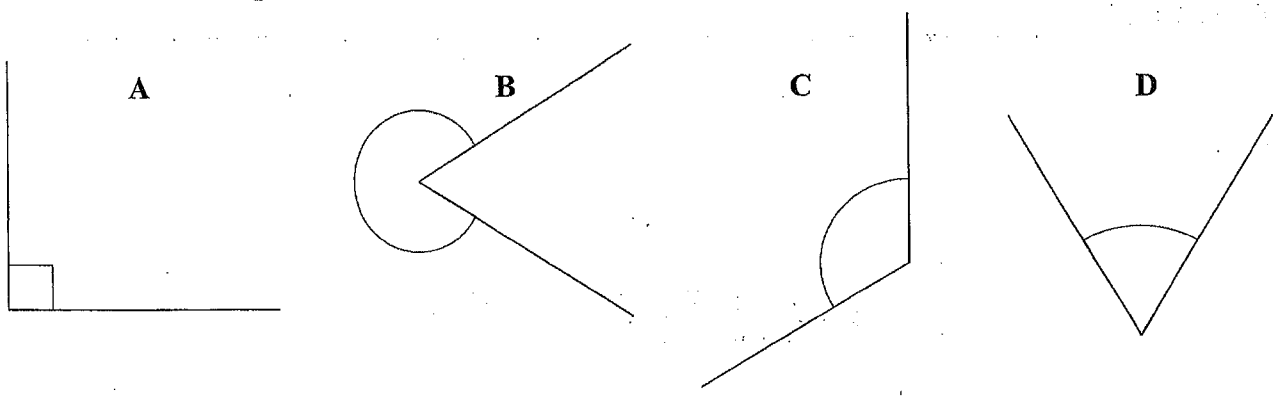
ABE = 56 − 25 = 31°

180 − 61 − 31 = 88° Angles in a triangle add to 180°

88 °

(Total for question 8 is 3 marks)

1 Here are four angles A, B , C and D.



(a) Measure the size of angle C.

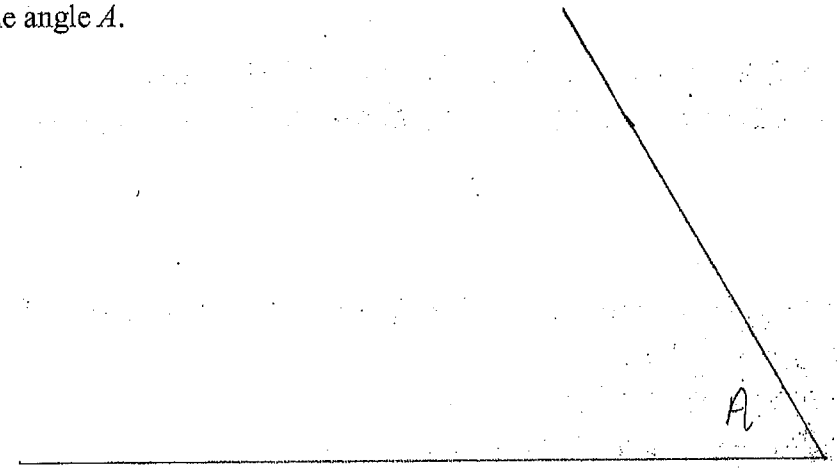
120 °

(b) Match the angle mathematical name to the angle.

Mathematical Name	Angle
Acute Angle	D
Obtuse Angle	C
Right Angle	A
Reflex Angle	B

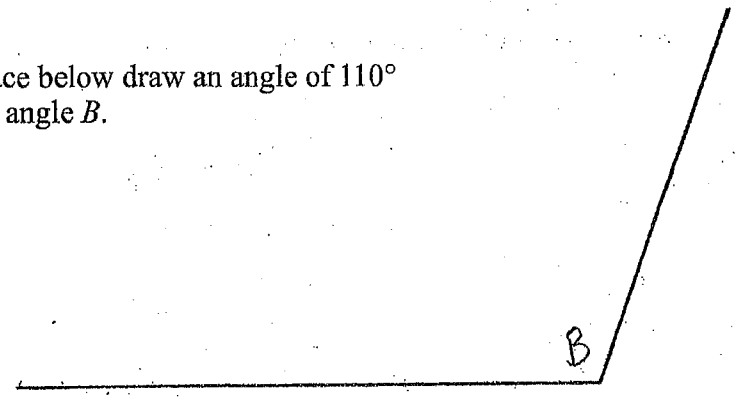
(Total for question 7 is 3 marks)

2 In the space below draw an angle of 60°
Label the angle *A*.



(Total for question 2 is 1 mark)

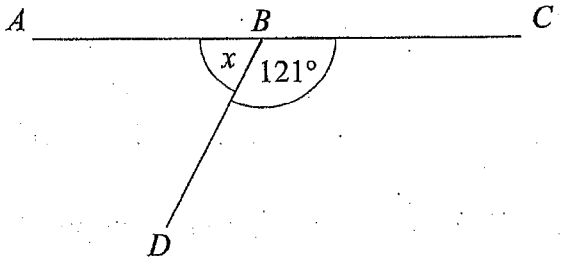
3 In the space below draw an angle of 110°
Label the angle B.



(Total for question 3 is 1 mark)

Diagrams are NOT accurately drawn, unless otherwise indicated.

4 ABC is a straight line. Work out the size of the angle marked x.

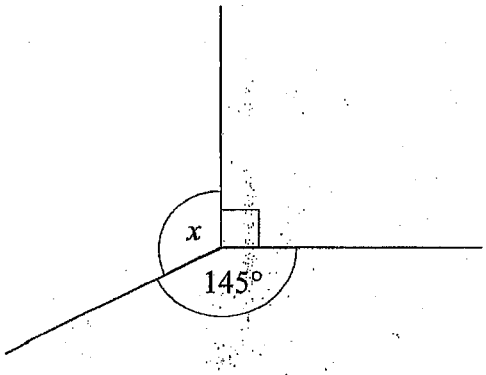


180 − 121

59 °

(Total for question 4 is 2 marks)

5 Work out the size of the angle marked x.



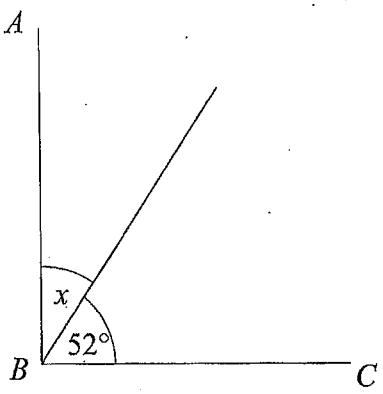
90 + 145 = 235

360 − 235 = 125

125 °

(Total for question 5 is 2 marks)

6 *AB* and *BC* are perpendicular lines. Work out the size of the angle marked *x*.

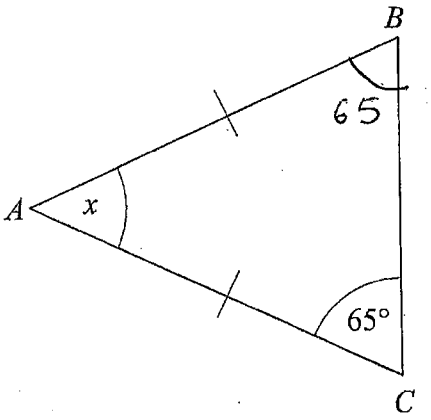


90 − 52

38 °

(Total for question 6 is 2 marks)

7 *ABC* is an isosceles triangle Work out the size of the angle marked *x*.



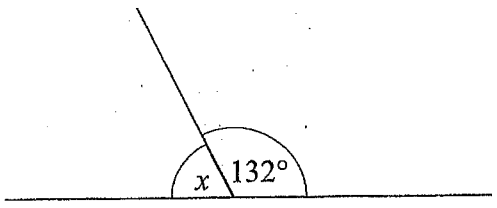
65 + 65 = 130

180 − 130 = 50

50 °

(Total for question 7 is 2 marks)

8



(a) Work out the size of the angle marked x.

180 − 132

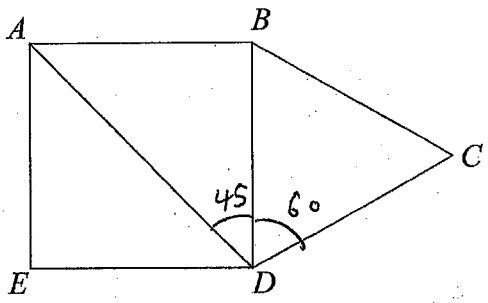
48 °

(b) Give a reason for your answer.

Angles on a straight line add to 180°

(Total for question 8 is 2 marks)

9 The diagram shows a square $ABDE$ and an equilateral triangle BCD.



(a) Write down the size of angle ABD

90 °

(b) Write down the size of angle BCD

(c) Find the size of angle ADC

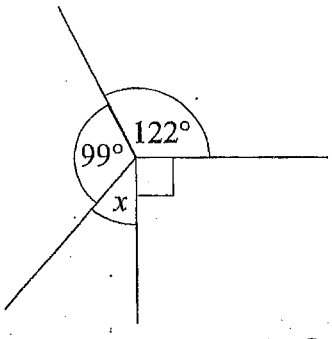
60 °

45 + 60

105 °

(Total for question 9 is 4 marks)

10



$99 + 122 = 221$

$221 + 90 = 311$

$360 - 311 = 49$

(a) Work out the size of the angle marked x.

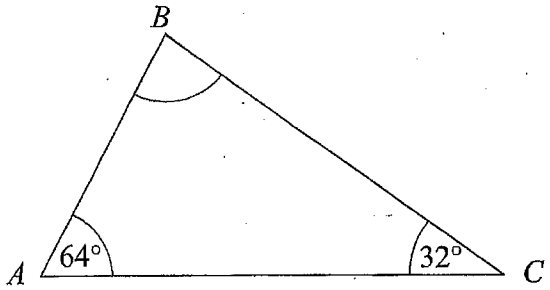
49 °

(b) Give a reason for your answer.

Angles around a point add to 360°

(Total for question 10 is 2 marks)

11



$64 + 32 = 96$

$180 - 96 = 84$

(a) Work out the size of the angle ABC.

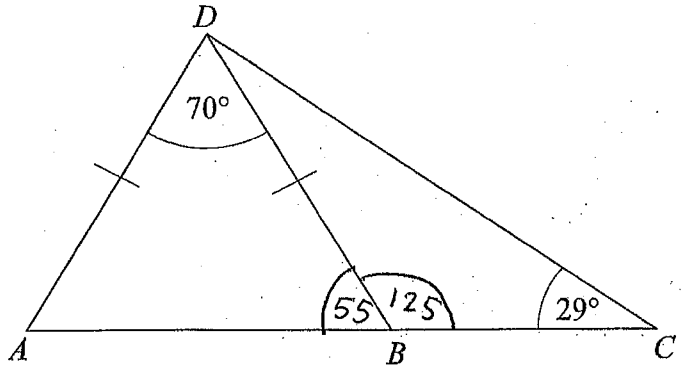
84 °

(b) Give a reason for your answer.

Angles in a triangle add to 180°

(Total for question 11 is 2 marks)

12 *ABC* is a straight line. Work out the size of the angle *BDC*.



180 − 70 = 110

$\frac{110}{2} = 55$

180 − 55 = 125

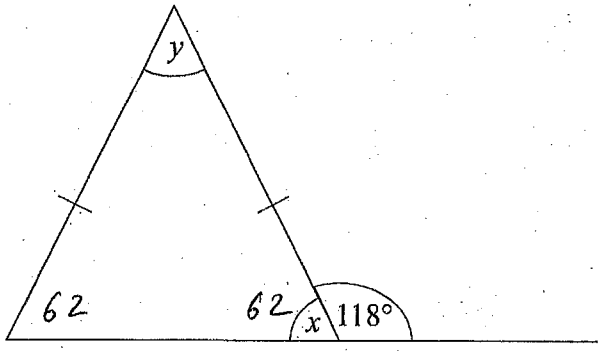
125 + 29 = 154

180 − 154 = 26

26 °

(Total for question 12 is 4 marks)

13



(a) Work out the size of the angle marked *x*.

180 − 118

62 °

(b) Work out the size of the angle marked *y*.

62 + 62 = 124

180 − 124

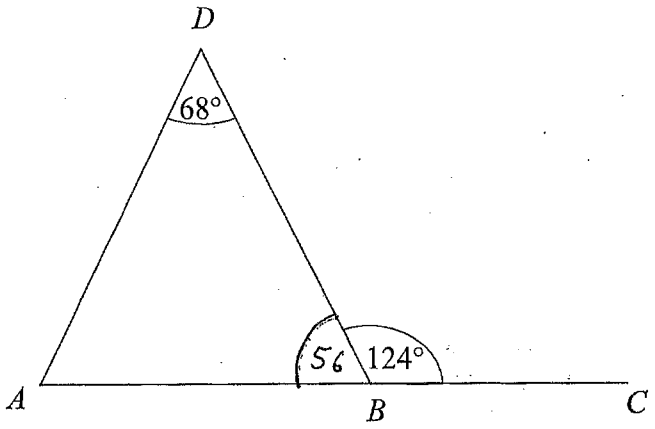
56 °

(c) Give a reason for your answer.

Angles at the base of an isosceles triangle are equal AND angles in a triangle add to 180°

(Total for question 13 is 3 marks)

14 *ABC* is a straight line.



180 − 124 = 56

Show that *ABD* is an isosceles triangle

ABD = 56° Angles on a straight line add to 180°

56 + 68 = 124

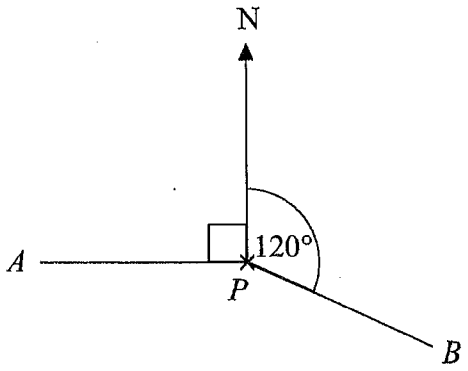
180 − 124 = 56

DAB = 56° Angles in a triangle add to 180°

Two angles equal ∴ isosceles triangle

(Total for question 14 is 4 marks)

1



(a) Write down the bearing of B from P.

120 °

(1)

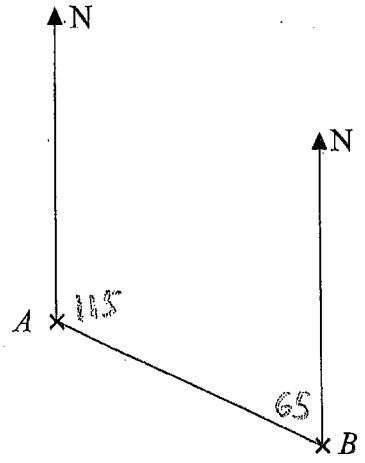
(b) Work out the bearing of A from P.

270 °

(1)

(Total for Question 1 is 2 marks)

2



(a) Measure the bearing of B from A.

115 °

(1)

(b) Measure the bearing of A from B.

360 − 65

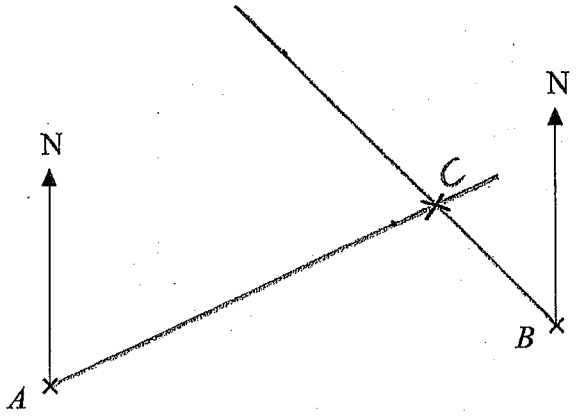
295 °

(1)

(Total for Question 2 is 2 marks)

3 The accurate scale drawing shows the positions of boat A and boat B.

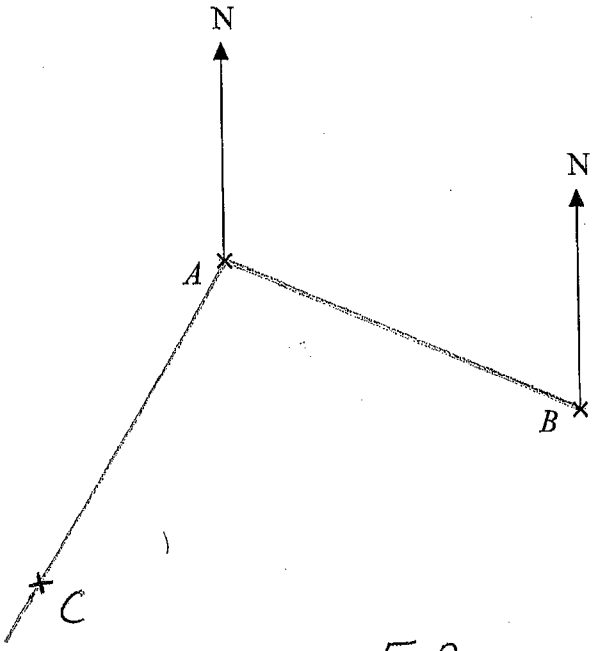
Boat C is on a bearing of 065° from A.
Boat C is on a bearing of 315° from B.



On the diagram, mark with a cross (×) the position of boat C on the diagram.

(Total for Question 3 is 2 marks)

4 The accurate scale drawing shows the positions of boat A and boat B.



Scale
2 cm represents 1 km

(a) Find the distance from A to B.

5.2 cm

5.2 ÷ 2 = 2.6

2.6 km

(1)

(b) Measure the bearing of B from A.

113 °

(1)

Another boat C is 2.5 km from A on a bearing of 210°

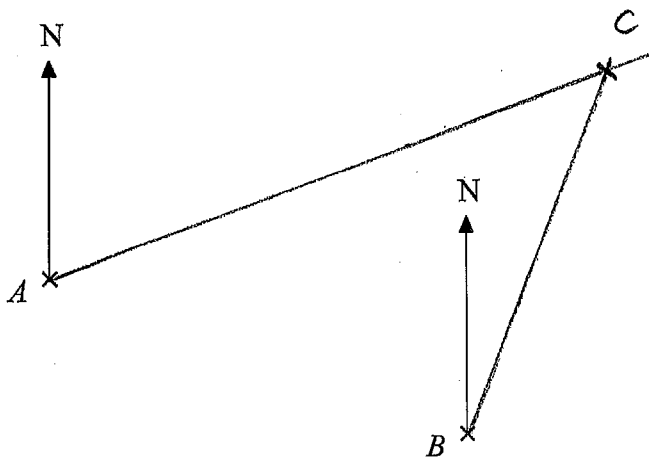
(c) On the diagram, mark the position of boat C with a cross (×). **(2)**

2.5km = 5cm

(Total for Question 4 is 4 marks)

5 The accurate scale drawing shows the positions of point A and point B.

Point C is 8 cm from point A on a bearing of 070°



(a) Find the distance from B to C.

5.2cm

5.2 cm

(2)

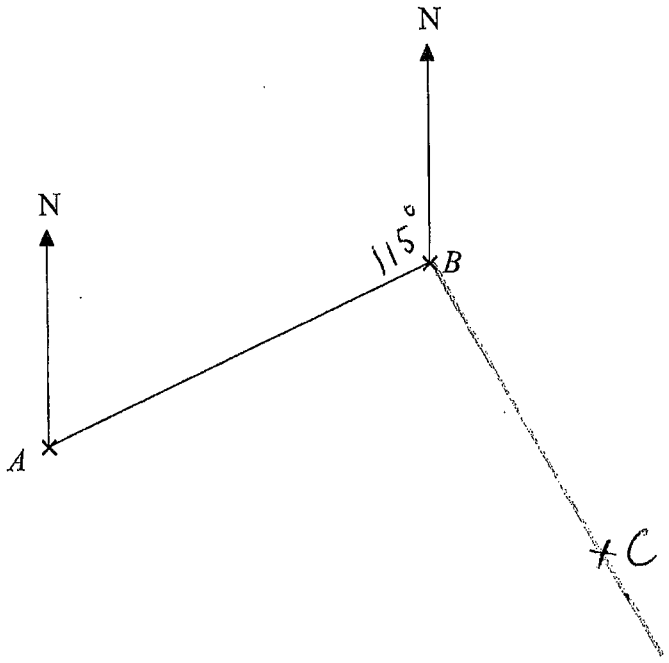
(b) Find the bearing of C from B.

022 °

(2)

(Total for Question 5 is 4 marks)

6 The accurate scale drawing shows the positions of point A and point B.
1 cm represents 100 m.



(a) Find the bearing of A from B.

360 − 115

245 °

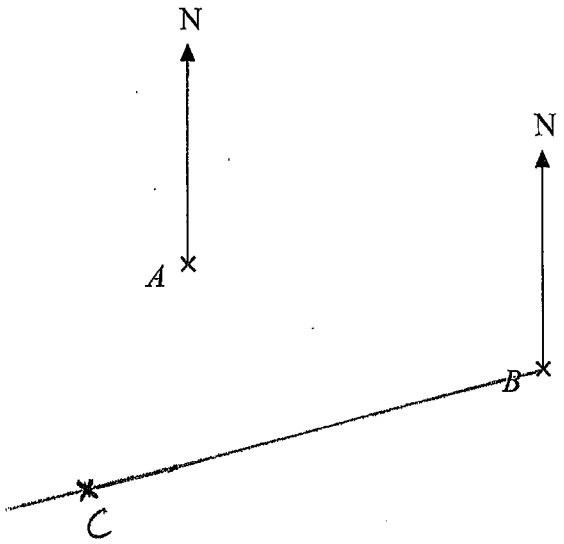
(1)

Point C is 450 m from B on a bearing of 150°

(b) Draw point C, with a cross (×), on the diagram. **(2)**

(Total for Question 6 is 3 marks)

7 The accurate scale drawing shows the positions of two towns, town A and town B.
2 cm represents 1 km.



(a) Find the real distance between town A and town B.

5cm = 2.5km

2.5 km

(1)

Town C is 3.2 km from B on a bearing of 255°

(b) Draw the position of town C, with a cross (×), on the diagram. **(2)**

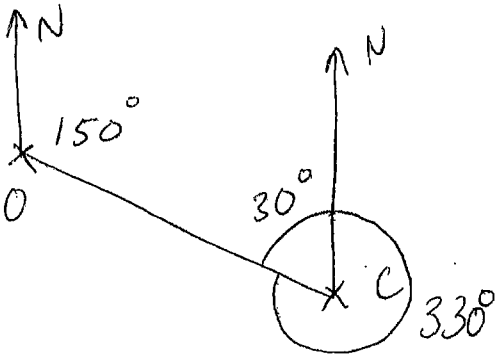
3.2km = 6.4 cm

360 − 255 = 105

(Total for Question 7 is 3 marks)

8 Oxford is on a bearing of 330° from Cambridge.

Find the bearing of Cambridge from Oxford.



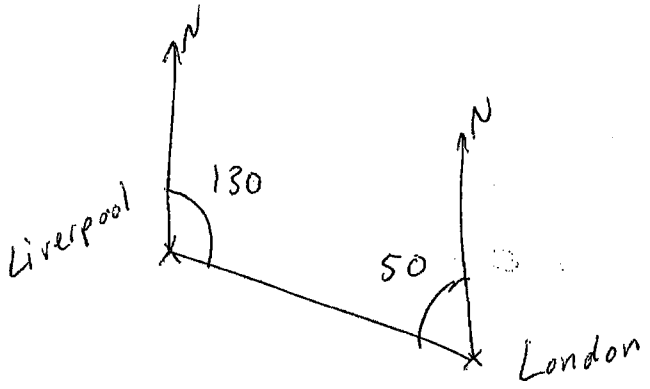
180 − 30 = 150°

150 °

(Total for Question 8 is 2 marks)

9 The bearing of London from Liverpool is 130°

Find the bearing of Liverpool from London.

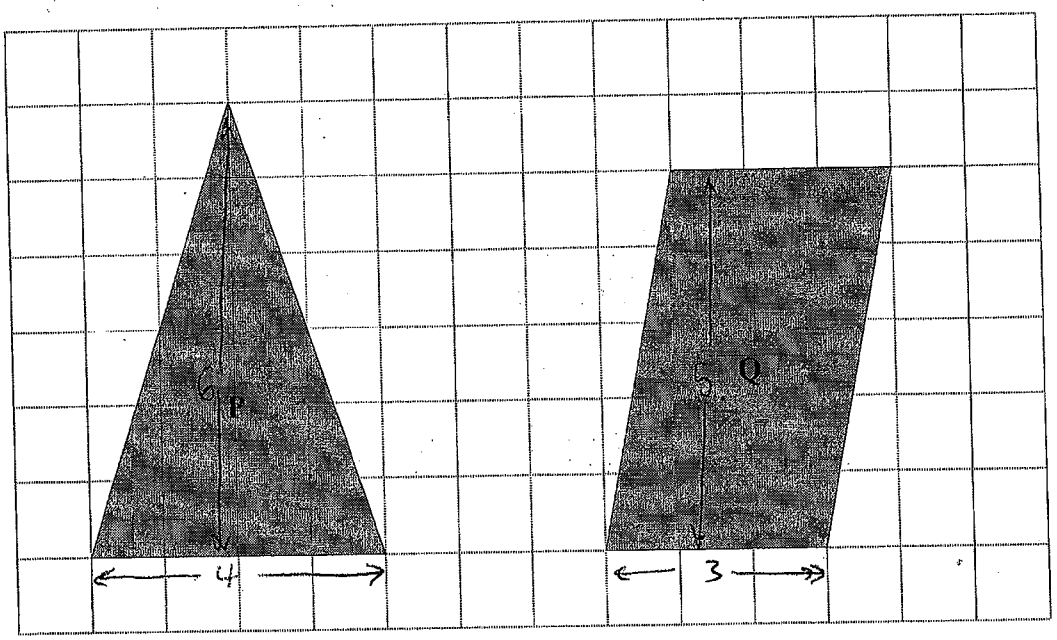


360 − 50 = 310°

310 °

(Total for Question 9 is 2 marks)

1 The diagram shows two shapes on a centimetre grid.



(a) Find the area of shape **P**

$\frac{\text{base} \times \text{height}}{2}$ $\frac{4 \times 6}{2} = 12\ \text{cm}^2$

12 cm^2

(b) Write down the mathematical name for shape **Q**.

parallelogram

(c) Find the area of shape **Q**.

base × height

$3 \times 5 = 15\ \text{cm}^2$

15 cm^2

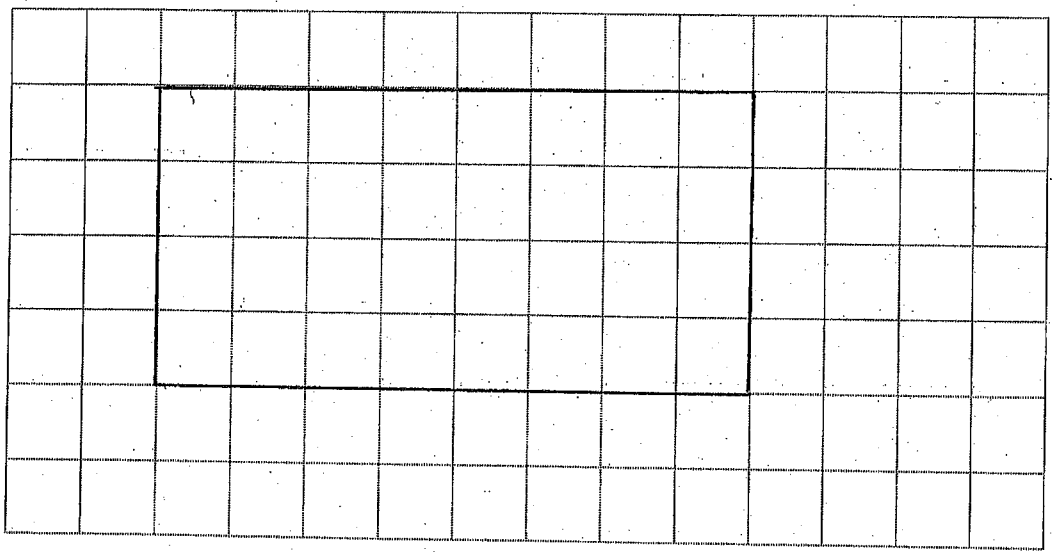
(Total for question 1 is 3 marks)

2 The length of a rectangle is two times the width of the rectangle.
The perimeter of the rectangle is 24 cm.

Draw the rectangle on the centimetre grid.

width	length	perimeter
2	4	12
3	6	18
4	8	24 ✓

4 x 8



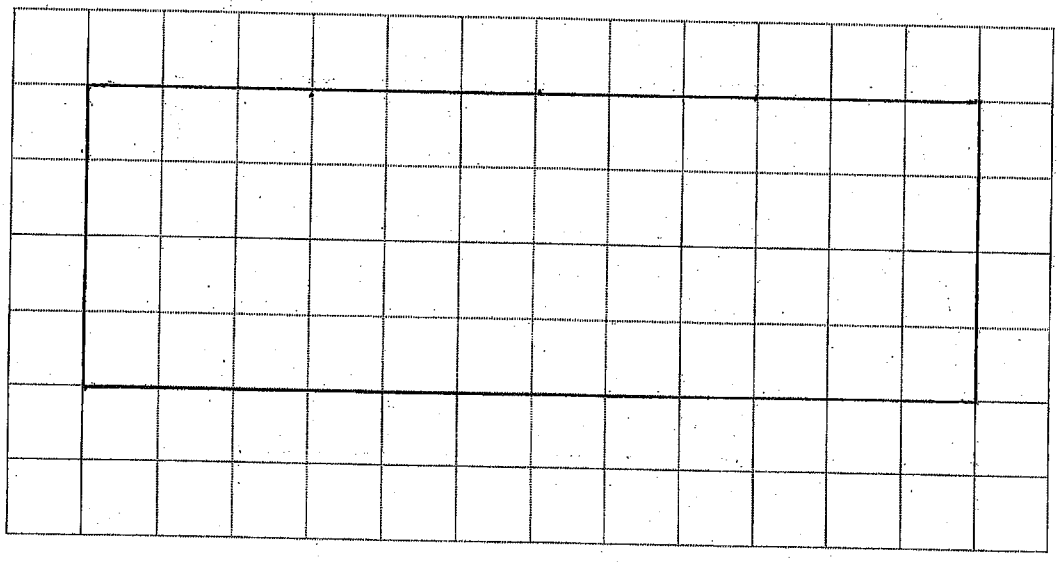
(Total for question 2 is 2 marks)

3 The length of a rectangle is three times the width of the rectangle.
The area of the rectangle is 48 cm^2.

Draw the rectangle on the centimetre grid.

width	length	area
2	6	12
3	9	27
4	12	48 ✓

4 x 12



(Total for question 3 is 2 marks)

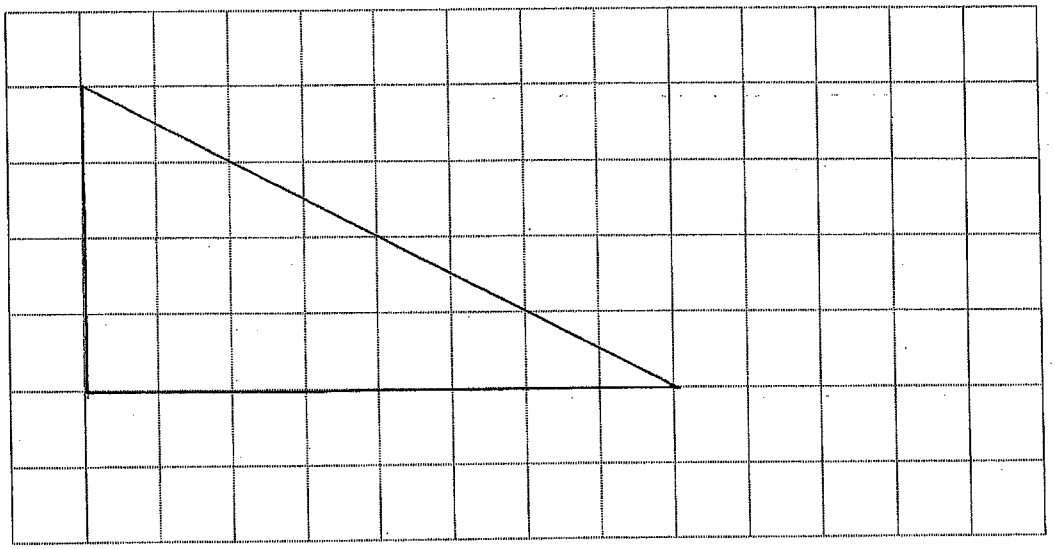
4 The base of a triangle twice the height of the triangle.
The area of a triangle is 16 cm^2.

Draw the triangle on the centimetre grid.

$\frac{\text{base} \times \text{height}}{2} = 16$

$\text{base} \times \text{height} = 32$

height	base	base x height ~~area~~
2	4	8
3	6	18
4	8	32 ✓

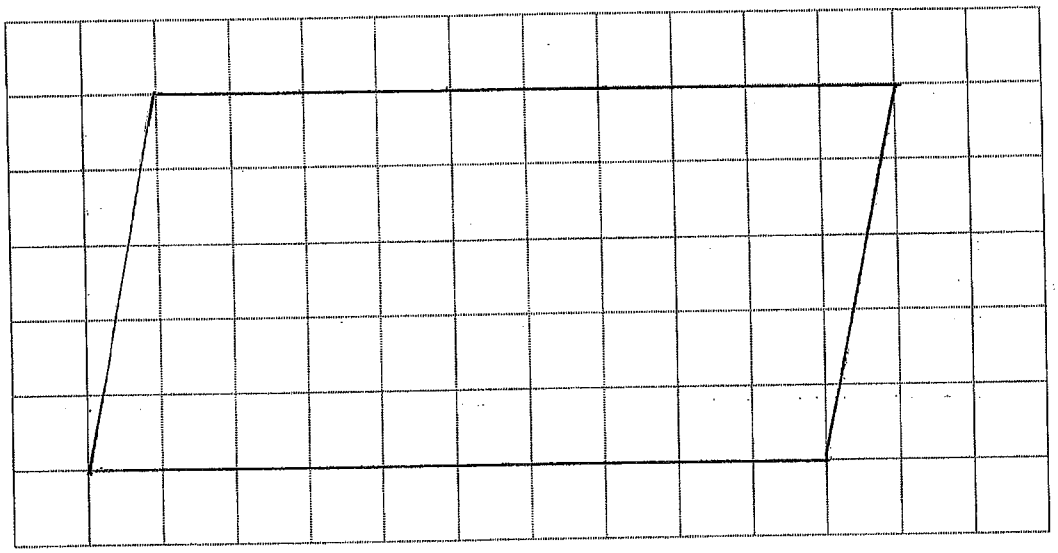


(Total for question 4 is 2 marks)

5 The base of a parallelogram twice the perpendicular height of the parallelogram.
The area of the parallelogram is 50 cm^2.

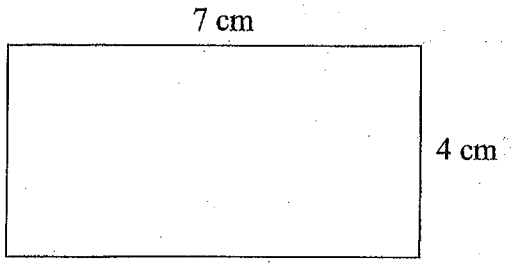
Draw the parallelogram on the centimetre grid.

base	height	area
6	3	18
8	4	32
10	5	50 ✓

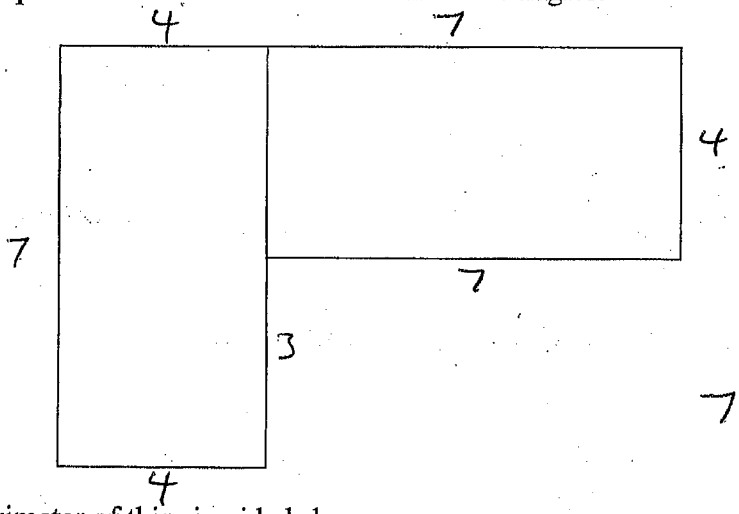


(Total for question 5 is 2 marks)

6 Here is a rectangle.



The six-sided shape below is made from two of these rectangles.



7 − 4 = 3

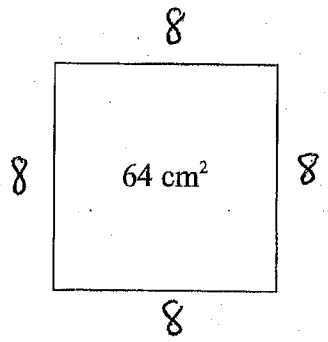
Work out the perimeter of this six-sided shape.

7 + 4 + 7 + 4 + 7 + 3 + 4

36 cm

(Total for question 6 is 3 marks)

7 A square has an area of 64 cm^2.



8 × 8 = 64

Find the perimeter of the square.

4 × 8 = 32

32 cm

(Total for question 7 is 2 marks)

8 A square has a perimeter of 36 cm.

Find the area of the square.

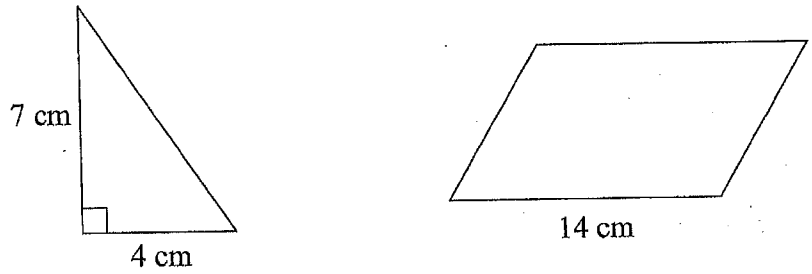
$\frac{36}{4} = 9$

$9 \times 9 = 81$

81 cm^2

(Total for question 8 is 2 marks)

9 The diagram shows a right angled triangle and a parallelogram.



The area of the parallelogram is four times the area of the triangle.

The perpendicular height of the parallelogram is h.

Find the value of h.

Area of triangle $= \frac{4 \times 7}{2} = 14\ cm^2$

$4 \times 14 = 56\ cm^2$

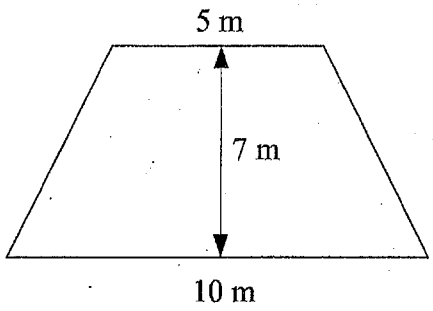
$14 \times h = 56$

$h = \frac{56}{14} = \frac{28}{7} = 4$

$h =$ 4

(Total for question 9 is 3 marks)

10 The diagram shows a garden is in the shape of a trapezium.



Find the area of the garden.

$\frac{1}{2}(a+b) \times h$

$\frac{1}{2}(5+10) \times 7$

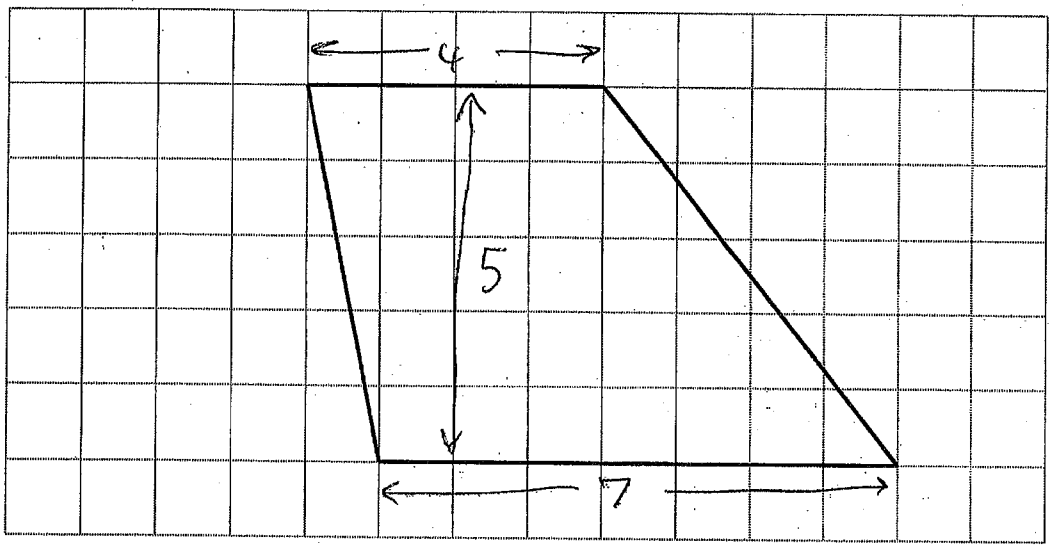
$\frac{1}{2}(15) \times 7$

7.5×7

52.5 m^2

(Total for question 10 is 3 marks)

11 Here is a trapezium drawn on a centimetre grid.



Find the area of the trapezium.

$\frac{1}{2}(4+7) \times 5$

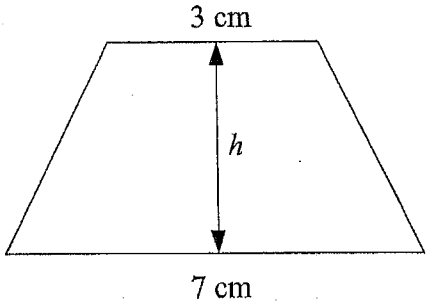
$\frac{1}{2}(11) \times 5$

5.5×5

27.5 cm^2

(Total for question 11 is 2 marks)

12 The diagram shows a trapezium with an area of 30 cm^2 and a perpendicular height h cm^2.



Find the value of h.

$\frac{1}{2}(3+7) \times h = 30$

$\frac{1}{2}(10) \times h = 30$

$5 \times h = 30$

$h = 6$

$h =$ 6 [cm]

(Total for question 12 is 2 marks)

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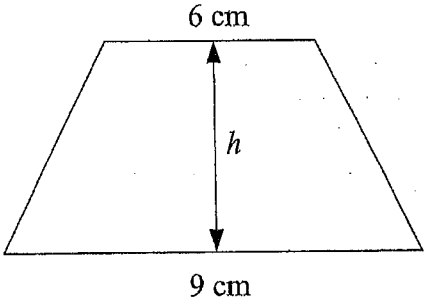
13 The diagram shows a trapezium with an area of 45 cm^2 and a perpendicular height h cm^2.



Find the value of h.

$\frac{1}{2}(6+9) \times h = 45$

$\frac{1}{2}(15) \times h = 45$

$7.5h = 45$

$h = \frac{45}{7.5} = 6$

$h =$ 6 [cm]

(Total for question 13 is 2 marks)

1.

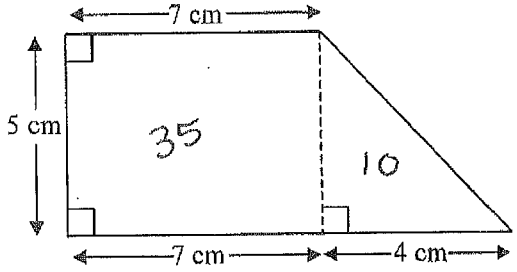


Diagram **NOT** accurately drawn

Work out the area of the shape.

$5 \times 7 = 35$

$\frac{1}{2} \times 4 \times 5 = 10$

45 ..... cm^2

(Total 3 marks)

2.

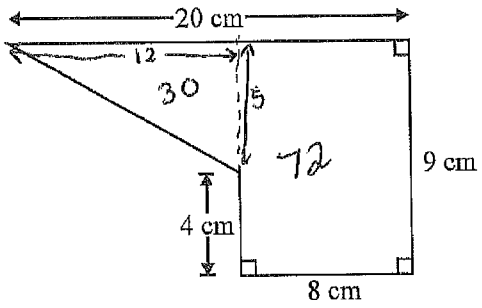


Diagram **NOT** accurately drawn

The diagram shows a shape.
Work out the area of the shape.

$8 \times 9 = 72$

$\frac{1}{2} \times 12 \times 5 = 30$

102 ..... cm^2

(Total 4 marks)

3. Here is a trapezium.

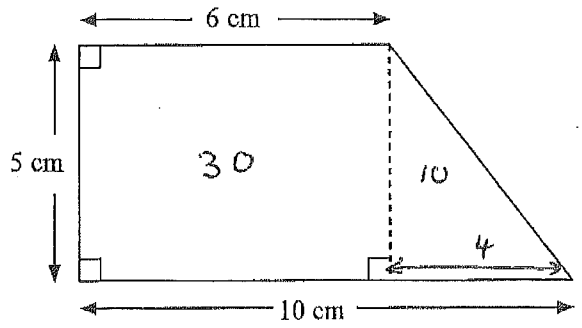


Diagram **NOT** accurately drawn

Work out the area of the trapezium.

$5 \times 6 = 30$

$\frac{1}{2} \times 4 \times 5 = 10$

40 ..... cm^2

(Total 2 marks)

4. The diagram shows a wall with a door in it.

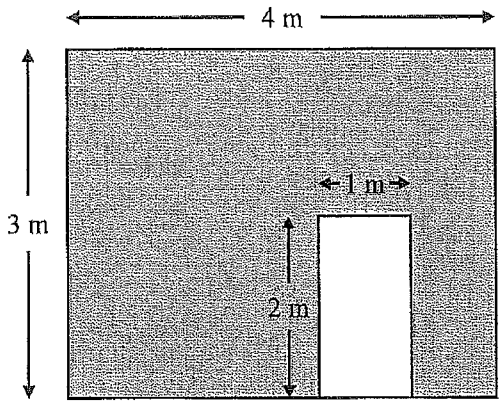


Diagram **NOT** accurately drawn

Work out the shaded area.

$3 \times 4 = 12$

$1 \times 2 = 2$

10 ..... m^2

(3)

(Total 3 marks)

5. The diagram shows a 6-sided shape made from a rectangle and a right-angled triangle.

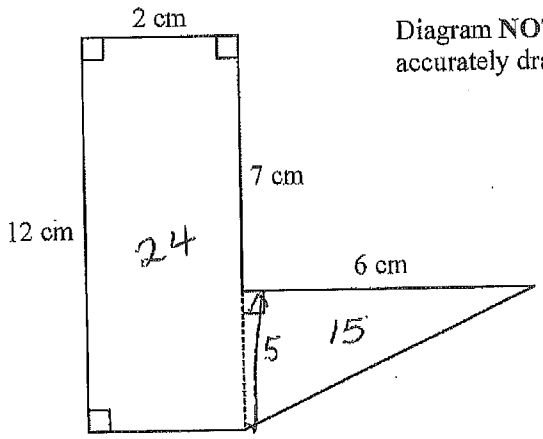


Diagram **NOT** accurately drawn

Work out the total area of the 6-sided shape.

$2 \times 12 = 24$

$\frac{1}{2} \times 6 \times 5 = 15$

39 .....cm^2

(Total 3 marks)

6.

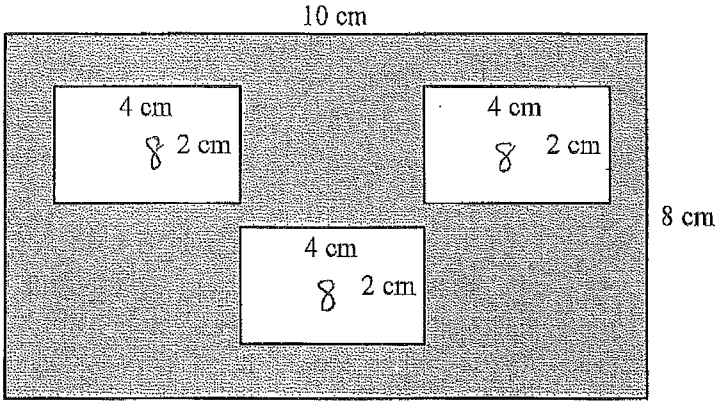


Diagram **NOT** accurately drawn

The diagram shows 3 small rectangles inside a large rectangle.
The large rectangle is 10 cm by 8 cm.
Each of the 3 small rectangles is 4 cm by 2 cm.

Work out the area of the region shown shaded in the diagram.

$10 \times 8 = 80$

$4 \times 2 = 8$

$80 - (3 \times 8)$

$80 - 24 = 56$

56 ..... cm^2

(Total 3 marks)

7.

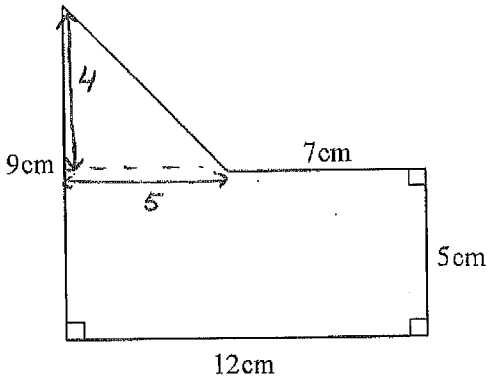


Diagram **NOT** accurately drawn

Work out the area of the shape.

$12 \times 5 = 60$

$\frac{1}{2} \times 4 \times 5 = 10$

.....70..... cm^2

(Total 4 marks)

8.

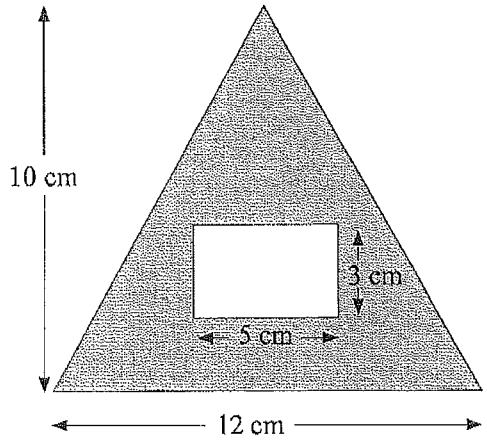


Diagram **NOT** accurately drawn

The diagram shows a rectangle inside a triangle.

The triangle has a base of 12 cm and a height of 10 cm.
The rectangle is 5 cm by 3 cm.

Work out the area of the region shown shaded in the diagram.

$\frac{1}{2} \times 12 \times 10 = 60$

$3 \times 5 = 15$

45 ..... cm^2

(Total 3 marks)

9.

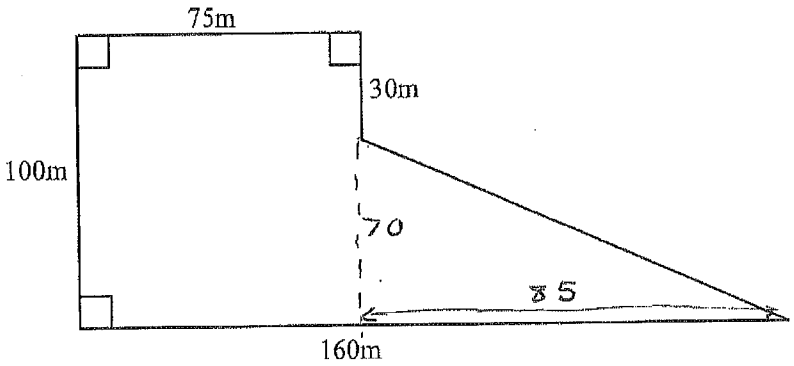


Diagram **NOT** accurately drawn

The diagram shows the plan of a field.
The farmer sells the field for £3 per square metre.

Work out the total amount of money the farmer should get.

$75 \times 100 = 7500$

$\frac{1}{2} \times 70 \times 85 = 2975$

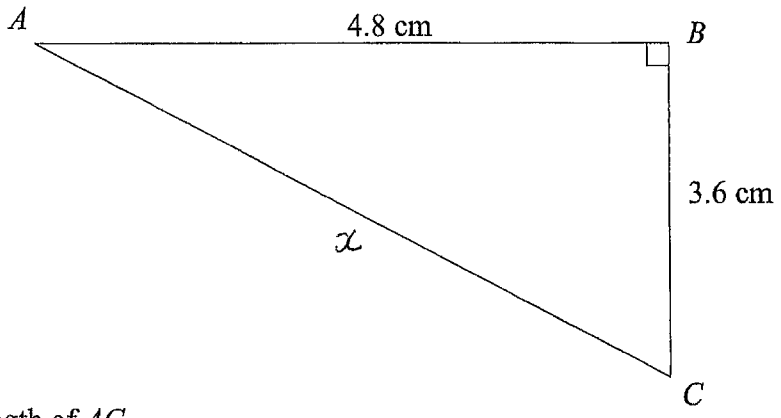
10475

10475×3

£ 31425

(Total 5 marks)

1



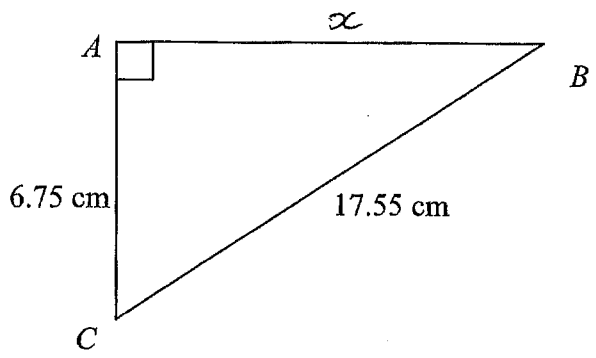
Calculate the length of AC.

$$3.6^2 + 4.8^2 = x^2$$
$$36 = x^2$$
$$x = \sqrt{36}$$
$$= 6$$

.....6.....cm

(Total for question 1 is 3 marks)

2



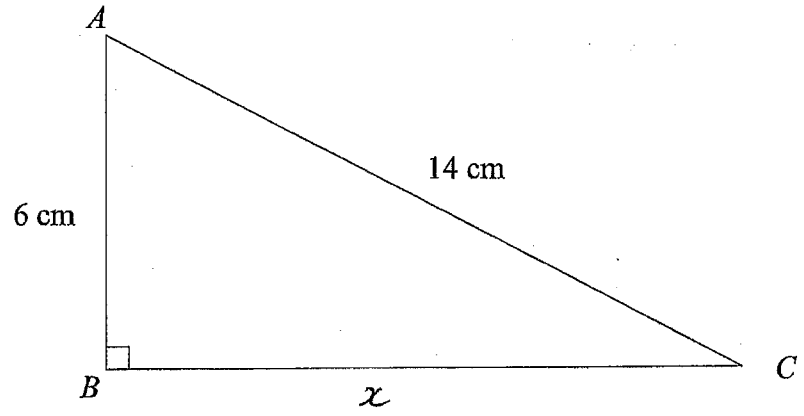
Calculate the length of ~~BC~~ AB.

$$x^2 + 6.75^2 = 17.55^2$$
$$x^2 = 17.55^2 - 6.75^2$$
$$x^2 = 262.44$$
$$x = \sqrt{262.44}$$
$$= 16.2$$

.....16.2.....cm

(Total for question 2 is 3 marks)

3



Calculate the length of *BC*.
Give your answer to 1 decimal place.

$x^2 + 6^2 = 14^2$

$x^2 = 14^2 - 6^2$

$x^2 = 160$

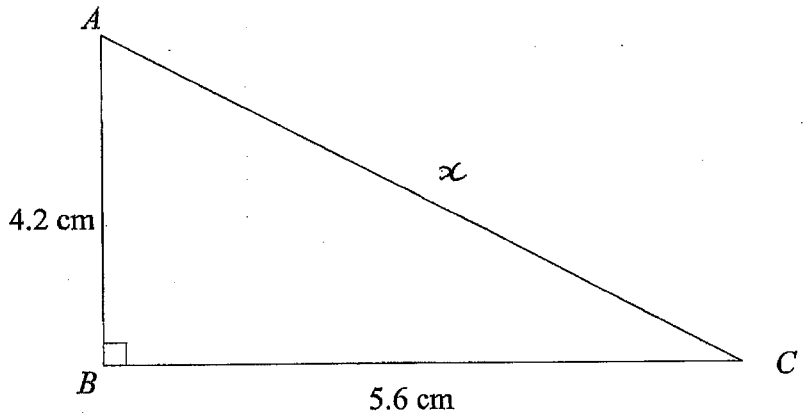
$x = \sqrt{160}$

$= 12.6$ (1dp)

12.6 ..... cm

(Total for question 3 is 3 marks)

4



Calculate the length of *AC*.

$4.2^2 + 5.6^2 = x^2$

$49 = x^2$

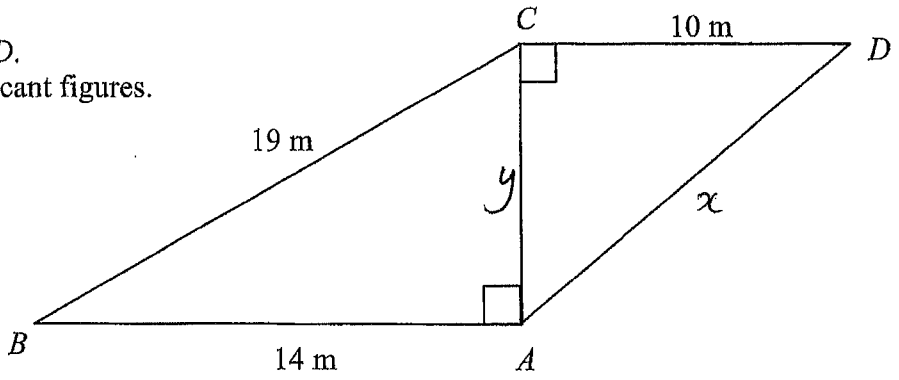
$x = \sqrt{49}$

$= 7$

7 ..... cm

(Total for question 4 is 3 marks)

5 Calculate the length of the *AD*.
Give your answer to 3 significant figures.



$14^2 + y^2 = 19^2$

$y^2 = 19^2 - 14^2$

$y^2 = 165$

$y = \sqrt{165}$

$= 12.84523...$

$10^2 + "12.84523"^2 = x^2$

$265 = x^2$

$x = \sqrt{265}$

$= 16.3$ (3sf)

16.3 .....m

(Total for question 5 is 4 marks)

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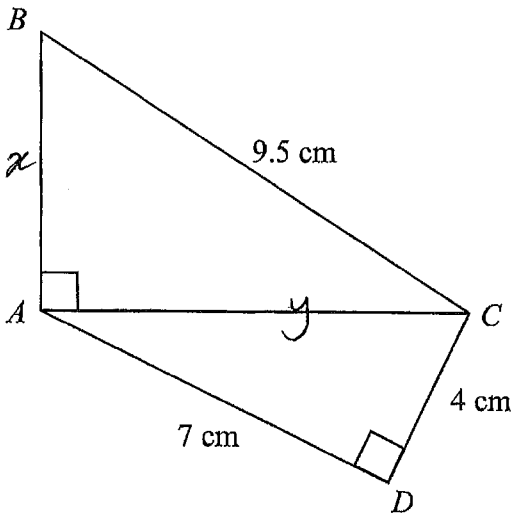
6 Calculate the length of the *AB*.
Give your answer to 3 significant figures.



$4^2 + 7^2 = y^2$

$65 = y^2$

$x^2 + y^2 = 9.5^2$

$x^2 + 65 = 9.5^2$

$x^2 = 9.5^2 - 65$

$x^2 = 25.25$

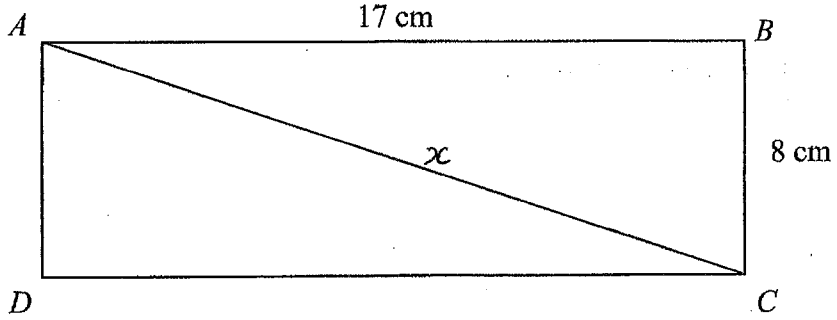
$x = \sqrt{25.25}$

$= 5.02$ (3sf)

5.02 .....cm

(Total for question 5 is 4 marks)

7



ABCD is a rectangle .
Calculate the length of the diagonal *AC*.

Give your answer correct to 1 decimal place.

$8^2 + 17^2 = x^2$

$353 = x^2$

$x = \sqrt{353}$

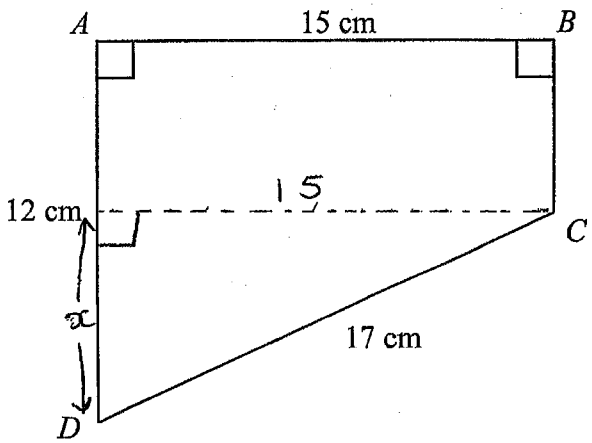
$x = 18.8$ (1dp)

18.8 cm

(Total for question 7 is 3 marks)

8 *ABCD* is a trapezium.

Calculate the length of *BC*.



$x^2 + 15^2 = 17^2$

$x^2 = 17^2 - 15^2$

$x^2 = 64$

$x = \sqrt{64}$

$= 8$

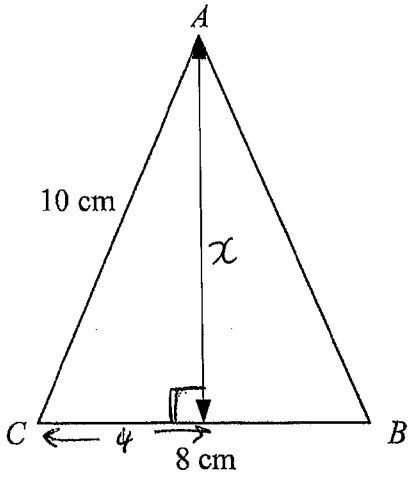
BC = 12 − 8 = 4

4 cm

(Total for question 8 is 3 marks)

9 *ABC* is an isosceles triangle.

Calculate the perpendicular height of *ABC*.
Give your answer correct to 3 significant figures..



$x^2 + 4^2 = 10^2$

$x^2 = 10^2 - 4^2$

$x^2 = 84$

$x = \sqrt{84}$

$= 9.17$ (3sf)

9.17 .....cm

(Total for question 9 is 3 marks)

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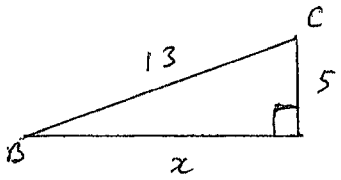
10 *ABCD* is a trapezium.

Calculate the length of *AC*.
Give your answer correct to 3 significant figures..



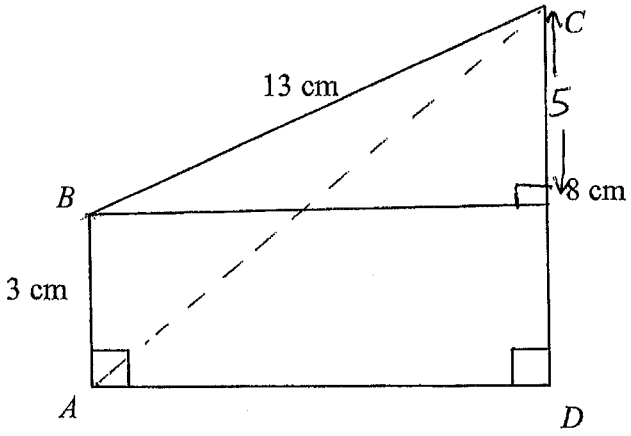
$x^2 + 5^2 = 13^2$

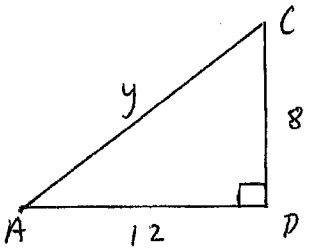
$x^2 = 13^2 - 5^2$

$x^2 = 144$

$x = \sqrt{144}$

$= 12$





$8^2 + 12^2 = y^2$

$y^2 = 208$

$y = \sqrt{208}$

$y = 14.4$

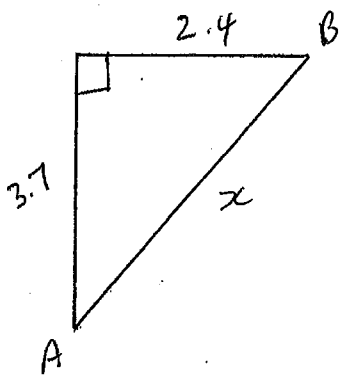
(3sf)

14.4 .....cm

(Total for question 10 is 4 marks)

11 A ship leaves point A and sails for 3.7 km due North.
The ship then sails for 2.4 km due East to reach point B.

Calculate the the shortest distance between point A and point B.
Give your answer correct to 1 decimal place.



$2.4^2 + 3.7^2 = x^2$

$x^2 = 19.45$

$x = \sqrt{19.45}$

$= 4.4$ km (1dp)

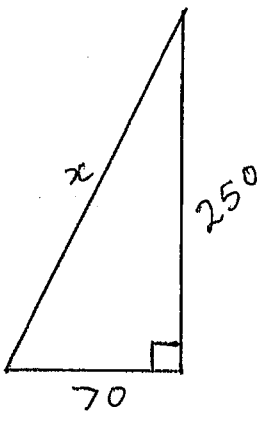
4.4 km

(Total for question 11 is 3 marks)

250cm

12 A ladder reaches 2.5 m up a vertical wall.
The base of the ladder is 70 cm from the base of the wall on a horizontal ground.

Find the length of the ladder.



$70^2 + 250^2 = x^2$

$67400 = x^2$

$x^2 = 67400$

$x = \sqrt{67400}$

$= 259.6150997$ cm

$= 260$ cm (nearest cm)

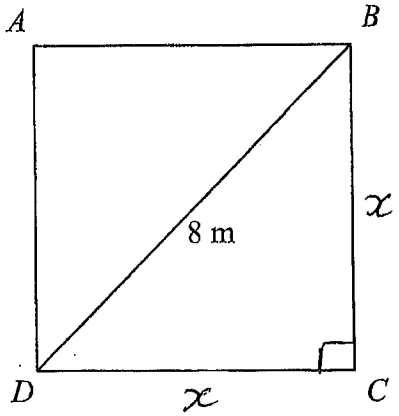
260 cm

(Total for question 12 is 4 marks)

or 2.6m

13 *ABCD* is a square.
The diagonal of the square is 8 m.

Calculate the perimeter of the square.
Give your answer correct to one decimal place.



$x^2 + x^2 = 8^2$

$2x^2 = 64$

$x^2 = 32$

$x = \sqrt{32}$

$= 5.656854249$ m

$4 \times 5.656... = 22.6$ m (1dp)

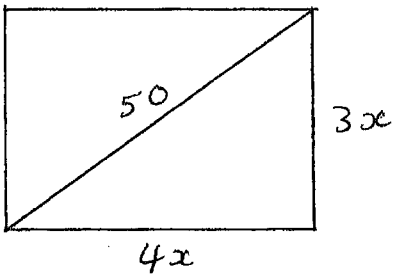
22.6 m

(Total for question 13 is 3 marks)

14 A television has a diagonal length of 50 inches.

The ratio of the length of the television to the width of the television is 4:3

Calculate the length and the width of the television.
Give your answers correct to 1 decimal place.



$(3x)^2 + (4x)^2 = 50^2$

$9x^2 + 16x^2 = 2500$

$25x^2 = 2500$

$x^2 = 100$

$x = 10$

$4 \times 10 = 40$

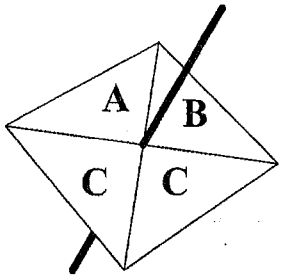
$3 \times 10 = 30$

Length 40 inches

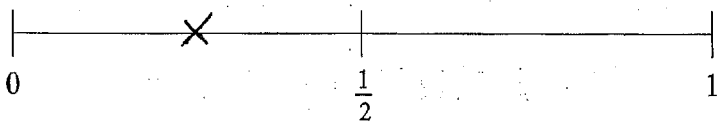
Width 30 inches

(Total for question 14 is 3 marks)

1 Stevie spins a fair 4-sided spinner.



(a) On the probability scale mark with a cross (X) the probability that the spinner lands on **A**.



(1)

(b) Write down the probability that the spinner lands on **C**.

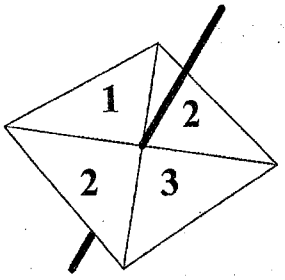
$\frac{2}{4}$ OR $\frac{1}{2}$ $\frac{1}{2}$

(1)

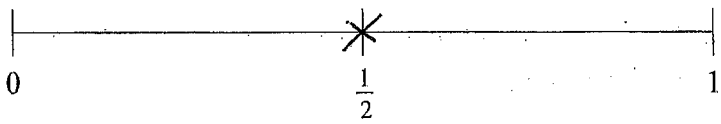
(Total for Question 1 is 2 marks)

---

2 Sophie spins a fair 4-sided spinner.



(a) On the probability scale mark with a cross (X) the probability that the spinner lands on 2.



(1)

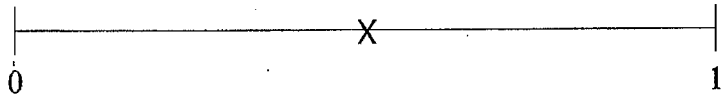
(b) Write down the probability that the spinner lands on **4**.

0

(1)

(Total for Question 2 is 2 marks)

3 The probability of an event is marked with a cross (X) on the probability scale.



Write down an estimate for the probability of the event.

$\frac{1}{2}$

(Total for Question 3 is 1 mark)

---

4 Here is a list of 8 numbers.

1 2 3 4 5 6 8 9

One of the numbers is chosen at random.

Write down the probability that this number is 9.

$\frac{1}{8}$

(Total for Question 4 is 1 mark)

---

5 There are 11 pens in a box.

5 pens are red.
4 pens are blue.
2 pens is green.

On pen is selected at random from the box.

(a) Write down the probability that pen is green.

$\frac{2}{11}$

(1)

(b) Write down the probability that pen is black.

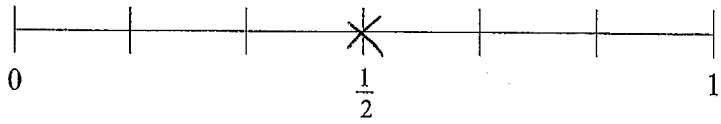
0

(1)

(Total for Question 5 is 2 marks)

6 An ordinary fair dice is thrown once.

(a) On the probability scale mark with a cross (X) the probability that the dice lands on an even number.



(1)

(b) Write down the probability that the dice lands on a number less than 3.

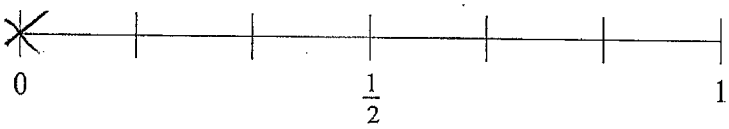
$\frac{2}{6}$ or $\frac{1}{3}$ $\frac{1}{3}$

(1)

(Total for Question 6 is 2 marks)

7 An ordinary fair dice is thrown once.

(a) On the probability scale mark with a cross (X) the probability that the dice lands on 10.



(1)

(b) Write down the probability that the dice lands on a number greater than 3.

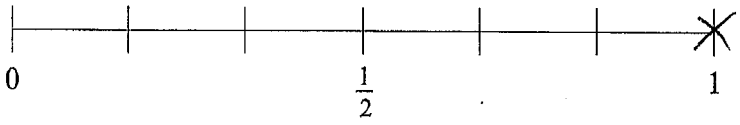
$\frac{3}{6}$ or $\frac{1}{2}$ $\frac{1}{2}$

(1)

(Total for Question 7 is 2 marks)

8 An ordinary fair dice is thrown once.

(a) On the probability scale mark with a cross (X) the probability that the dice lands on a number less than 7.



(1)

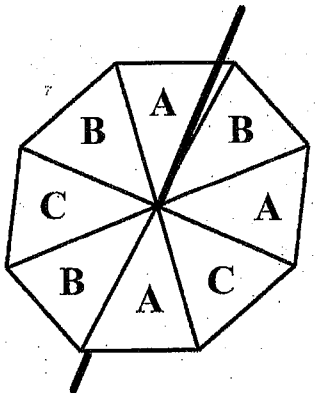
(b) Write down the probability that the dice lands on 5.

$\frac{1}{6}$

(1)

(Total for Question 8 is 2 marks)

9 Sam spins a fair 8-sided spinner.



Write down the probability that the spinner lands on **A**.

$\frac{3}{8}$

(Total for Question 9 is 1 mark)

---

10 Raphael buys one raffle ticket.

A total of 250 raffle tickets are sold.
One of these tickets will win the raffle.
Each ticket has an equal chance of winning the raffle.

(a) Write down the probability that Raphael's ticket will win the raffle.

$\frac{1}{250}$

(b) Write down the probability that Raphael's ticket will not win the raffle.

$\frac{249}{250}$

(Total for Question 10 is 2 marks)

---

11 The probability of Barry winning a Badminton match is $\frac{3}{8}$

Work out the probability that Barry does not win a Badminton match.

$\frac{5}{8}$

(Total for Question 11 is 1 marks)

---

12 The probability of Timmy winning a Tennis match is 0.7.

Work out the probability that Timmy does not win a Tennis match.

0.3

(Total for Question 12 is 1 marks)

13 There are 26 sweets in a bag.

15 of the sweets are red.
The rest of the sweets are white.

One of the sweets is taken at random.

Find the sweets that the ~~counter~~ sweet is red.

$\frac{15}{26}$

(Total for Question 13 is 2 marks)

---

14 There are 30 pens in a box.

12 of the pens are black.
7 of the pens are green.
The rest of the pens are red.

$12 + 7 = 19$

$30 - 19 = 11$

One of the pens is chosen at random.

Find the probability that the pen is red.

$\frac{11}{30}$

(Total for Question 14 is 2 marks)

---

15 There are 53 counters in a bag.

$53 - 15 = 38$

15 of the counters are red.
The rest of the counters are blue.

One of the counters is taken at random.

Find the probability that the counter is blue.

$\frac{38}{53}$

(Total for Question 15 is 2 marks)

---

16 A draw is being held to win a prize.

$350 - 17 = 333$

Bruce buys 17 tickets.
A total of 350 tickets are in the draw.

Find the probability that Bruce does **not** win the prize.

$\frac{333}{350}$

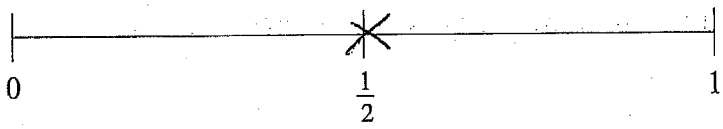
(Total for Question 16 is 2 marks)

17 There are 8 marbles in a bag.

4 marbles are red.
3 marbles are blue.
1 marble is green.

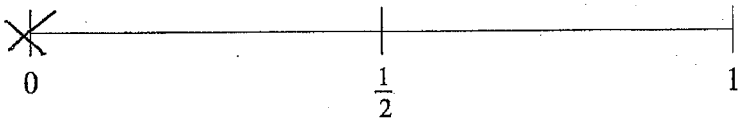
On marble is selected at random from the bag.

(a) On the probability scale mark with a cross (X) the probability that the marble is red.



(1)

(b) On the probability scale mark with a cross (X) the probability that the marble is yellow.



(1)

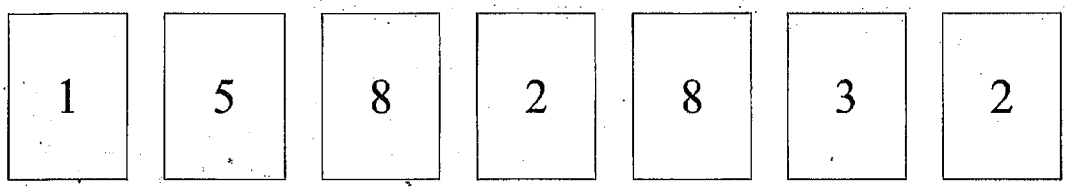
(c) Write down the probability that marble is blue.

3/8

(1)

(Total for Question 17 is 3 marks)

18 Here are some number cards.



One of the cards is selected at random.

(a) Write down the probability that card has the number 8 on it.

2/7

(1)

(b) Find the probability the card has an odd number on it.

3/7

(1)

(Total for Question 18 is 2 marks)

19 There are some counters in a bag.

The table shows the number of counters of each colour.

Colour	Red	Blue	Yellow	Green
Number of Counters	7	2	5	3

A counter is taken at random from the bag.

$7+2+5+3=17$

(a) Write down the probability that the counter is green.

$\frac{3}{17}$

(b) Write down the probability that the counter is not blue.

$\frac{15}{17}$

(1)

(Total for Question 19 is 2 marks)

---

20 In a box of chocolates there are

11 milk chocolates
5 dark chocolates
7 white chocolates

$11+5+7=23$

Charlie takes one of the chocolates ~~is taken~~ at random.

Write down the probability that Charlie takes a white chocolate.

$\frac{7}{23}$

(Total for Question 20 is 2 marks)

---

21 There are red counters, blue counters, yellow counters and green counters in a bag.

A counter is picked at random from the bag.

The table shows the probabilities that the counter will be red, will be blue and will be yellow.

Colour	Red	Blue	Yellow	Green
Probability	0.2	0.4	0.3	0.1

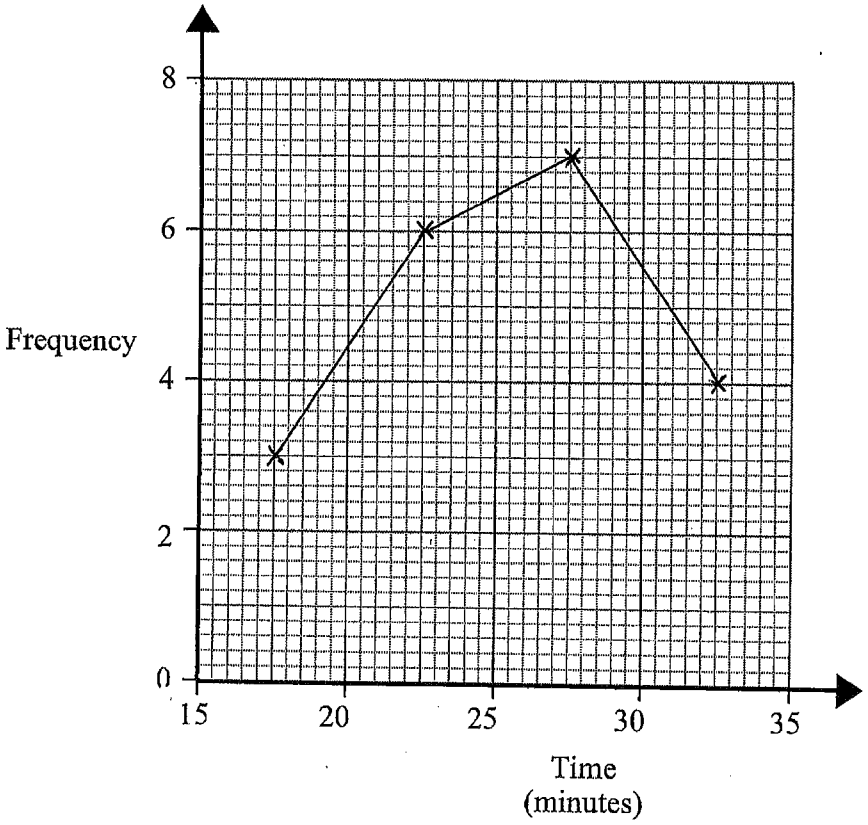
Complete the table to show the probability that the counter will be green.

(Total for Question 21 is 2 marks)

1 The table below gives information about the time taken for 20 people to run 5 km.

Time (minutes)	Frequency
$15 < t \leqslant 20$	3
$20 < t \leqslant 25$	6
$25 < t \leqslant 30$	7
$30 < t \leqslant 35$	4

Draw a frequency polygon to show this information.

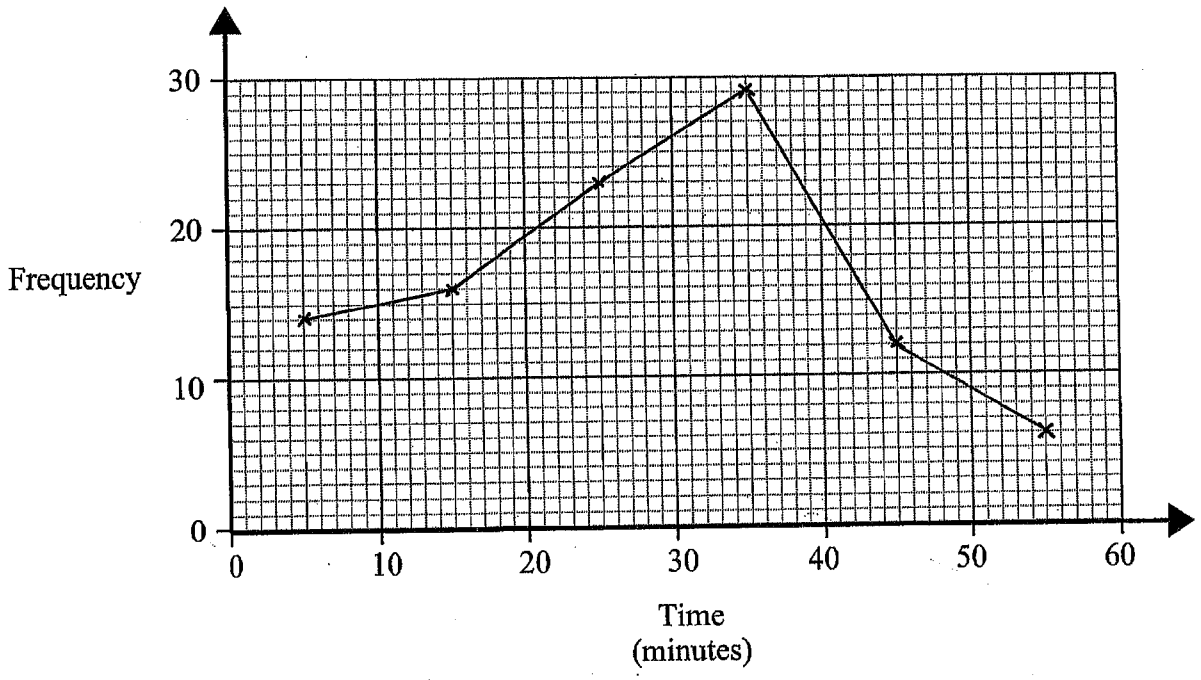


(Total for Question 1 is 2 marks)

2 The frequency table shows the time taken for 100 people to travel to an event.

Time (minutes)	Frequency
$0 < t \leqslant 10$	14
$10 < t \leqslant 20$	16
$20 < t \leqslant 30$	23
$30 < t \leqslant 40$	29
$40 < t \leqslant 50$	12
$50 < t \leqslant 60$	6

Draw a frequency polygon to show this information.

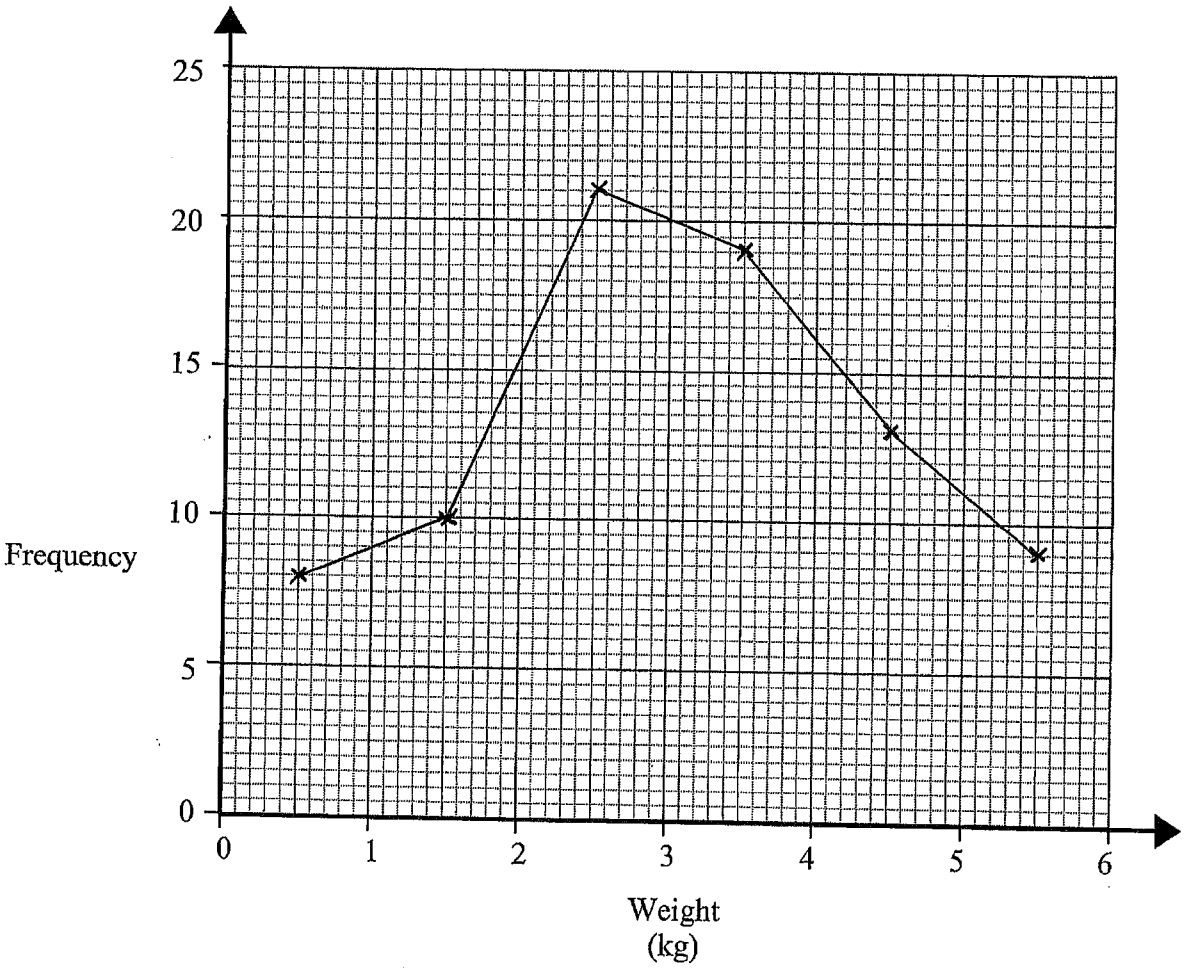


(Total for Question 2 is 2 marks)

3 The frequency table shows the weight, in kg, of some cats.

Weight (kg)	Frequency
$0 < w \leqslant 1$	8
$1 < w \leqslant 2$	10
$2 < w \leqslant 3$	21
$3 < w \leqslant 4$	19
$4 < w \leqslant 5$	13
$5 < w \leqslant 6$	9

Draw a frequency polygon to show this information.

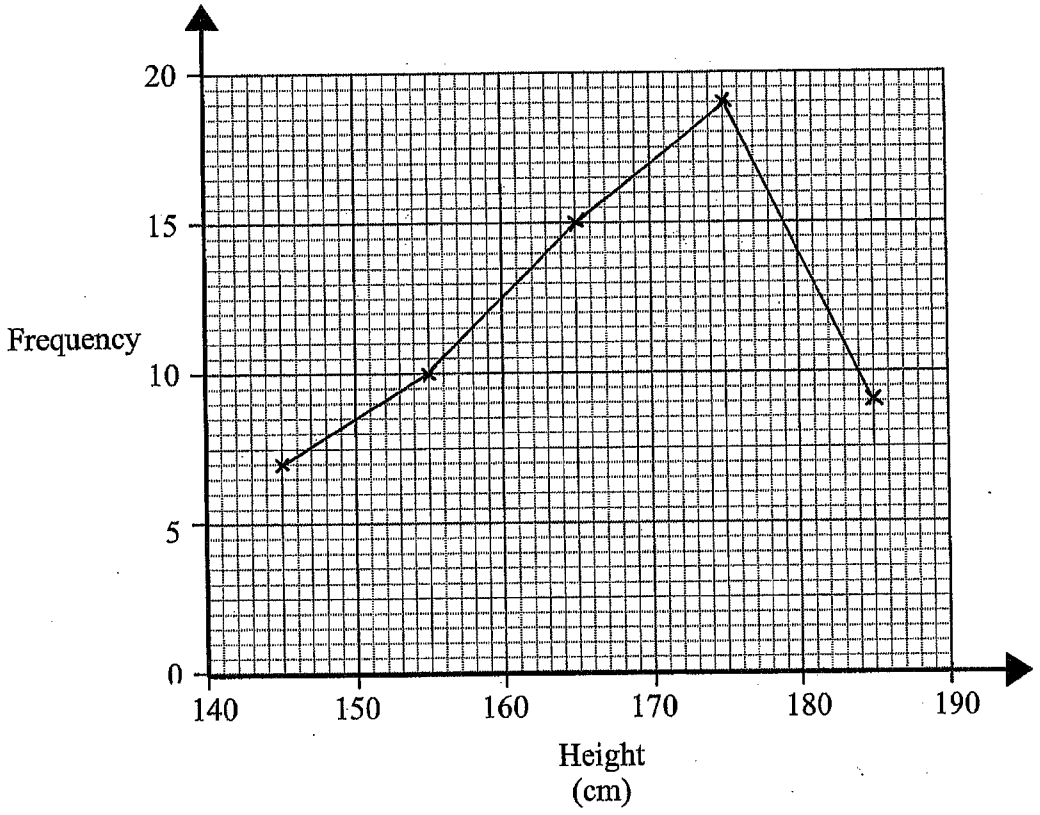


(Total for Question 3 is 2 marks)

4 The frequency table shows the heights, in cm, of some tomato plants.

Height (cm)	Frequency
$140 < h \leqslant 150$	7
$150 < h \leqslant 160$	10
$160 < h \leqslant 170$	15
$170 < h \leqslant 180$	19
$180 < h \leqslant 190$	9

Draw a frequency polygon to show this information.

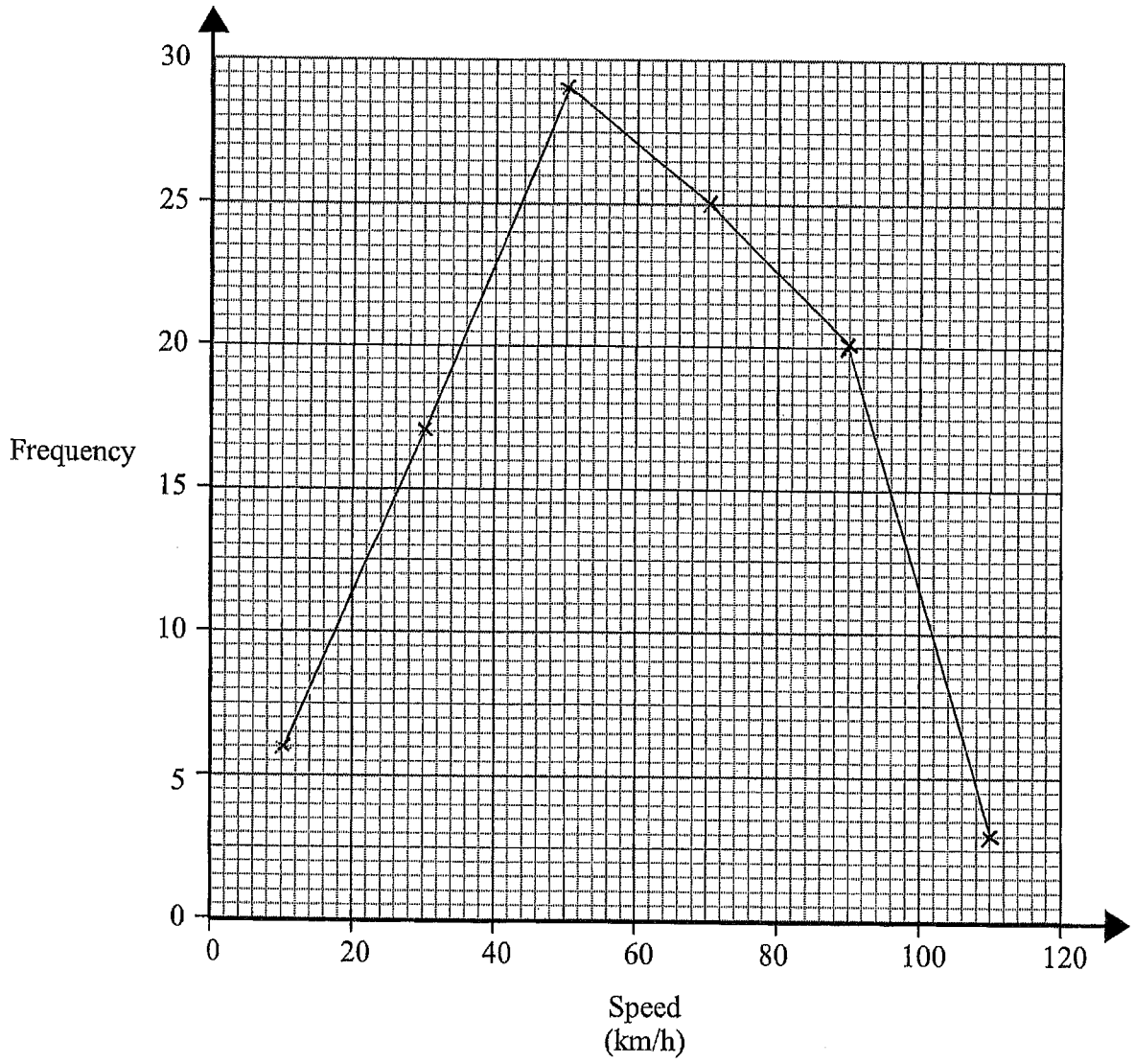


(Total for Question 4 is 2 marks)

5 The frequency table shows the speeds of 100 cars.

Speed (km/h)	Frequency
$0 < s \leqslant 20$	6
$20 < s \leqslant 40$	17
$40 < s \leqslant 60$	29
$60 < s \leqslant 80$	25
$80 < s \leqslant 100$	20
$100 < s \leqslant 120$	3

Draw a frequency polygon to show this information.

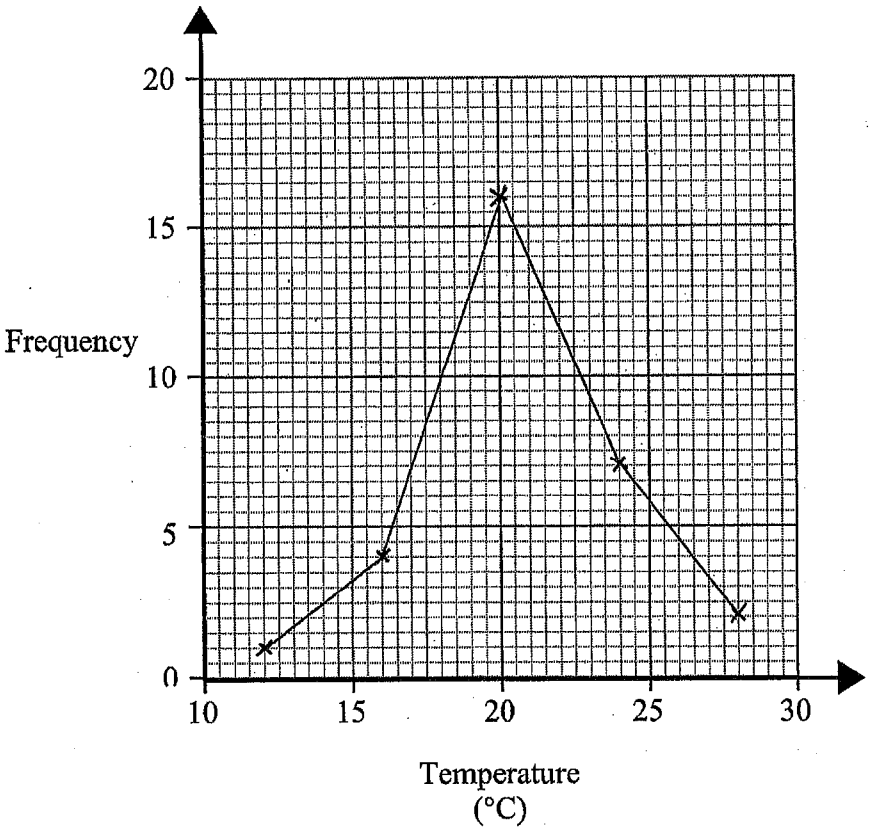


(Total for Question 5 is 2 marks)

6 The frequency table shows the temperature, in degrees, of 30 days.

Temperature (°C)	Frequency
$10 < t \leqslant 14$	1
$14 < t \leqslant 18$	4
$18 < t \leqslant 22$	16
$22 < t \leqslant 26$	7
$26 < t \leqslant 30$	2

Draw a frequency polygon to show this information.

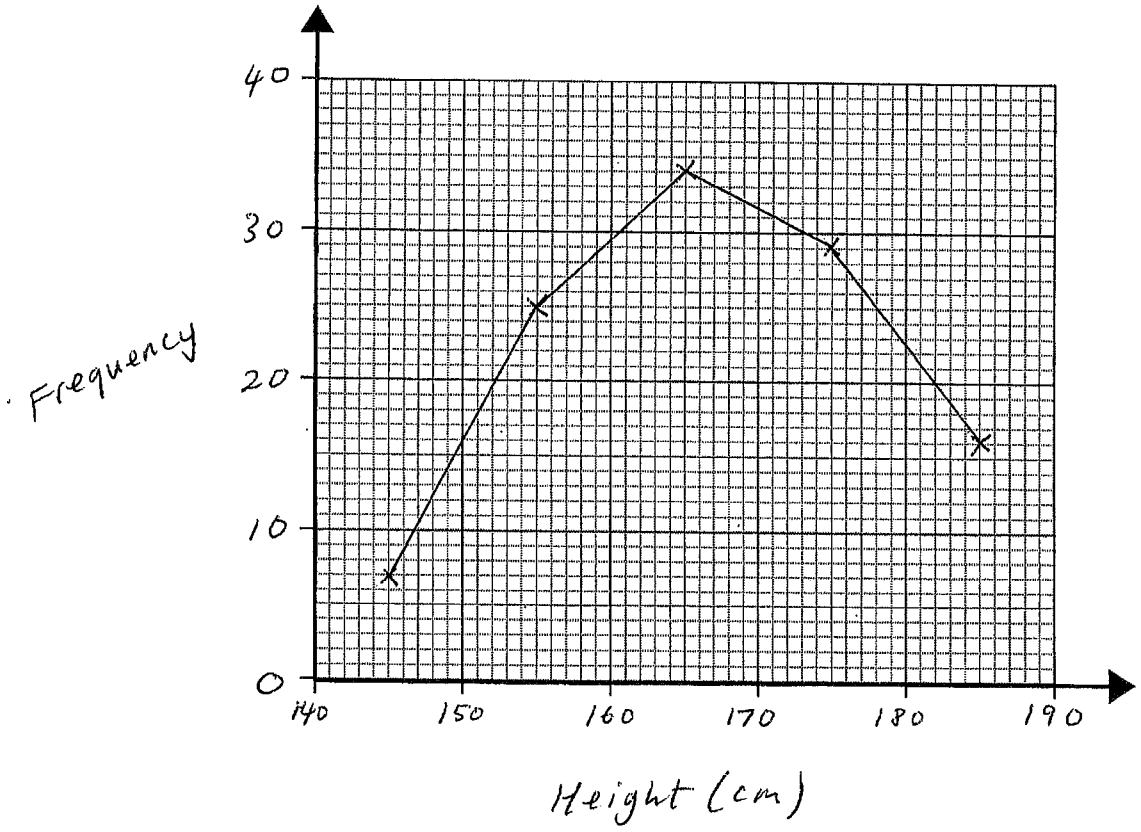


(Total for Question 6 is 2 marks)

7 The frequency table shows the heights, in cm, of some people.

Height (cm)	Frequency
$140 < h \leqslant 150$	7
$150 < h \leqslant 160$	25
$160 < h \leqslant 170$	34
$170 < h \leqslant 180$	29
$180 < h \leqslant 190$	16

Draw a frequency polygon to show this information.



(Total for Question 7 is 4 marks)

1 Here is a list of 10 numbers.

2 3 4 4 4 5 6 6 7 7

(a) Work out the range.

$7 - 2 = 5$

5

(1)

(b) Find the mode.

4

(1)

(c) Calculate the mean.

$2 + 3 + 4 + 4 + 4 + 5 + 6 + 6 + 7 + 7 = 48$

$\frac{48}{10} = 4.8$

4.8

(2)

(Total for question 14 is 4 marks)

---

2 Here is a list of 5 numbers.

4 6 9 10 11

(a) Work out the range.

$11 - 4 = 7$

7

(1)

(b) Write down the median.

(c) Calculate the mean.

9

(1)

$4 + 6 + 9 + 10 + 11 = 40$

$\frac{40}{5} = 8$

8

(2)

(Total for question 2 is 4 marks)

3 Here are the heights, in cm, of 8 people.

155 171 164 171 167 188 190 151

(a) Work out the range.

190 − 151

39 cm

(1)

(b) Find the mode.

171 cm

(1)

(c) Calculate the mean.

155 + 171 + 164 + 171 + 167 + 188 + 190 + 151

= 1357

$\frac{1357}{8}$ = 169.625 169.625 cm

(2)

(Total for question 3 is 4 marks)

---

4 Here are the weights, in grams, of 6 potatoes

150 129 125 133 144 105

(a) Work out the range.

150 − 105 = 45

45

(1)

(b) Work out the median weight.

105 125 129 133 144 150

↑

$\frac{129 + 133}{2}$ = 131

131 g

(2)

(Total for question 4 is 3 marks)

5 Here are six cards. Each card has a number on it.

19	7	11	8	15	15

(a) Work out the range of the numbers on the cards.

$19 - 7 = 12$

12

(1)

(b) Work out the mean of the numbers on the cards.

~~$19 + 7 =$~~

$19 + 11 + 15 + 15 + 8 + 7 = 75$

$\frac{75}{6} = 12.5$

12.5

(2)

(Total for question 5 is 3 marks)

---

6 Here is a list of 10 numbers.

1 4 4 5 6 8 11 11 11 14

(a) Work out the range.

$14 - 1 = 13$

13

(1)

(b) Find the mode.

11

(1)

(Total for question 6 is 2 marks)

7 Here are seven cards. Each card has a number on it.

12	5	10	18	12	11	9

(a) Work out the range of the numbers on the cards.

$18 - 5 = 13$

13

(1)

(b) Work out the median of the numbers on the cards.

5 9 10 11 12 12 18

↑

11

(2)

(c) Work out the mean of the numbers on the cards.

$5 + 9 + 10 + 11 + 12 + 12 + 18 = 77$

$\frac{77}{7} = 11$

11

(2)

(Total for question 18 is 5 marks)

8 Here is a list of numbers.

8 6 4 5 9 8

(a) Work out the median

4 5 6 8 8 9

$\frac{6+8}{2} = 7$

7

(2)

Here are six cards.
There is a number on each card.
Two of the numbers are hidden.

4	5	?	6	3	?

The mode of the six numbers is 4
The mean of the six numbers is 5

Work out the two numbers that are hidden.

There must be at least one more 4.

4	5	4	6	3	x

The numbers must add to $5+6 = 30$

$4 + 5 + 6 + 3 + 4 = 22$

$30 - 22 = 8$

4 , 8

(2)

(Total for question 8 is 3 marks)

9 Here is a list of numbers.

14 19 15 20 11 14 19

(a) Find the range

$20 - 11 = 9$

9

(2)

(b) Calculate the mean

$14 + 19 + 15 + 20 + 11 + 14 + 19 = 112$

$\frac{112}{7} = 16$

16

(2)

Andrew says,

"The median is the middle number, so the median is 20."

(c) Andrew is incorrect, explain why.

11 14 14 15 19 19 20

↑

The numbers have to be ordered first.

The median is 15.

(1)

(Total for question 9 is 5 marks)

---

10 Here is a list of seven numbers.
One of the numbers is hidden.

11	6	7	10	7	9	?

The mean of the numbers is 9.

Find the value of the hidden number.

$7 \times 9 = 63$ The numbers must add to 63

$11 + 6 + 7 + 10 + 7 + 9 = 50$

$63 - 50 = 13$

13

(Total for question 10 is 2 marks)

11 The mean of eight numbers is 41.
The mean of two of the numbers is 29.
Work out the mean of the other six numbers.

$8 \times 41 = 328$ All numbers total 328

$2 \times 29 = 58$ Two numbers total 58

$328 - 58 = 270$

$\frac{270}{6} = 45$

45

(Total for question 11 is 3 marks)

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12 Mark ran at mean distance of 13.2 km in five days.

The next day Mark ran 20 km.

Find the mean distance Mark ran in the six days.

$13.2 \times 5 = 66$ km in 5 days

$66 + 20 = 86$ in 6 days

$\frac{86}{6} = 14.\dot{3}$ km

14.$\dot{3}$ km

(Total for question 12 is 3 marks)