Name:

Exam Style Questions

Mean, Median, Mode and Range

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 50
Video 53
Video 56
Video 57

1. James has a spinner that has sections labelled 1 to 5.
    He spins the spinner 10 times.

    Here are his scores.

    1   4   4   2   3   4   5   1   4   1

    (a) Find the mode.

    _____4_____

    (1)

    (b) Work out the mean.

    1 + 4 + 4 + 2 + 3 + 4 + 5 + 1 + 4 + 1 = 29
    29 ÷ 10 = 2.9

    _____2.9_____

    (2)

    (c) Work out the range.

    5 - 1 = 4

    _____4_____

    (2)

2. Simone records the number of minutes she spends on her mobile phone over
    7 days.

    8   5   13   6   24   19   10

    Find the median.

    5 6 8 10 13 19 24

    _____10_____ minutes

    (2)

3. Here are the ages of 9 children at a birthday party.

10   12   13   10   11   14   15   10   12

(a) Find the mode.

10

(1)

(b) Find out the median.

~~10~~ ~~10~~ ~~10~~ ~~11~~ 12 ~~12~~ ~~13~~ ~~14~~ ~~15~~

12

(2)

(c) Work out the range.

15 - 10 = 5

5

(2)

(d) Work out the mean.

10 + 10 + 10 + 11 + 12 + 12 + 13 + 14 + 15 = 107

107 ÷ 9 = 11.88888...   11.89 to 2 decimal places

(2)

4. A football team played six games.

Here are the number of goals they scored in each game:

6   0   3   2   2   5

(a) Work out the median number of goals scored.

0 2 2 3 5 6

2.5

(2)

(b) Work out the mean number of goals scored.

6 + 0 + 3 + 2 + 2 + 5 = 18

18 ÷ 6 = 3

3

(2)

The football team play one more game.
The mean number of goals scored increases to 4.

(c) Work out the number of goals scored in the seventh game.

One more game, would be the 7th
7 x 4 = 28 goals in total
They have scored 18 so far   10
28 - 18 = 10

(2)

5. Miss Jones gives her class a test.
The test is out of 40 marks.

Here are their scores.

31   29   20   35   32   38   32

(a) Work out the mode.

32

(1)

(b) Work out the median.

20 29 31 32 32 35 38

32

(2)

(c) Work out the range.

38 - 20 = 18

18

(2)

The pass mark for the test is 75%.

(d) How many students pass the test?

75% of 40 = 30

20 29 31 32 32 35 38

5

(2)

6. Hannah is recording the number of letters in each word in an article.

These are the first ten lengths.

3   4   5   6   2   4   3   7   3   6

(a) Work out the median.

2 3 3 3 4 4 5 6 6 7

4

(2)

(b) Calculate the mean.

2+3+3+3+4+4+5+6+6+7 = 43

43 ÷ 10 = 4.3

4.3

(2)

The 11th word has 4 letters.

(c) Tick the box which describes what affect this will have on the mean.

The mean will decrease	The mean will remain the same	The mean will increase
✓	☐	☐

(1)

(d) Tick the box which describes what affect this will have on the median.

The median will decrease	The median will remain the same	The median will increase
☐	✓	☐

2 3 3 3 4 4 5 6 6 7

(1)

7. Shown below are five cards which are arranged in order from smallest to largest

| 5 | 5 | 8 | 8 | 9 |

The range of the cards is 4.
The median of the cards is 8.   middle
The mean of the cards is 7.   adds up to 5×7=35

Work out the 4 missing numbers.

$$5 + 8 + 9 = 22$$
$$35 - 22 = 13$$

..........5.........., ...8..........., ...8........... and ....9...........

(4)

8. 8 boys and 8 girls from a class run 100m.

The times taken, to the nearest second, for each girl are:

15   20   24   18   19   21   26   29

The mean of the boys' times is 25 seconds.
The range of the boys' times is 14 seconds.

Thomas says that "the boys in our class are faster than the girls."

Is he correct?

girls mean: 21·5 seconds

girls range: 14 seconds

No. The mean time for the girls to run 100m is 21.5 seconds, which is less than the mean time for the boys. Therefore on average the girls were faster. The ranges for both the boys and girls are equal which suggests there are no outliers that are affecting the mean.

(5)

9. A set of six numbers have a median of 5.
All of the numbers are even.
The range of the numbers is 6.
The mode of the numbers is 4.

Write down a possible set of six numbers.

4 4 4 6 6 10

.............., ..., ..., ..., ... and ....

(4)

Exam Style Questions

Cumulative Frequency
Box Plots

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

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1. The weight of 80 deer was recorded by a zoo keeper.
   The table below shows this information.

Weight, w kg	Cumulative frequency
$0 < w \leq 20$	2
$0 < w \leq 40$	6
$0 < w \leq 60$	15
$0 < w \leq 80$	36
$0 < w \leq 100$	58
$0 < w \leq 120$	73
$0 < w \leq 140$	80

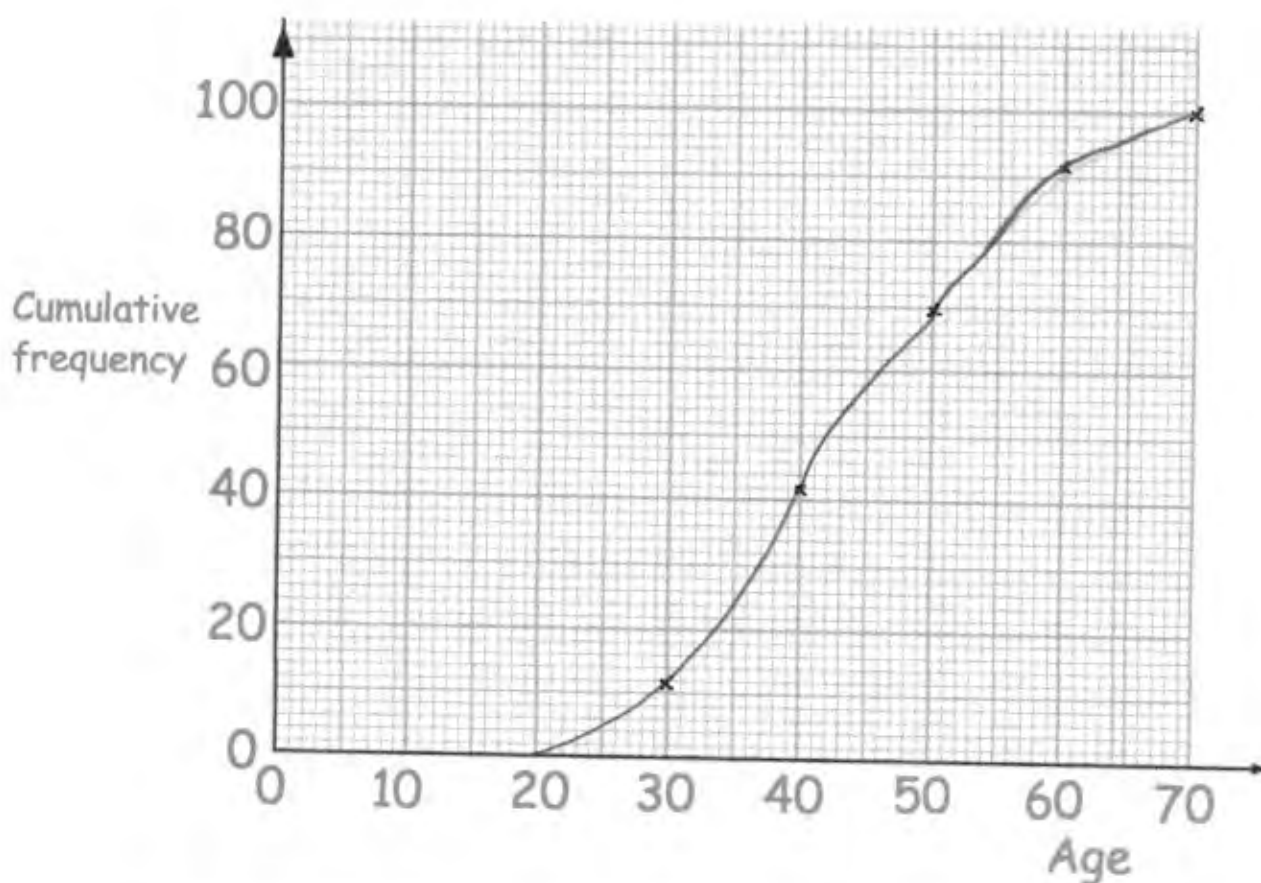Draw a cumulative frequency graph for this information.
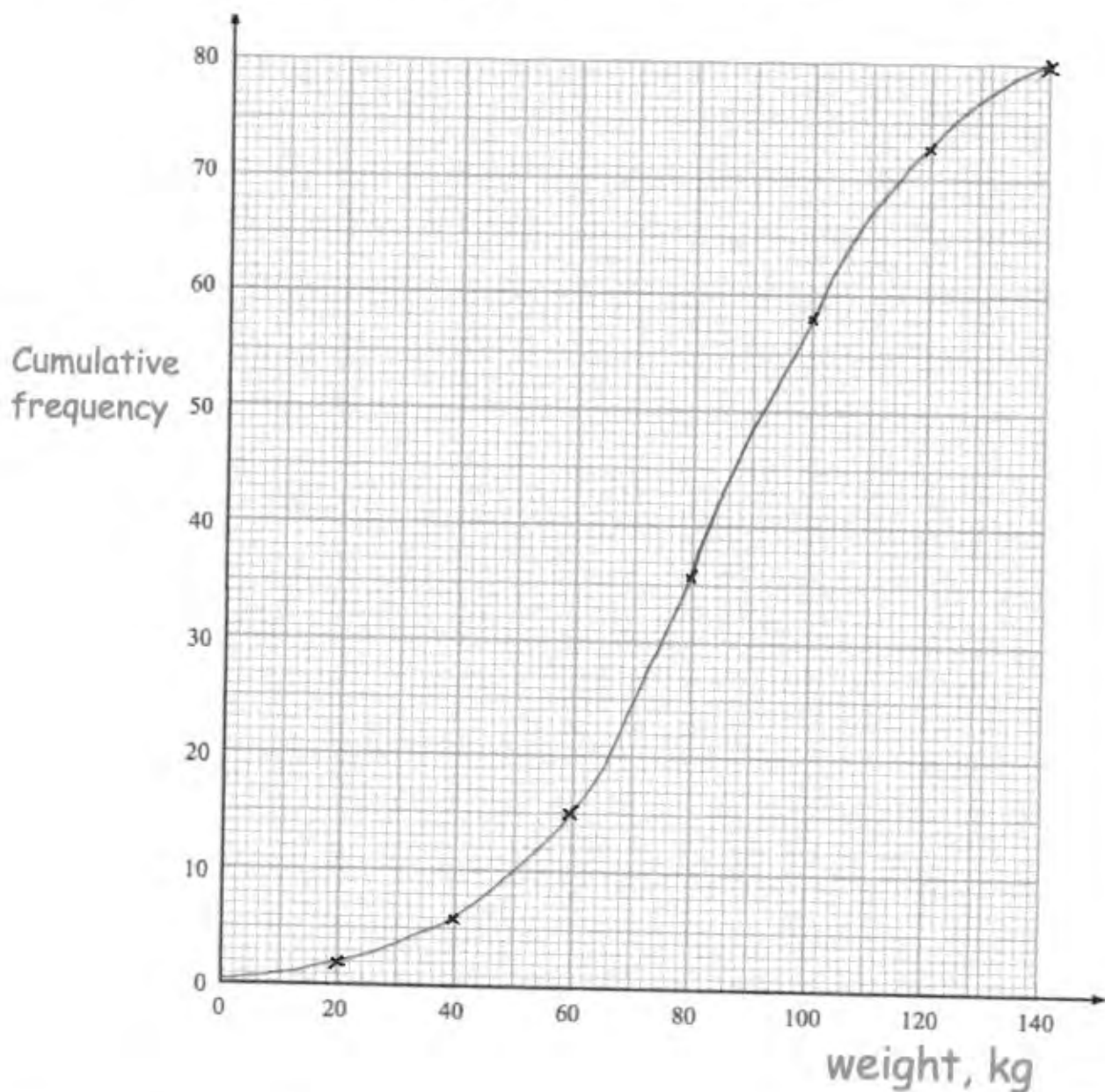
(2)

2. The ages of 100 teachers were recorded.
The table below shows this information.

Age, x years	Frequency	Cumulative frequency
20 < x ≤ 30	12	12
30 < x ≤ 40	30	42
40 < x ≤ 50	28	70
50 < x ≤ 60	22	92
60 < x ≤ 70	8	100

(a) Complete the cumulative frequency column in the table.

(1)

(b) Draw a cumulative frequency graph for this information.

(2)

3. The table shows information about the number of hours that 260 students spent revising for an exam.

Number of hours (h)	Frequency
0<h≤2	20
2<h≤4	32
4<h≤6	48
6<h≤8	120
8<h≤10	24
10<h≤12	16

(a) Complete the cumulative frequency table.

Number of hours (h)	Cumulative frequency
0<h≤2	20
0<h≤4	52
0<h≤6	100
0<h≤8	220
0<h≤10	244
0<h≤12	260

(1)

(b) On the grid on the following page, draw a cumulative frequency graph for your table.

(2)
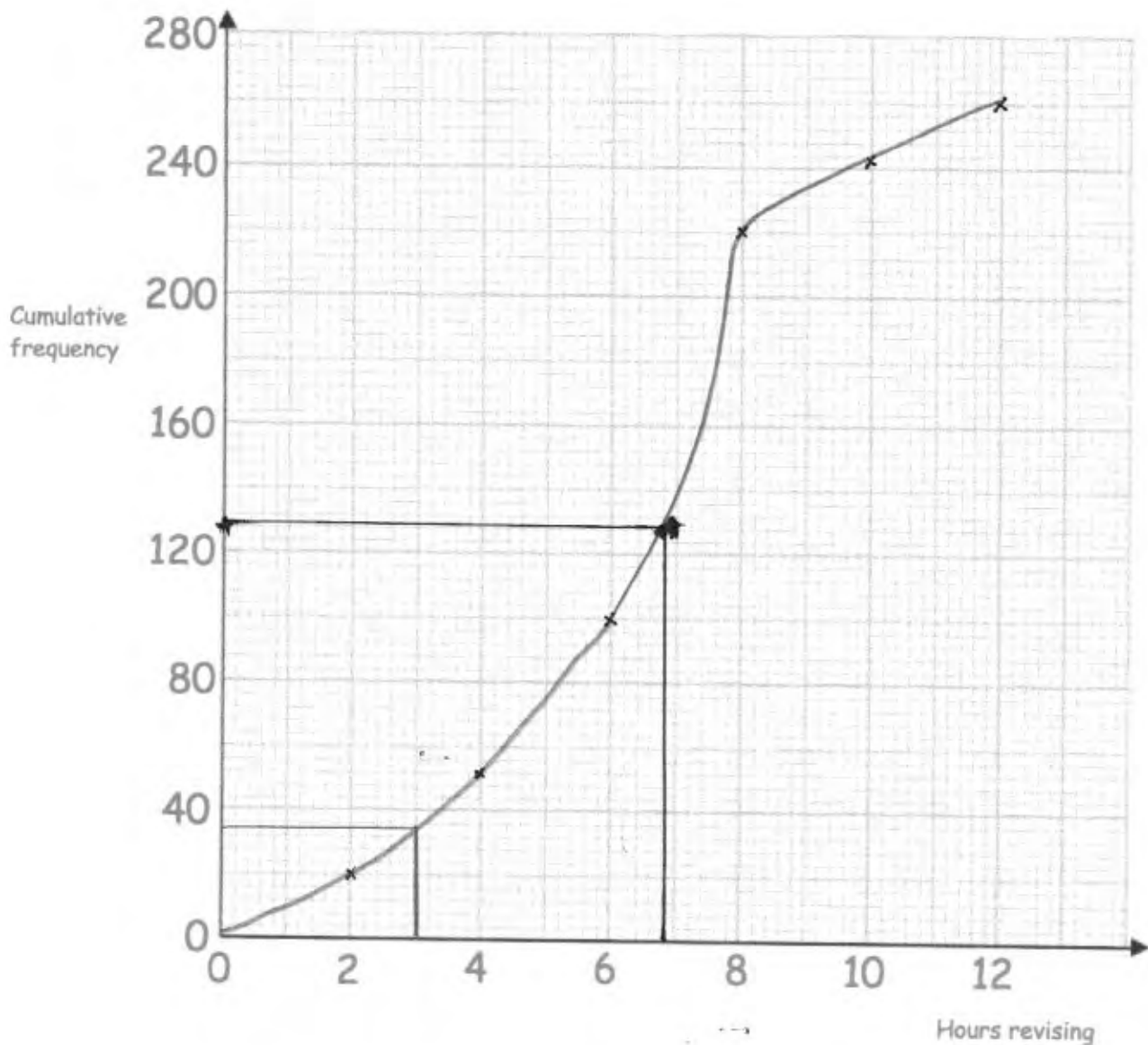
(c) Use your graph to find an estimate for the median number of hours spent revising.

6·8 ....hours

(1)

(d) Use your graph to find an estimate for the number of students who spent **less** than 3 hours revising.
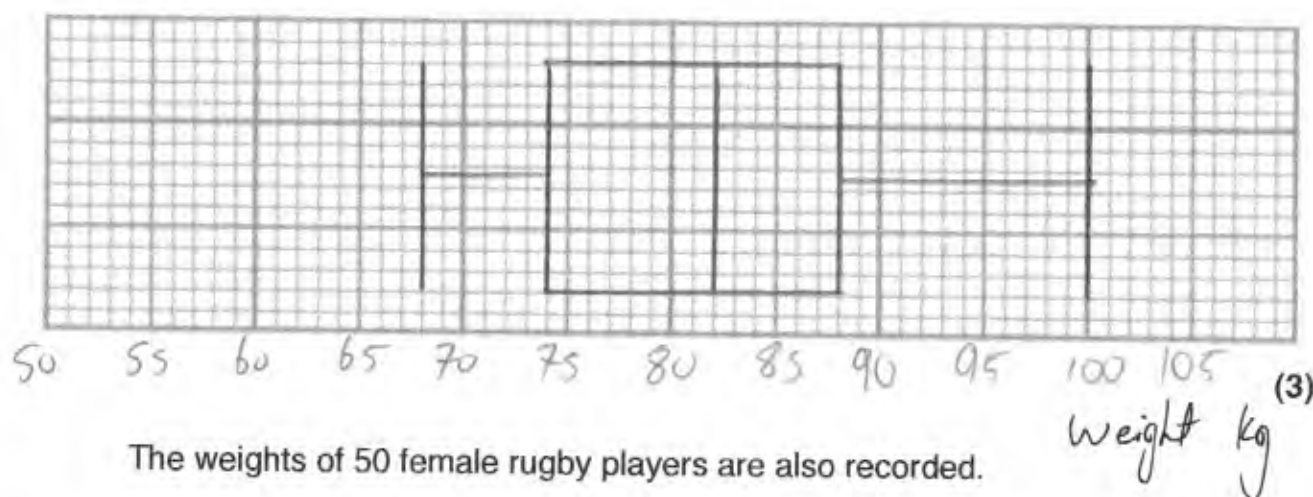
34

(2)

4. The table gives information about the weights of 50 male rugby players.

Lowest	68kg
Lower Quartile	74kg
Median	82kg
Upper Quartile	88kg
Highest	100kg

$IQR = 14kg$

$range = 32kg$

(a) Draw a box plot to show this information.

50 55 60 65 70 75 80 85 90 95 100 105

(3)

Weight kg

The weights of 50 female rugby players are also recorded.
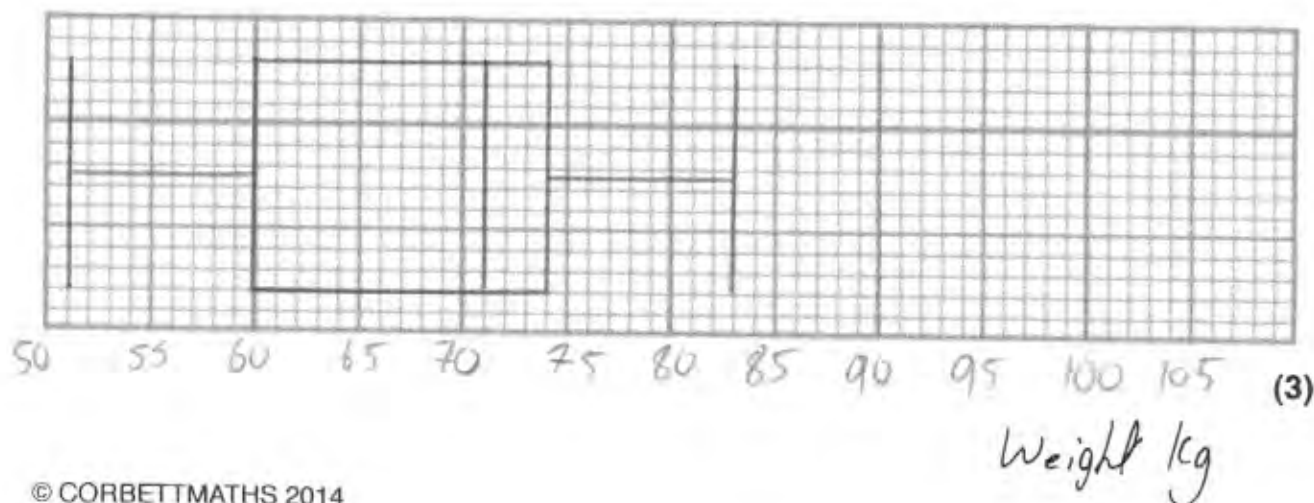
The lightest female rugby player is 51kg.
The lower quartile is 60kg.
The median is 71kg.
The range and interquartile range for the female rugby players is the same as the male rugby players.

UQ 74kg

highest 83kg

(b) Draw a box plot to show this information.

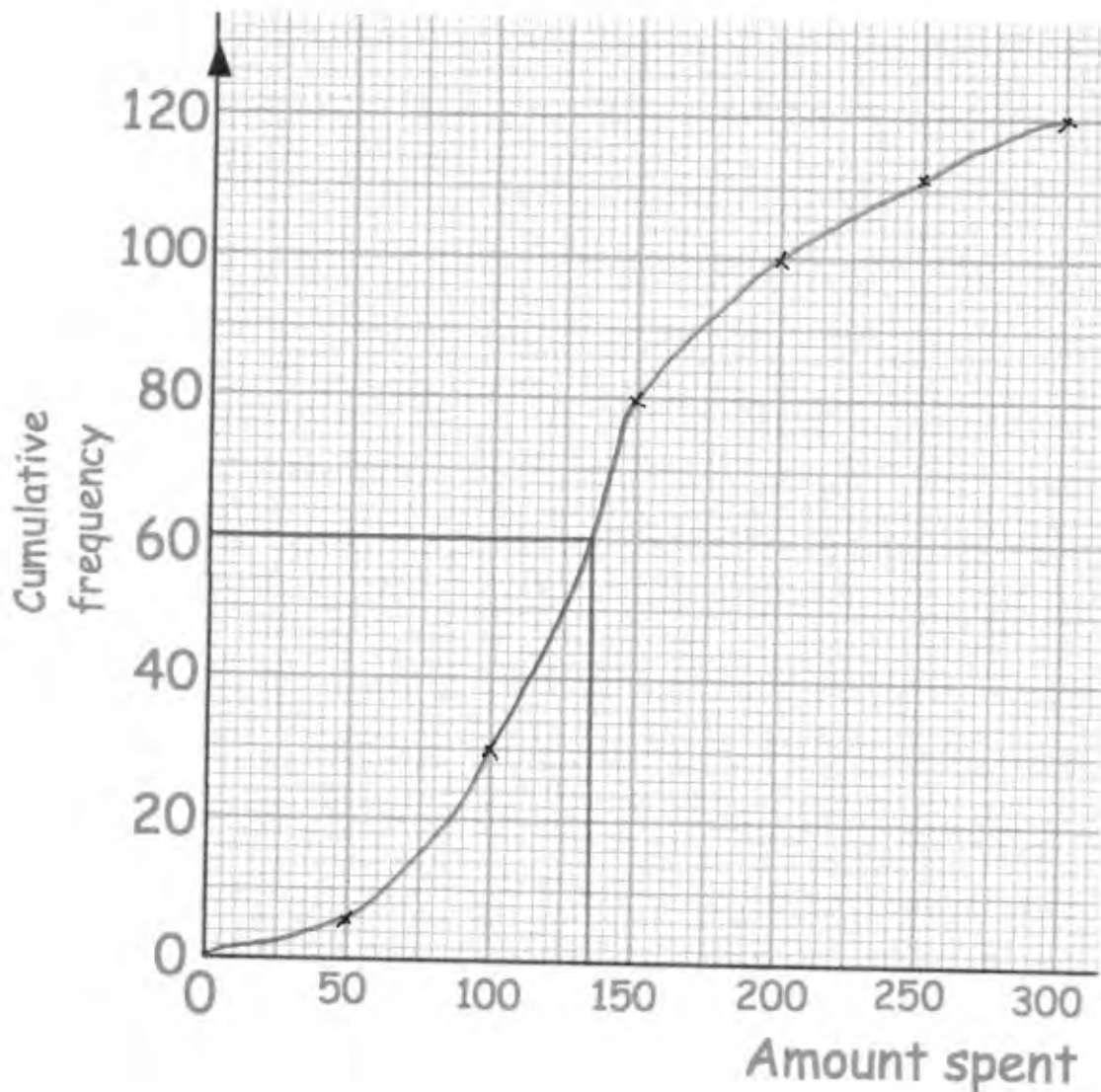50 55 60 65 70 75 80 85 90 95 100 105

(3)

Weight kg

5. John did a survey about the amounts of money spent by 120 women while Christmas shopping.

The cumulative frequency table shows this information.

Amount spent, £x	Cumulative frequency
$0 < x \leq 50$	6
$0 < x \leq 100$	30
$0 < x \leq 150$	80
$0 < x \leq 200$	100
$0 < x \leq 250$	112
$0 < x \leq 300$	120

(a) On the grid, draw a cumulative frequency diagram.

(2)

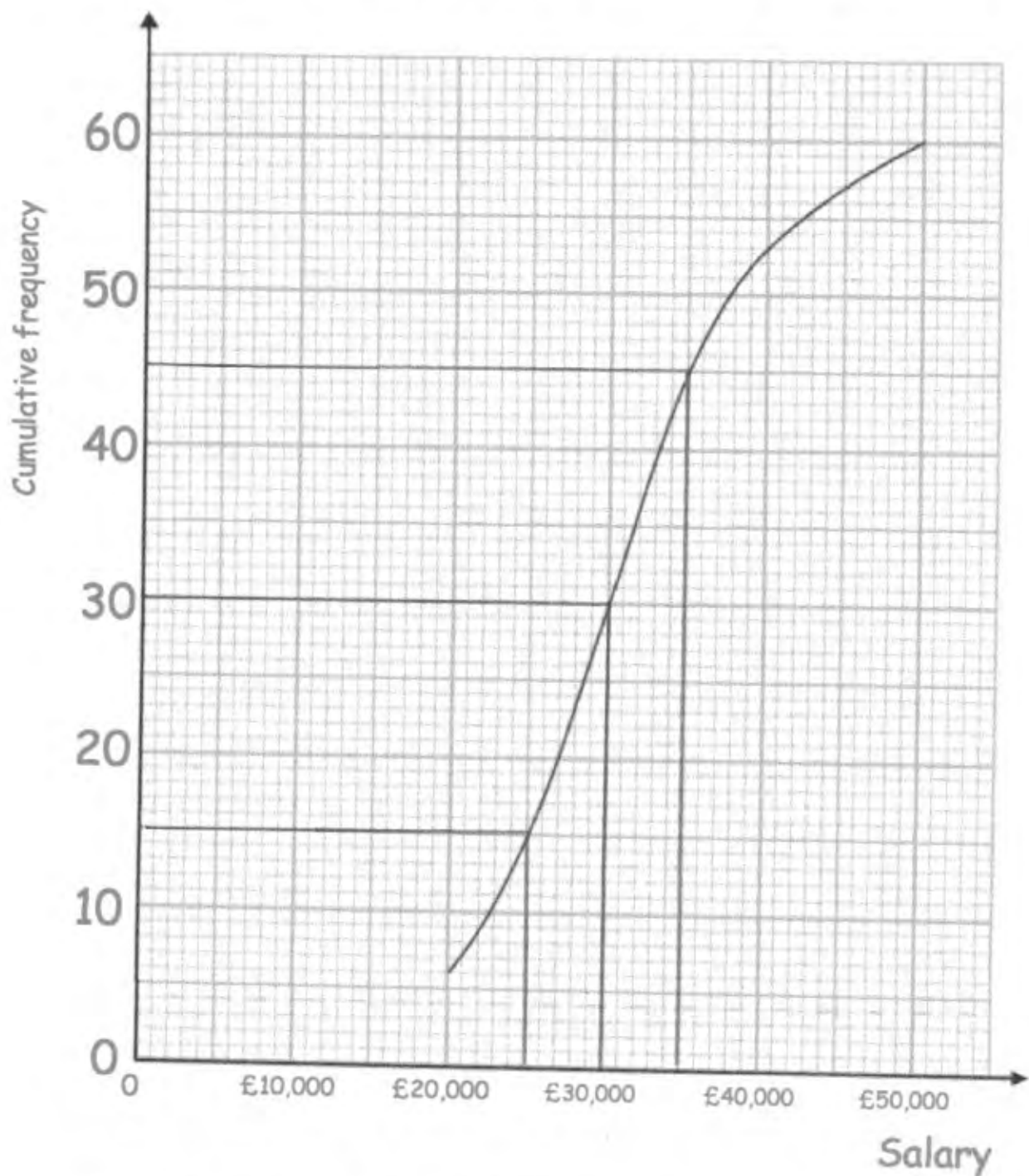(b) Use the cumulative frequency diagram to estimate the median.

£ ....135....

(2)

John then surveyed men about the amount of money they spent while Christmas shopping. The median was £160.

(c) Compare the amounts of money spent by the women with the amounts of money spent by the men.

The men spent more than the women, with a median of £160 compared to £135

(1)

6. A university surveyed 60 mathematics graduates on their starting salary.
The cumulative frequency graph shows some information about the salaries.

(a) Use the graph to find an estimate for the median salary.

£ 30000

(1)
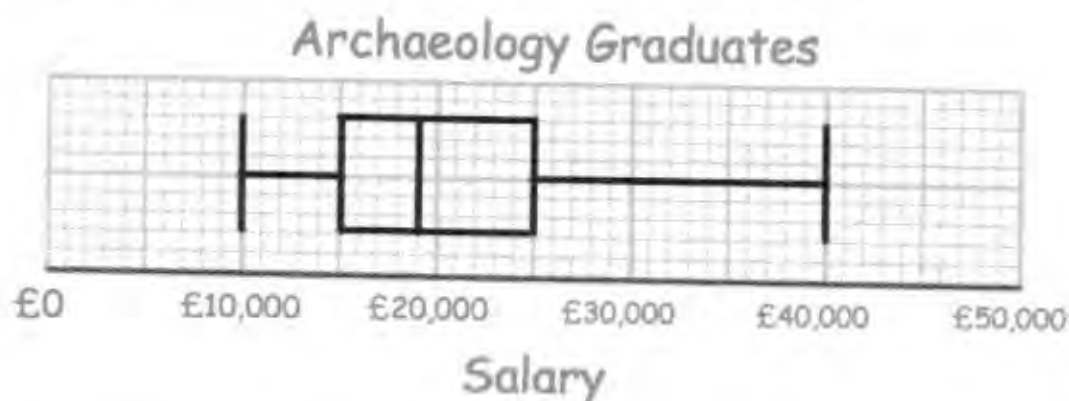
The 60 mathematics graduates
        had a minimum salary of £16,000
        and a maximum salary of £48,000.

(b) Use this information and the cumulative frequency curve to draw a box plot
    for the 60 mathematics graduates.

Mathematics Graduates

£0   £10,000   £20,000   £30,000   £40,000   £50,000
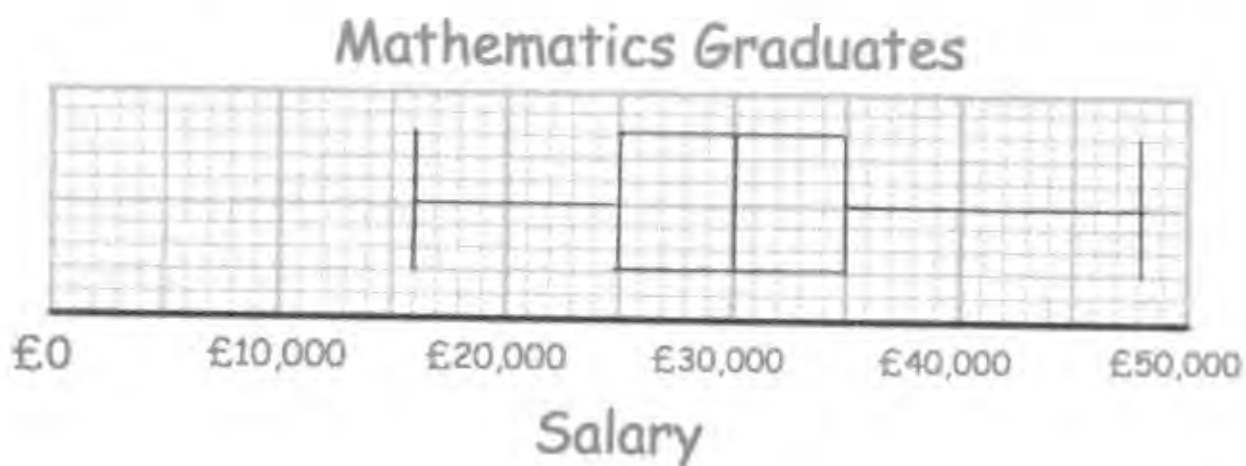
Salary

(3)

The university also surveyed 60 archaeology graduates.
The box plot below shows information about their salaries.

Archaeology Graduates

£0   £10,000   £20,000   £30,000   £40,000   £50,000

Salary

(c) Compare the distribution of the salaries of the mathematics graduates with
    the distribution of the salaries of the archaeology graduates.

The salaries are similarly spread, both with interquartile ranges
of £10,000. The mathematics graduates clearly earn more,
with a median of £30,000 compared to £19,000

(2)

7. The length of time, in minutes, that 80 customers spend in a shop was recorded.
A cumulative frequency diagram of this data is below.
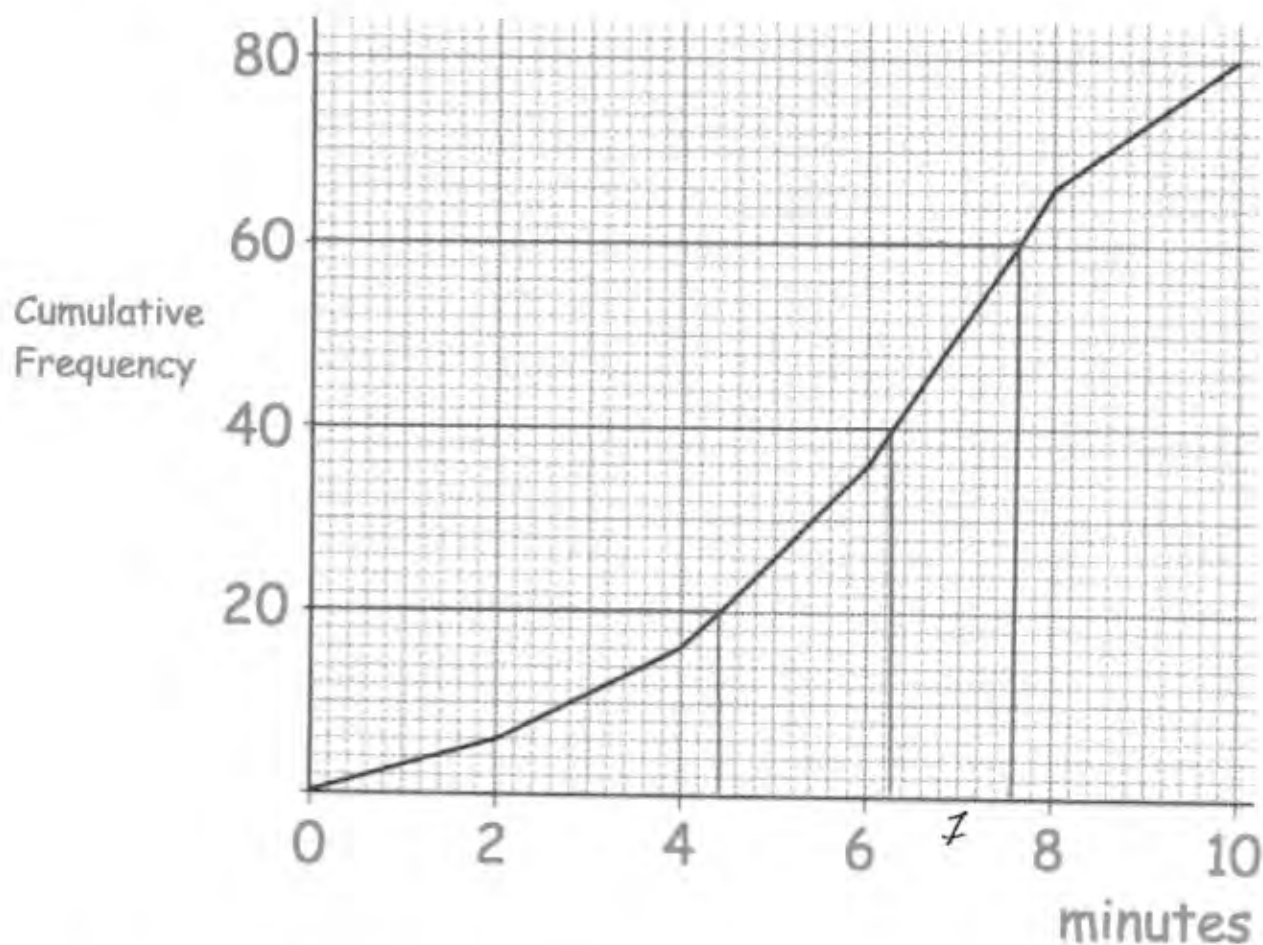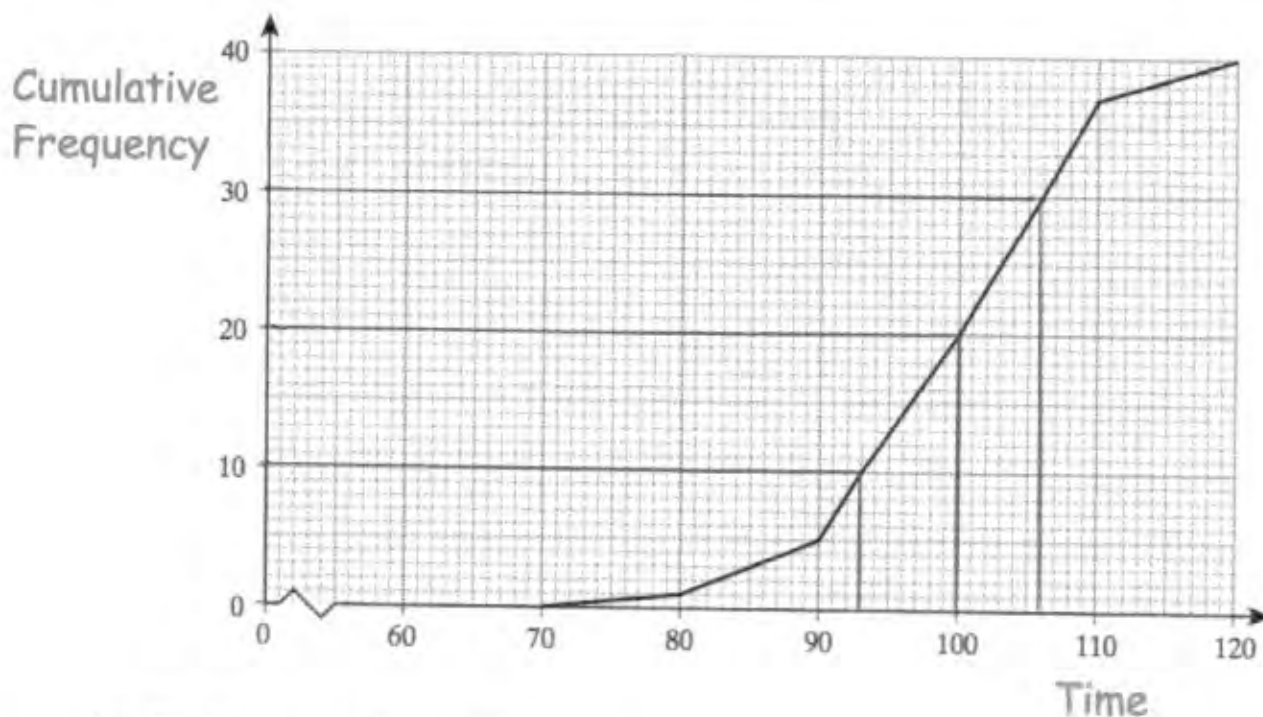

(a) Find an estimate of the median.

................6.3................minutes

(1)

(b) Find an estimate of the inter-quartile range.

7.6 – 4.4

................3.2................minutes

(2)

8.   40 students complete a puzzle.
     The time taken, in seconds, is recorded.
     The cumulative frequency diagram shows the information about the times taken.
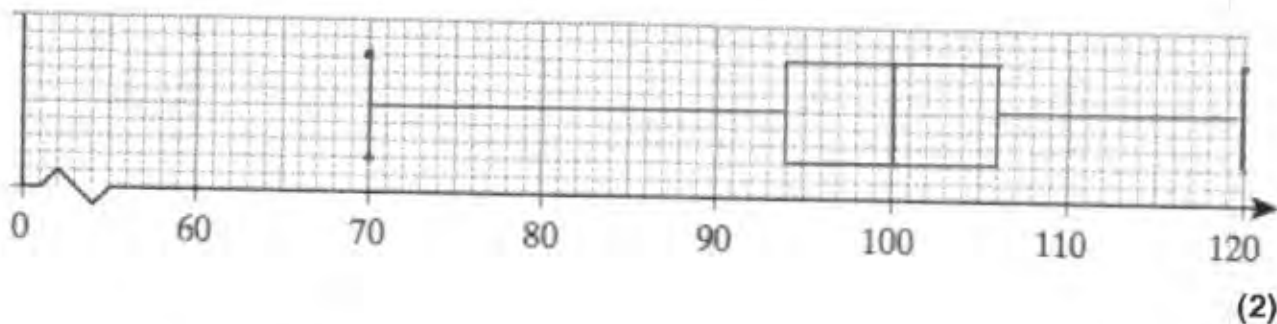

(a) Find the median time taken.

.............100......seconds
                              (1)

(b) Find the inter-quartile range.

106 - 94

..............12......seconds
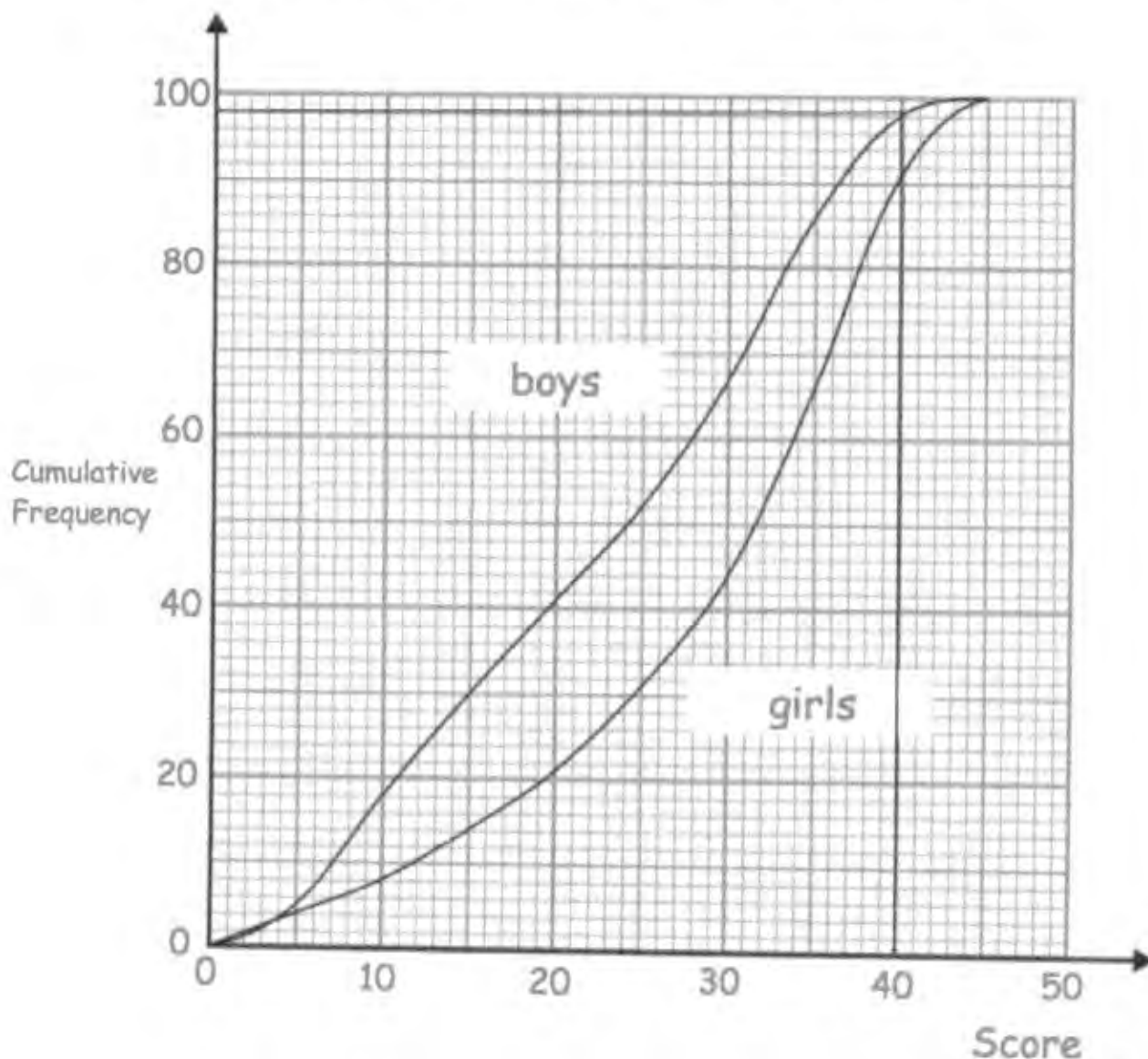   **(2)**

(c) Complete a box plot for times taken.

                              (2)

9. A teacher gave 100 boys and 100 girls a maths test.
The test was out of 45 marks.
The cumulative frequency curves show how each group performed.

(a) Find an estimate for the number of boys who scored over 40 marks.

boys girls
2⁴   ✓31·5 Median
19   14·5   IQR

................2................ d

(1)

(b) Make two comparisons between the distributions of the boys and girls scores.

The girls scored more than the boys on average, with a median of 31·5 compared to 24.
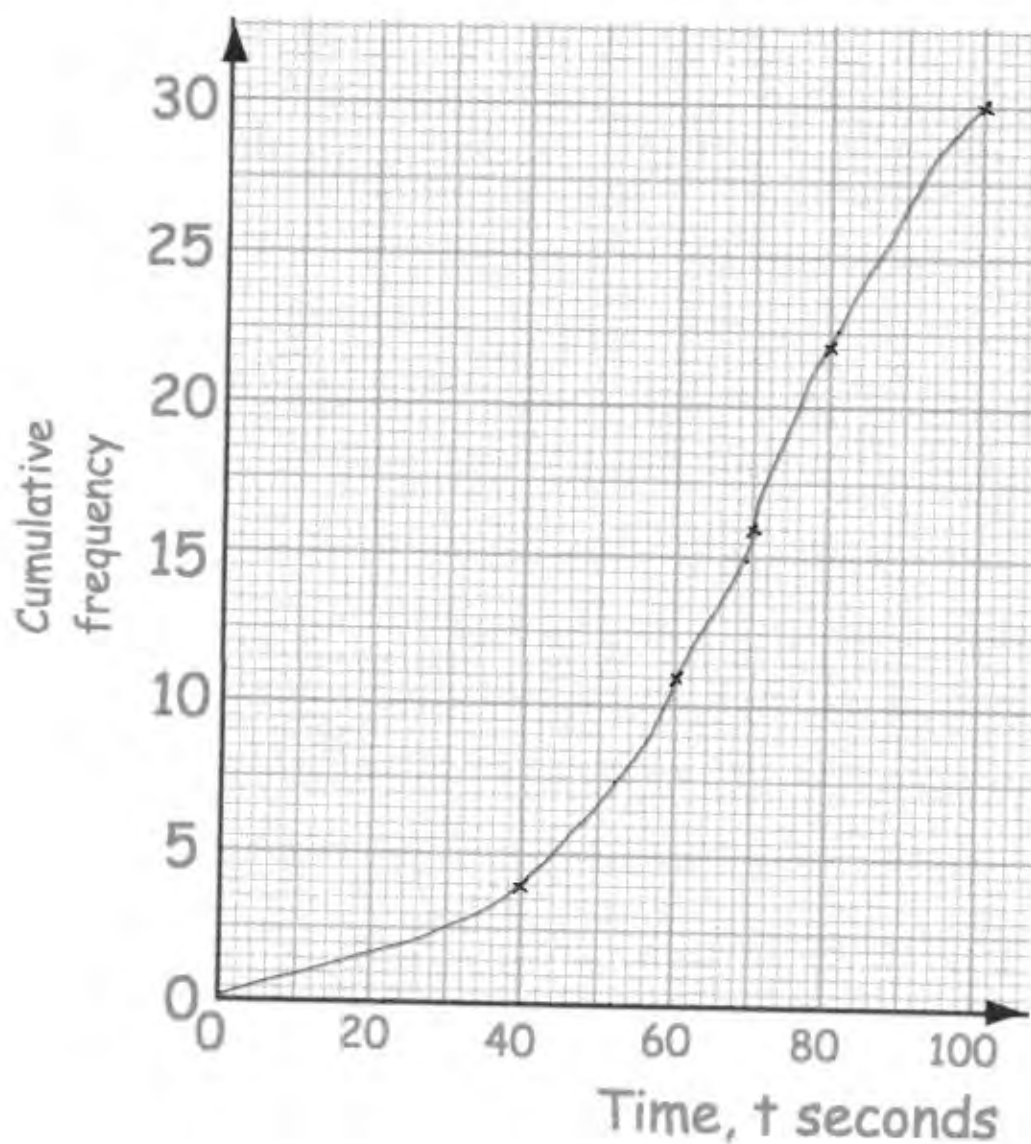
The boys results are more spread out (less consistent) as their IQR is 19 compared to 14·5.

(3)

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10. A group of primary school students run an obstacle course.

The table below shows some information about their times.

Time, (t)	Cumulative frequency
$0 < t \le 40$	4
$0 < t \le 60$	11
$0 < t \le 70$	16
$0 < t \le 80$	22
$0 < t \le 100$	30

(a) On the grid, draw a cumulative frequency graph for this information.

Median = 69

IQR =

81 – 52
= 29

(2)

A group of secondary school students did the same obstacle course.
Their median time was 72 seconds and interquartile range was 34 seconds.

(b) Compare the times taken of these two groups of students.

The primary school students were slightly quicker
with a median of 69 seconds compared to 72.

The primary school student times were less
spread out (more consistent) as their interquartile
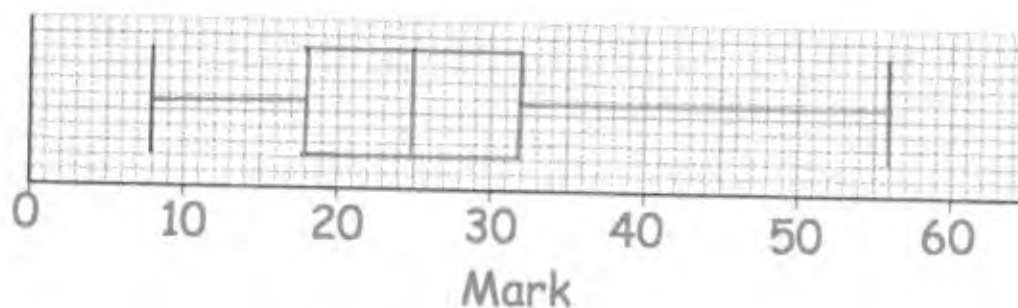range was 29 seconds, compared to 34

(5)

11. The cumulative frequency diagram below shows the distribution of marks in an Art exam.
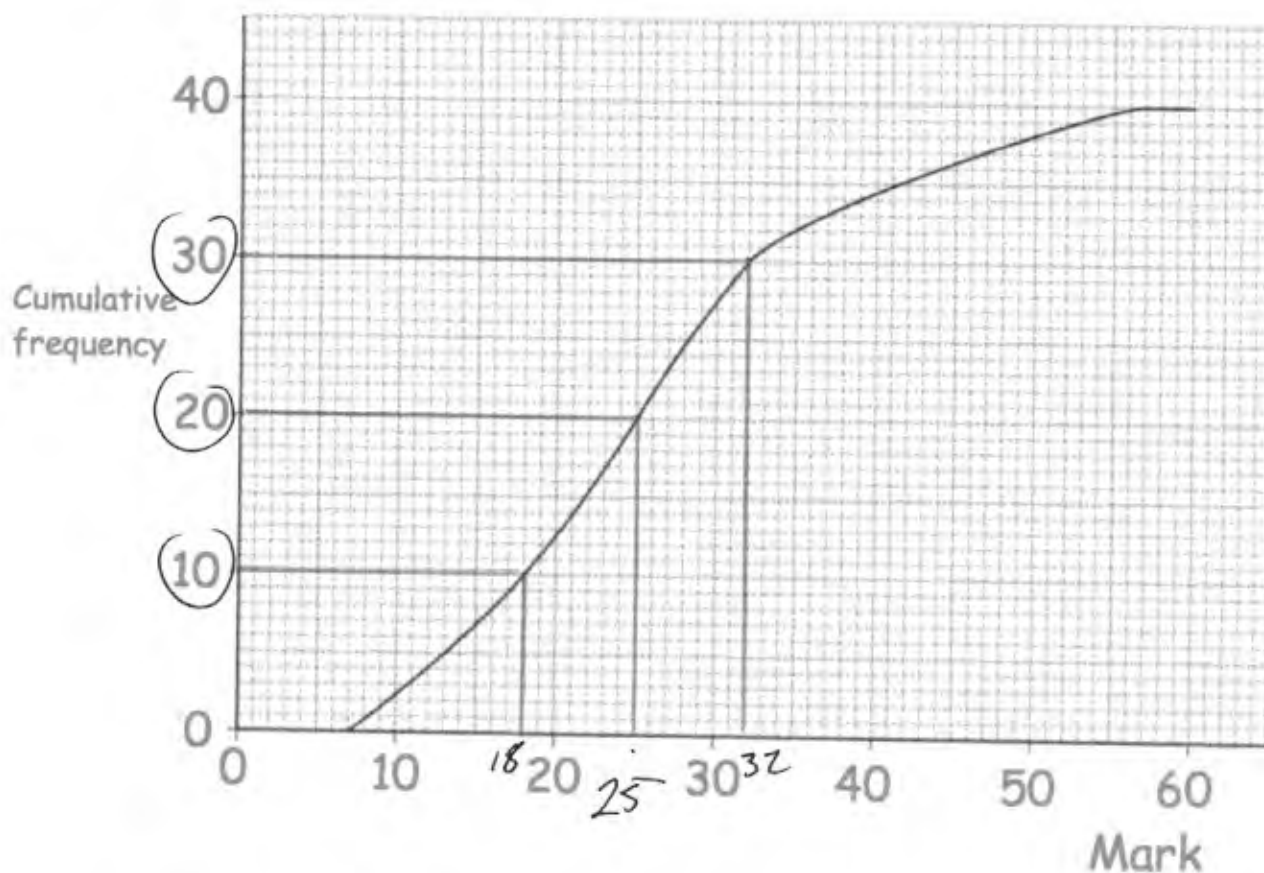
The lowest mark is 8.
The highest mark is 56.

(a) Draw a box plot for this data.

(b) What percentage of students scored more than the upper quartile mark?

....25....%

(1)

12. Mrs Davis sets her class a quiz, which has a maximum score of 50.
The distribution of the scores are shown in a box plot below.

(a) Write down the median score.

30
(1)

(b) Write down the highest score.

48
(1)

(c) Find the interquartile range.

35 - 19

16
(2)

Martin scored 35 marks.
(d) What percentage of the class scored a lower mark than Martin?
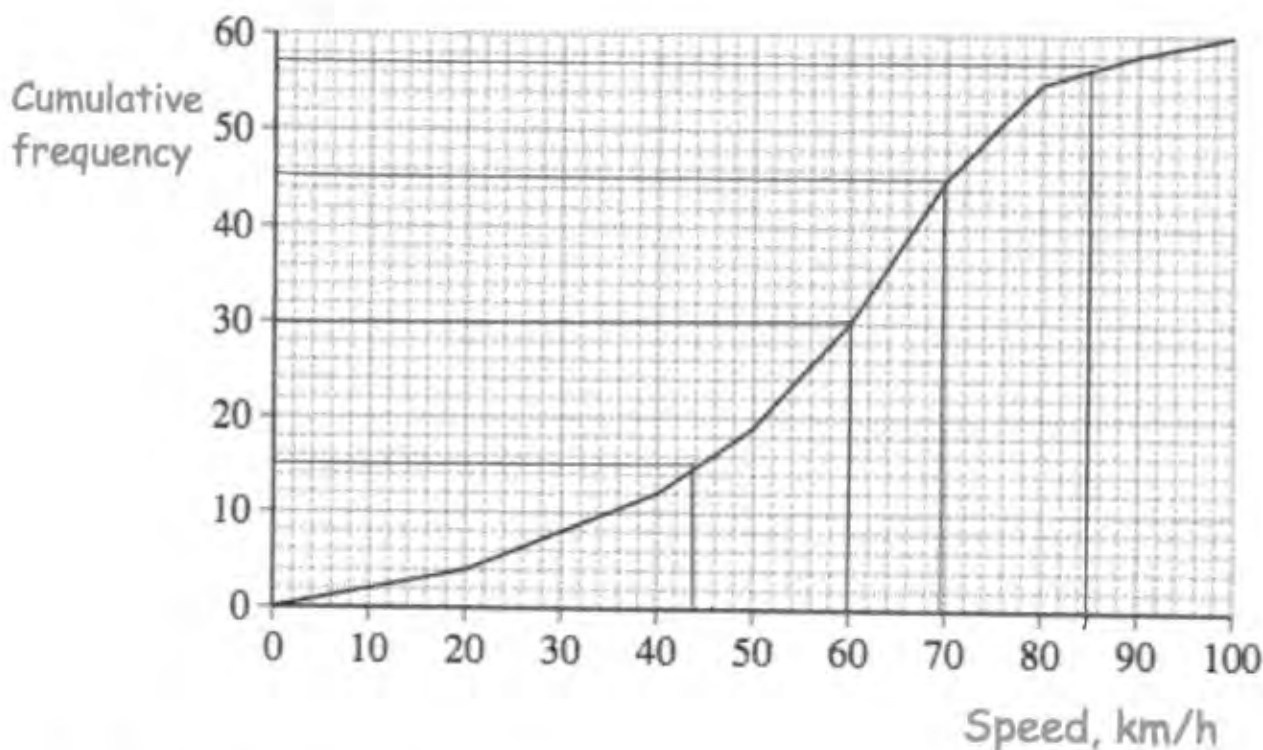
75 %
(1)

The interquartile range is a better measure of the spread of a distribution than the range.

Explain why.

One outlier will affect the range but not the interquartile range.
(1)

13. The cumulative frequency diagram shows the distribution of speeds for 60 cars on a road.

(a) Estimate the median speed.

_60 km/h_

(1)

(b) Estimate the interquartile range of the speeds.

70 - 44

_26 km/h_

(2)

The speed limit on the road is 85 km/h.

(c) How many cars exceeded the speed limit?

60 - 57

_3_

(2)

Name:

Exam Style Questions

Histograms

Corbettmaths

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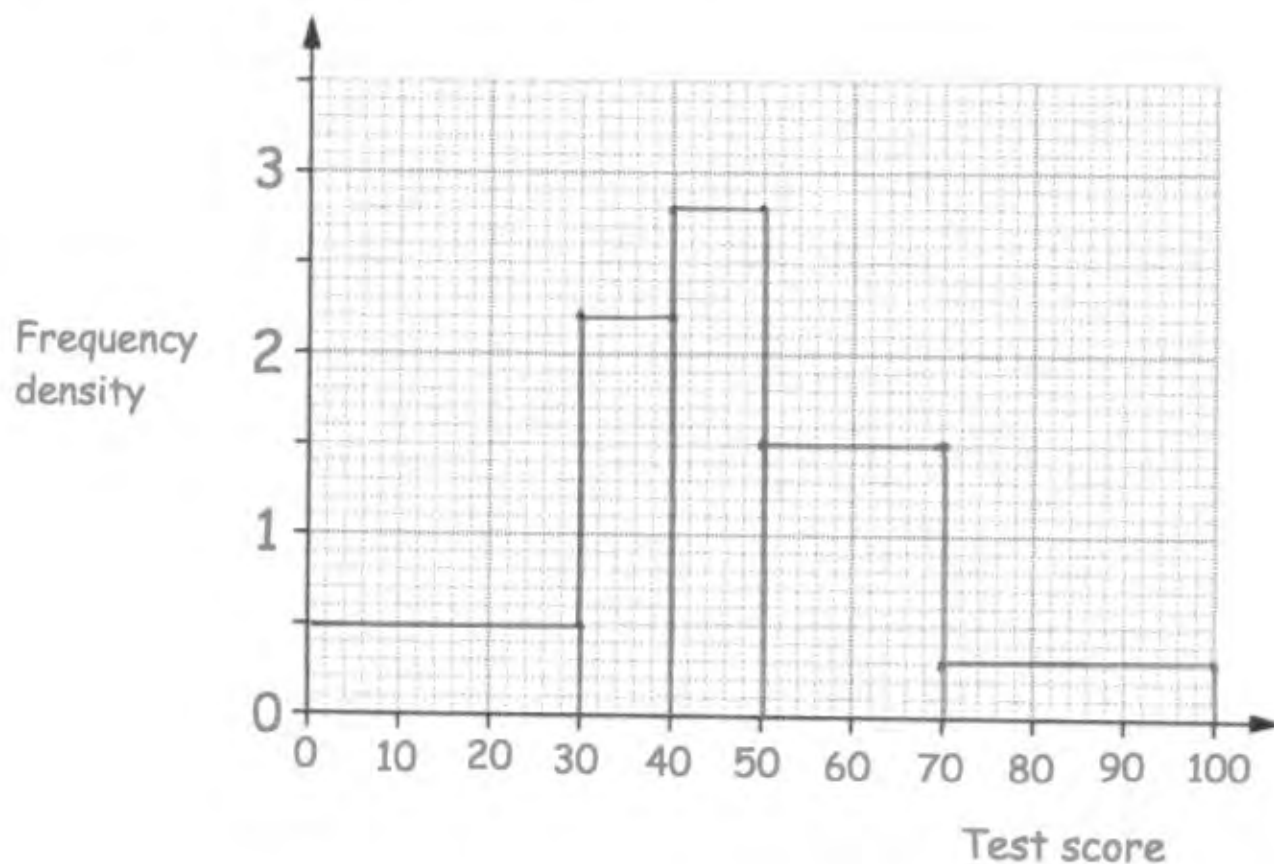
Video 157
Video 158
Video 159

1. The test scores from the students in a school are summarised in the table.

Test score, x	Frequency	frequency density
$0 < x \leq 30$	15	0.5
$30 < x \leq 40$	22	2.2
$40 < x \leq 50$	28	2.8
$50 < x \leq 70$	30	1.5
$70 < x \leq 100$	9	0.3

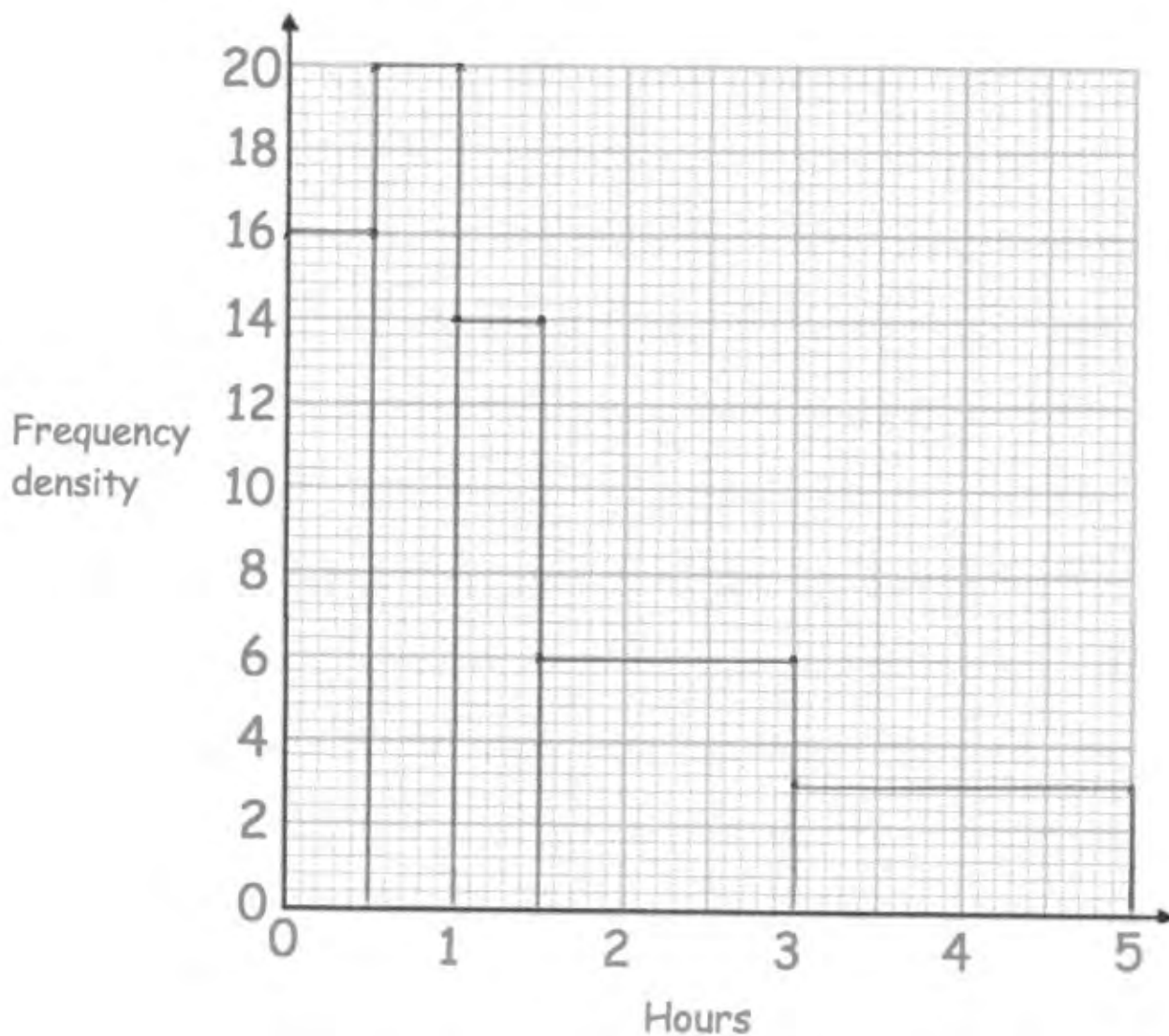Draw a histogram for this data.

(3)

2. The waiting times, h hours, for 40 patients at an accident and emergency department in one evening is shown below.

Waiting time, h	Frequency	frequency density
$0 < h \leq 0.5$	8	16
$0.5 < h \leq 1$	10	20
$1 < h \leq 1.5$	7	14
$1.5 < h \leq 3$	9	6
$3 < h \leq 5$	6	3

Draw a histogram for this data.

(3)

3.   The salaries, *p* pounds, of 10950 people in a town is shown below.

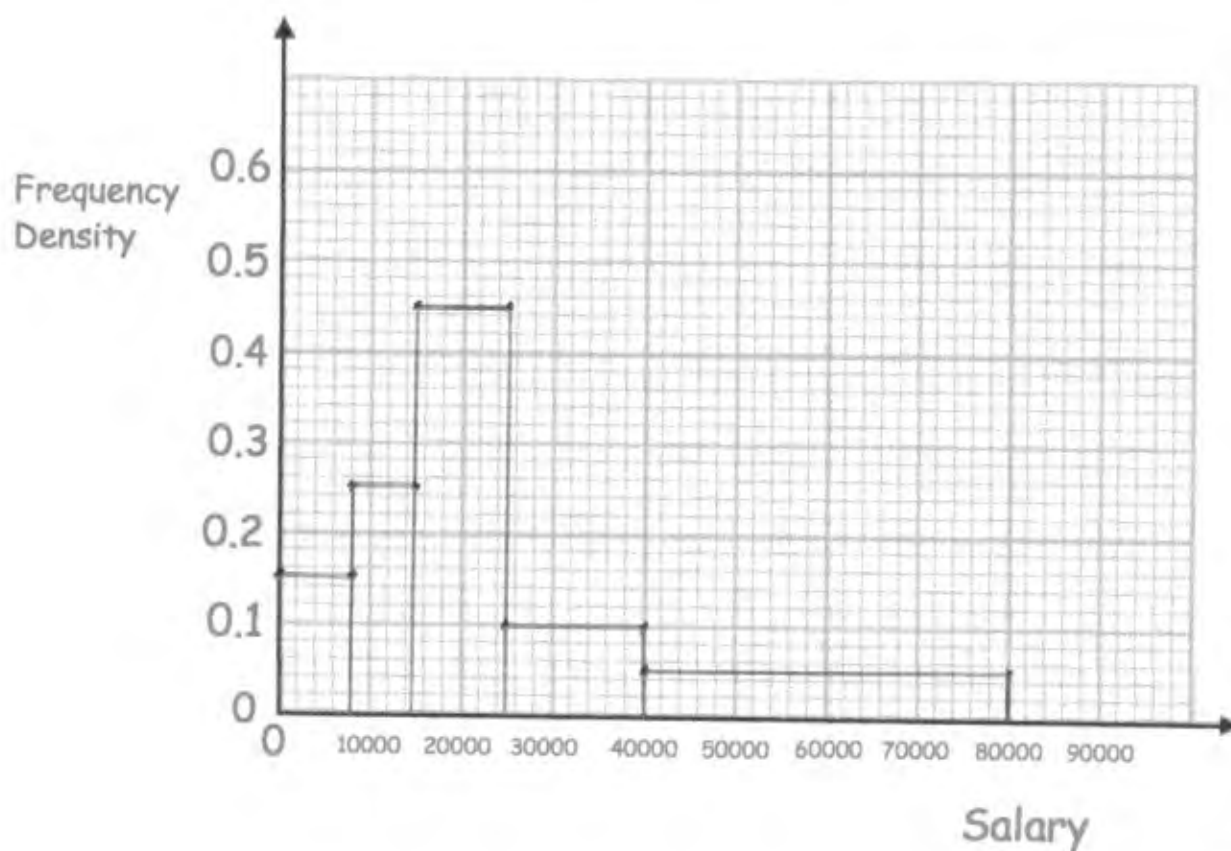| Salary, p	Frequency	frequency density
$0 < p \leq 8000$	1200	0.15
$8000 < p \leq 15000$	1750	0.25
$15000 < p \leq 25000$	4500	0.45
$25000 < p \leq 40000$	1500	0.1
$40000 < p \leq 80000$	2000	0.05

Draw a histogram for this data.

(3)

4. The lengths of 200 fish in a pond, *l* centimetres, are recorded below.

Length, l	Frequency	frequency density
0 < l ≤ 4	36	9
4 < l ≤ 6	40	20
6 < l ≤ 8	48	24
8 < l ≤ 12	44	11
12 < l ≤ 20	32	4

Draw a histogram for this data.
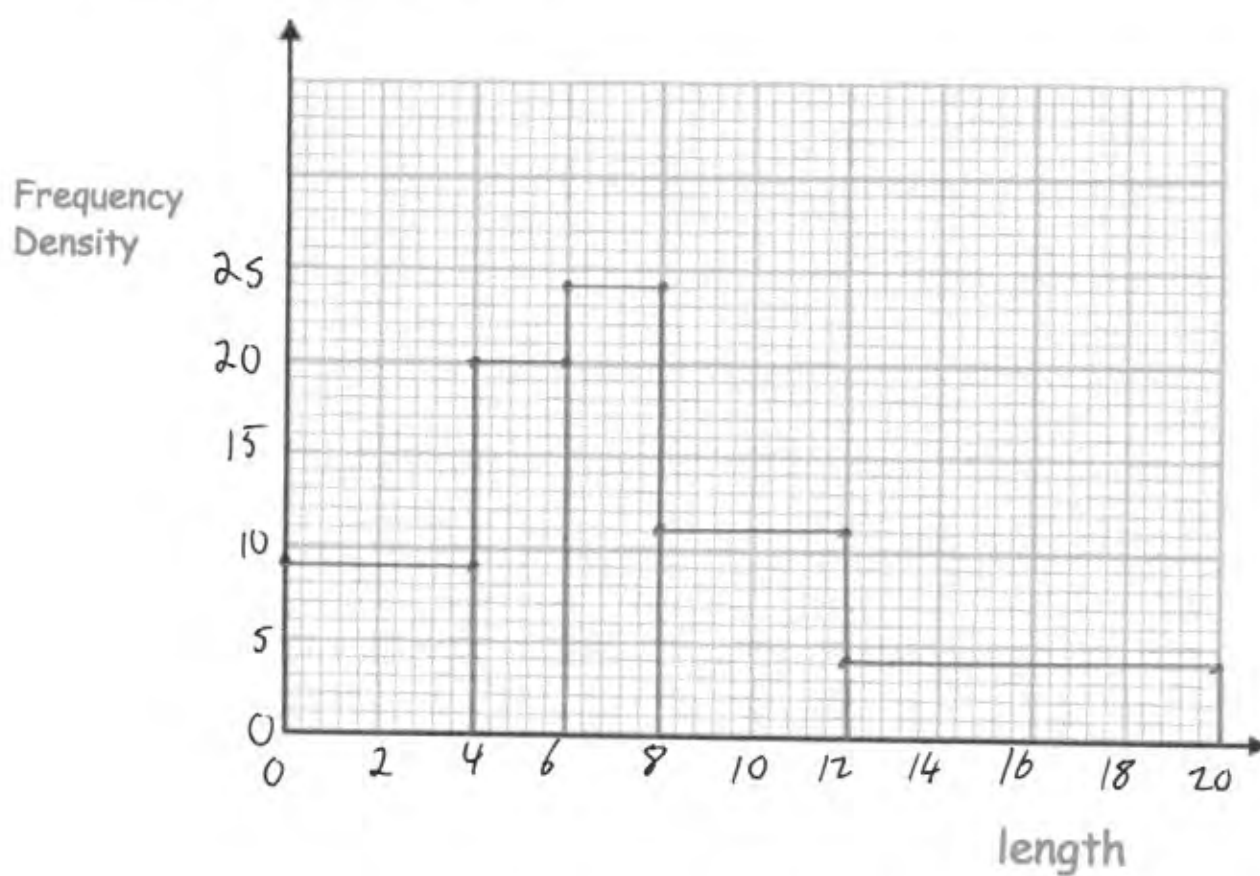
(3)

5.   The table gives information about the hours Easyair pilots have spent flying, t hours.

Time (t hours)	Frequency	frequency	density
$0 < t \leq 100$	24	0.24	
$100 < t \leq 150$	21	0.42	
$150 < t \leq 200$	17	0.34	
$200 < t \leq 350$	24	0.16	
$350 < t \leq 500$	9	0.06	

(a) Draw a histogram to show this information.
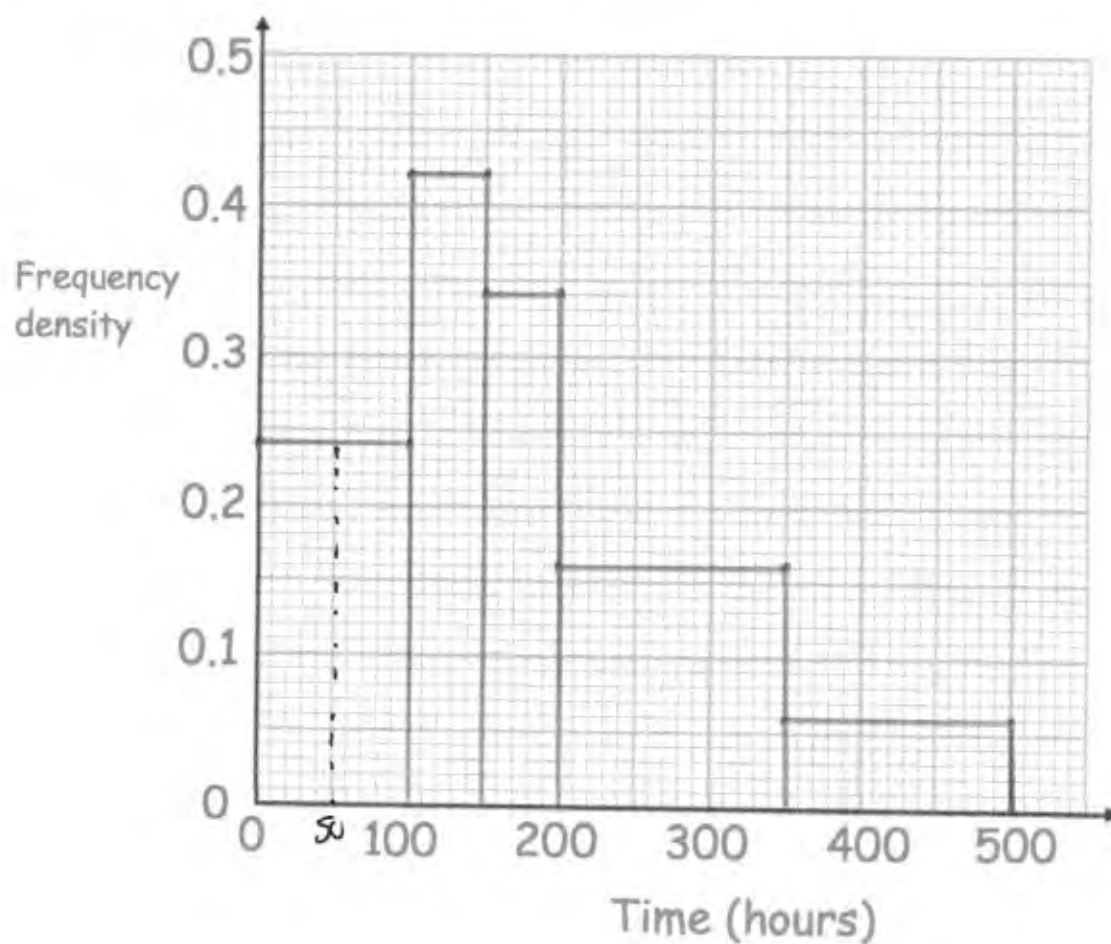
(3)

(b) Estimate the number of Easyair pilots who have flown under 50 hours.

$$24 \div 2 = 12$$

12

(1)

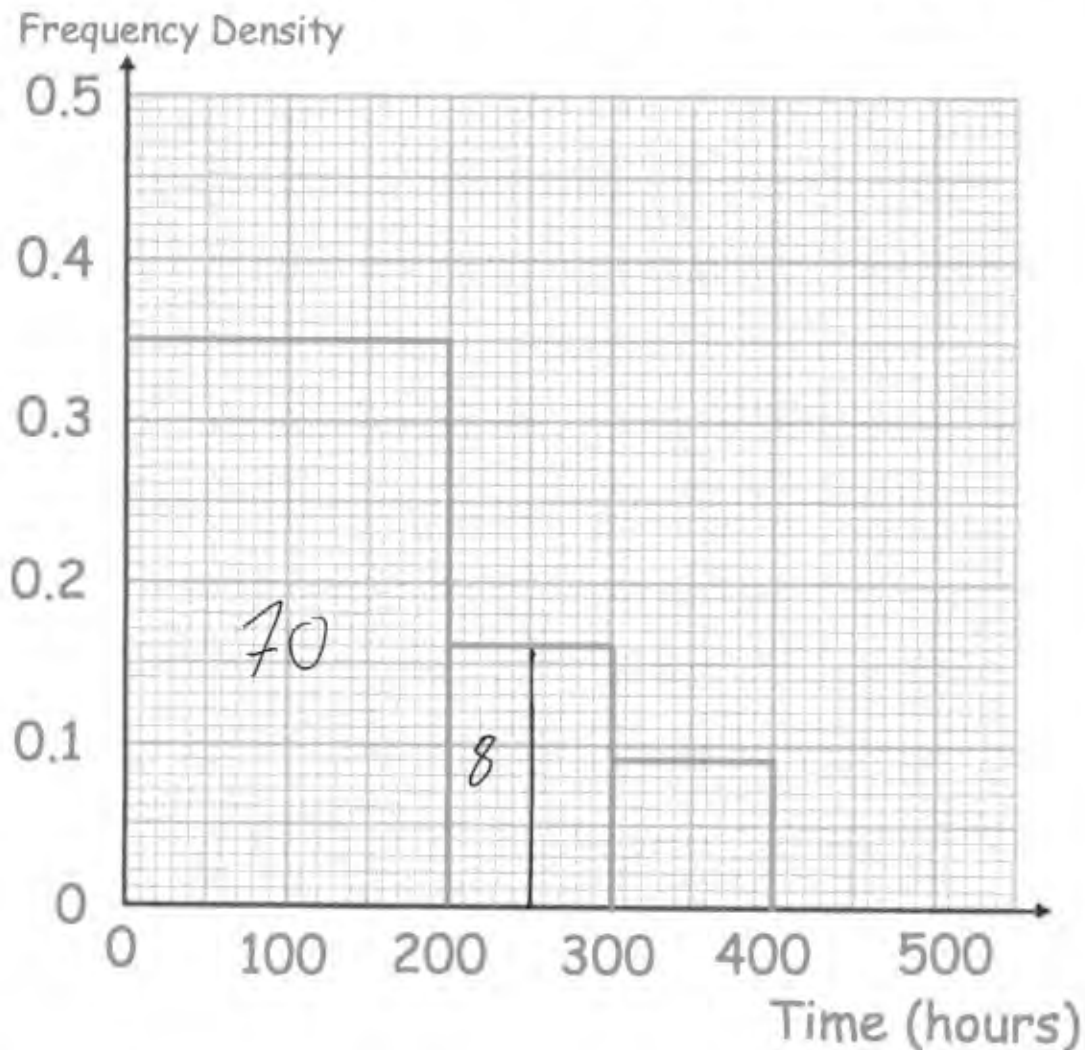The histogram shows the distribution of time spent flying by Ryanjet pilots.

Frequency Density

Time (hours)

(c) Estimate the number of pilots who have flown under 250 hours.

$$200 \times 0.35 = 70$$
$$50 \times 0.16 = 8$$

78

(2)

(d) Make one comparison between the distribution of time spent flying by pilots from Easyair and Ryanjet.

Easyair pilots have spent more time flying
- they only have 62 pilots that have flown under
200 hours, compared to 70 from Ryanjet.
- Easyair have 33 pilots who have flown **(1)**
over 200 hours, compared to 25 from Ryanjet.
- Easyair may have pilots who flew over 400 hours

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6. The table gives information about the lengths, l metres, of fish in a pond.

length (l cm)	Frequency	frequency density
$0 < l \le 8$	16	2
$8 < l \le 10$	7	3.5
$10 < l \le 12$	9	4.5
$12 < l \le 16$	6	1.5
$16 < l \le 20$	2	0.5

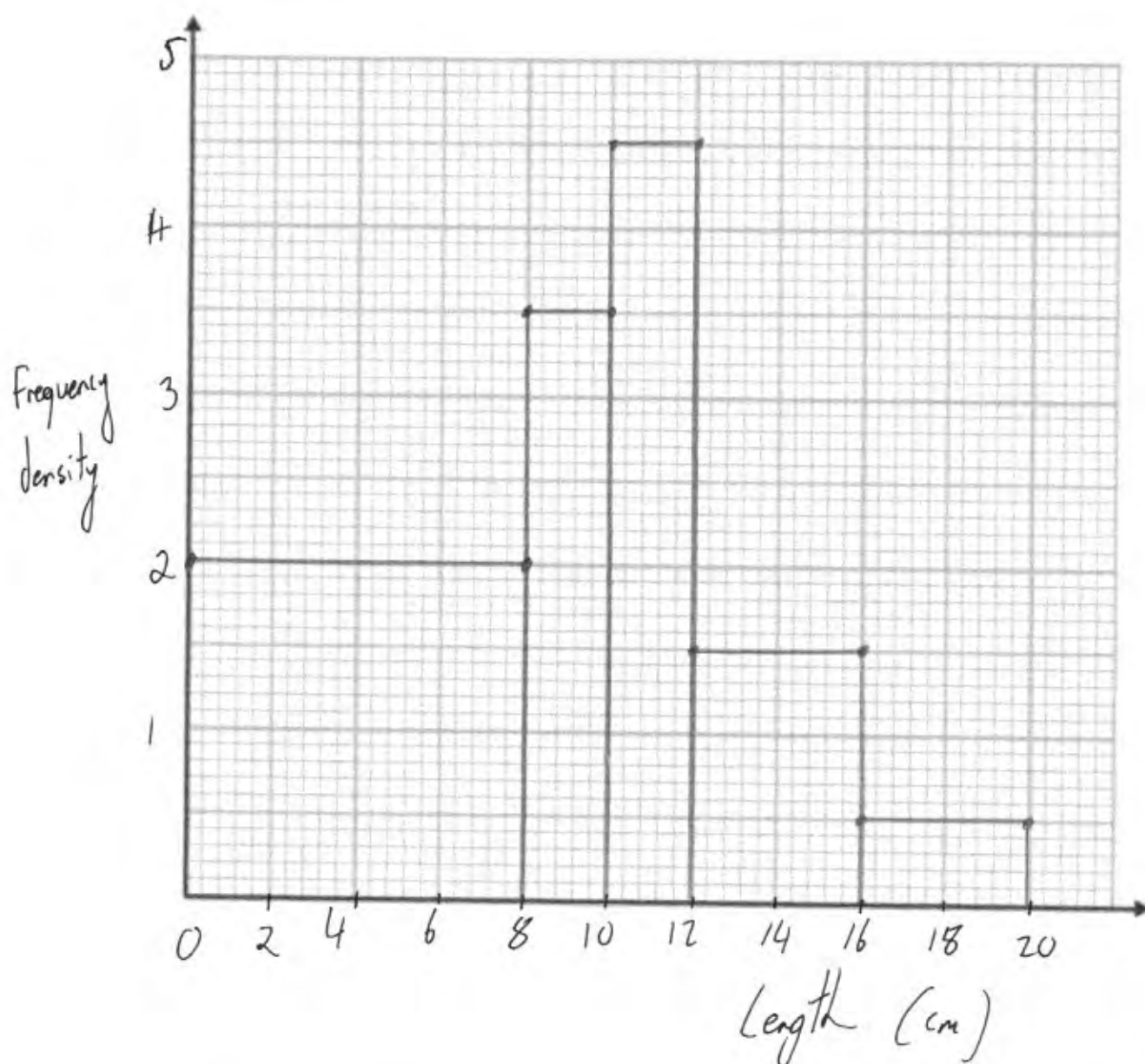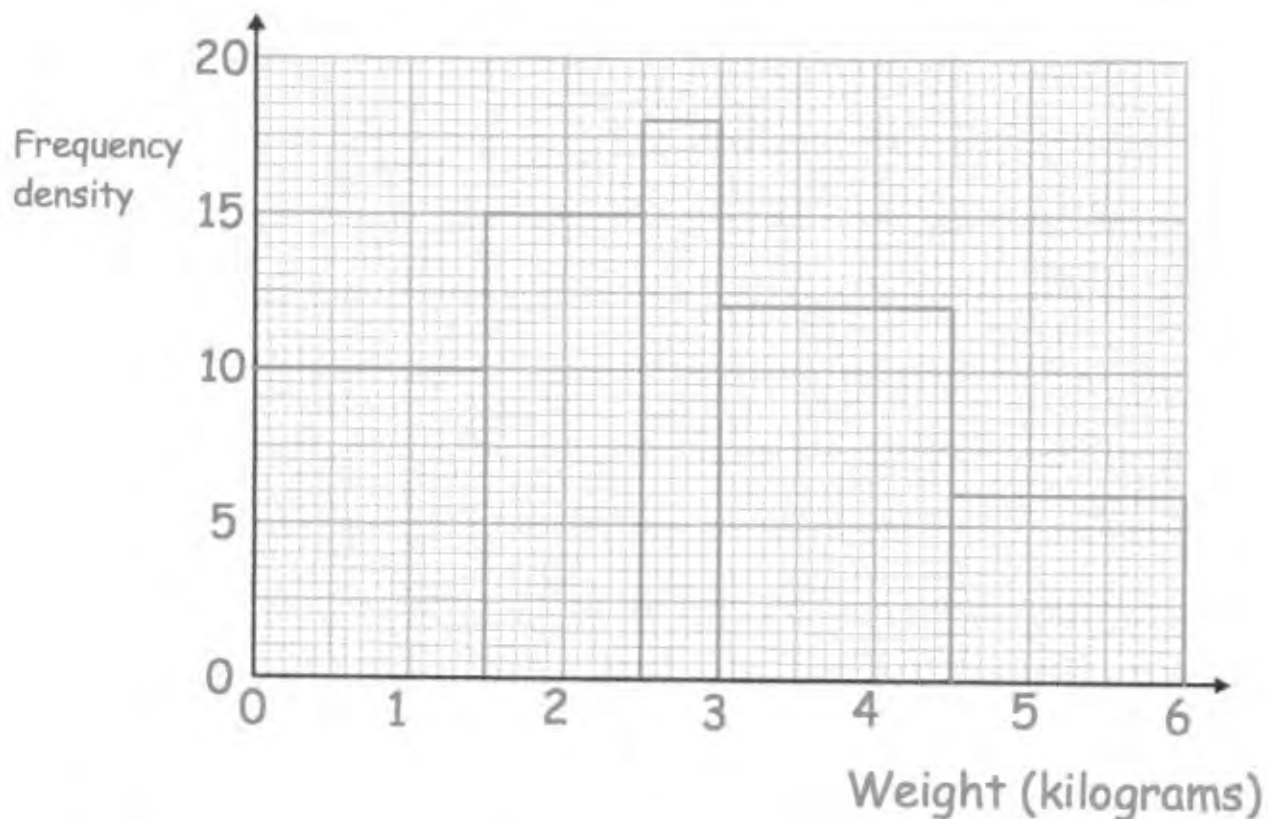Draw a histogram to show this information.

(3)

7. Below is a histogram showing information about the weight of parcels.

Weight (kilograms)

Use the histogram to complete the frequency table.

Weight, w	Frequency
0 < w ≤ 1.5	15
1.5 < w ≤ 2.5	15
2.5 < w ≤ 3	9
3 < w ≤ 4.5	18
4.5 < w ≤ 6	9

1·5 × 10

1 × 15

0·5 × 18

1·5 × 12

1·5 × 6

(3)

8.   Below is a histogram showing information about the value of antiques.
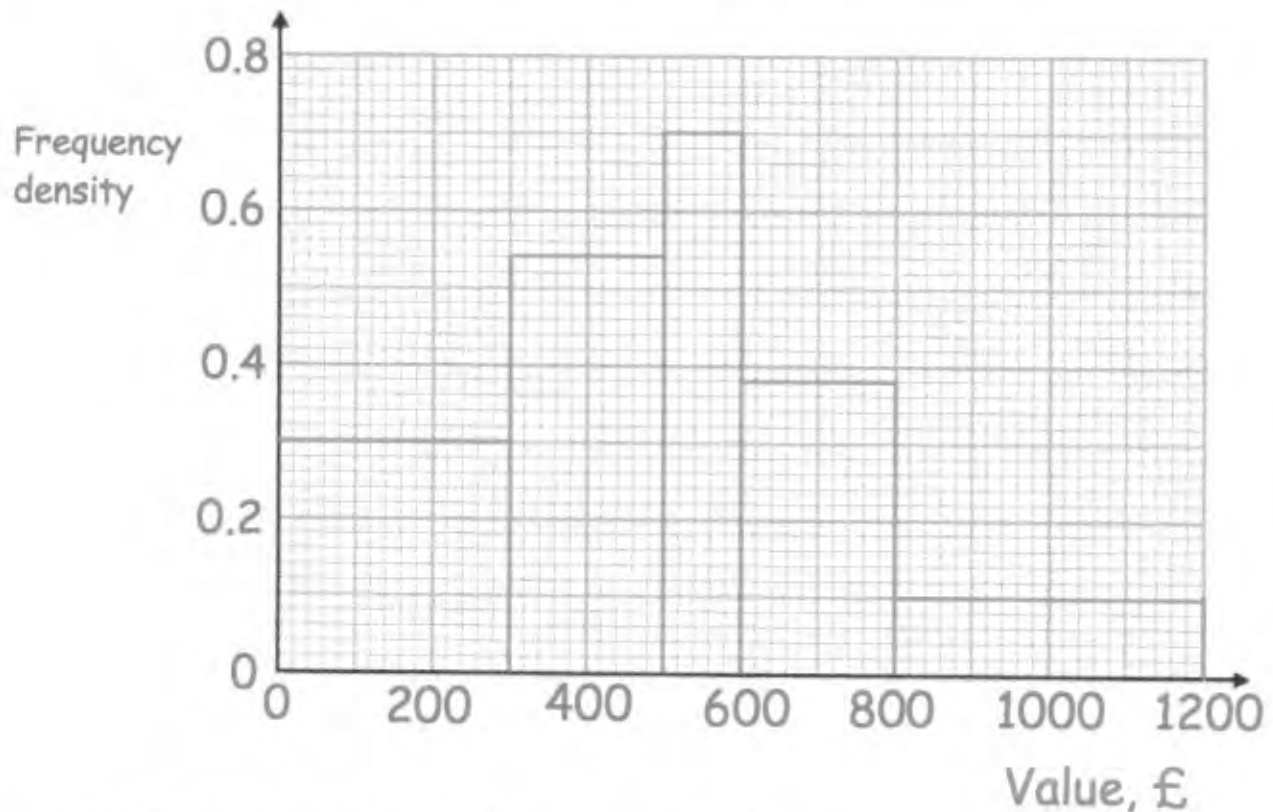
Use the histogram to complete the frequency table.

Values, v	Frequency
0 < v ≤ 300	90
300 < v ≤ 500	108
500 < v ≤ 600	70
600 < v ≤ 800	76
800 < v ≤ 1200	40

300×0.3

200×0.54

100×0.7

200×0.38

400×0.1

(3)

9. A group of students were asked to complete a puzzle.
The histogram shows the distribution of the times taken.

Time (seconds)
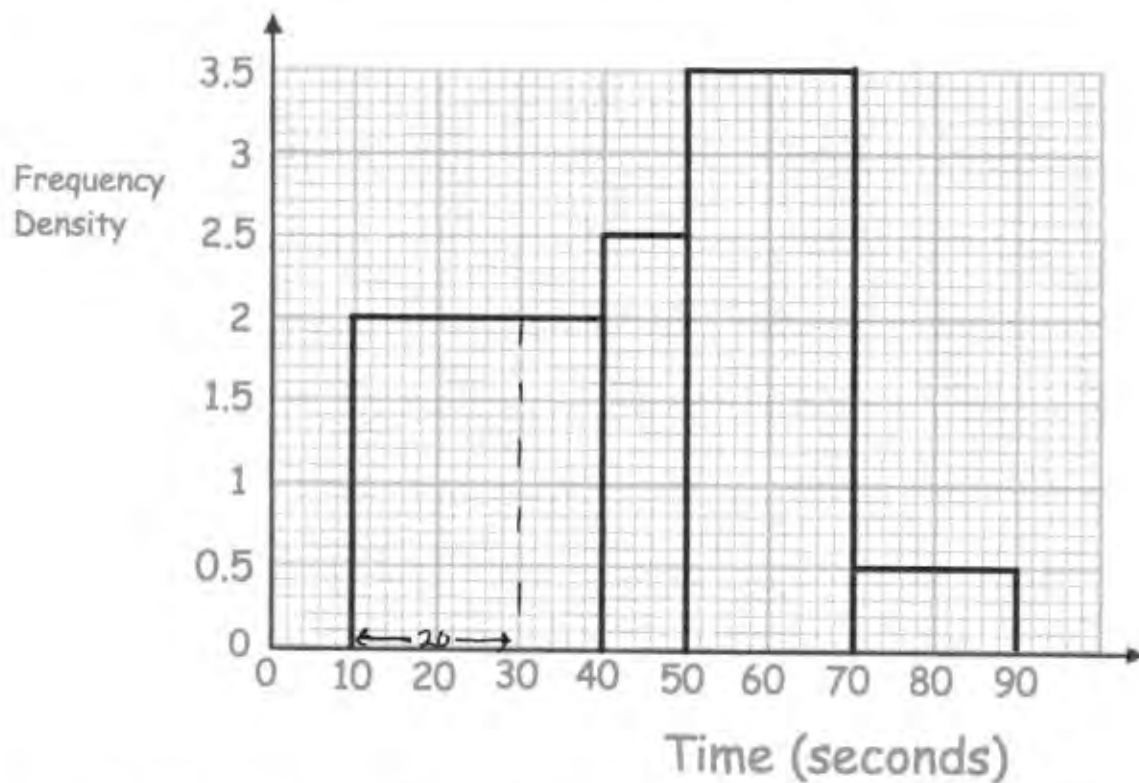
(a) Work out how many students took between 50 and 70 seconds to complete the puzzle.

20×3.5

70
....
(1)

(b) Calculate an estimate of the number of students who took under 30 seconds to complete the puzzle.

20×2

40
....
(2)

10. The histogram shows information about the speeds, in miles per hour, that cars travelled through a village. The speed limit is 60mph.
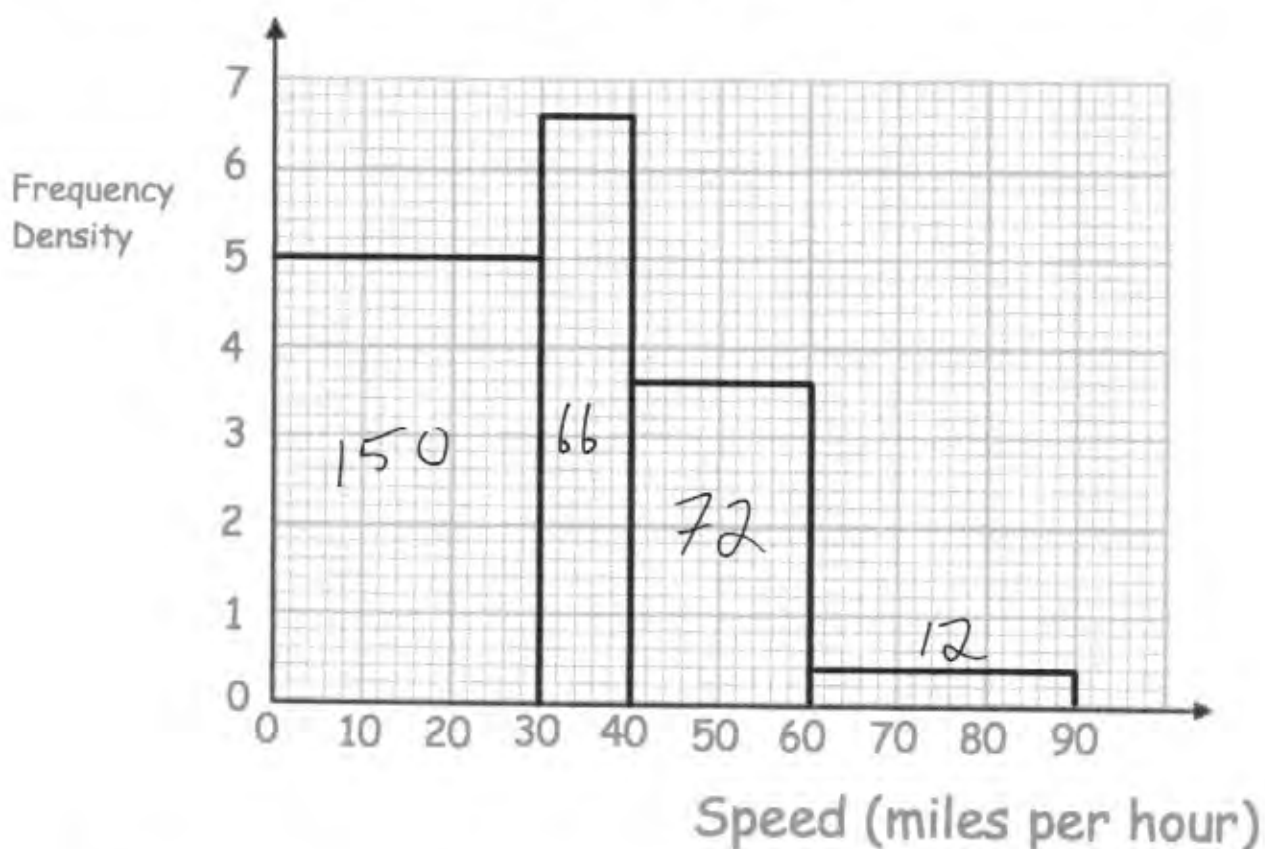
Work out the percentage of cars that were under the speed limit of 60mph.

total number of cars = 300

Under 60 = 150 + 66 + 72 = 288

$$\frac{288}{300} \times 100$$

....96%....

(3)

11. The histogram shows the ages of visitors to a library on one morning.
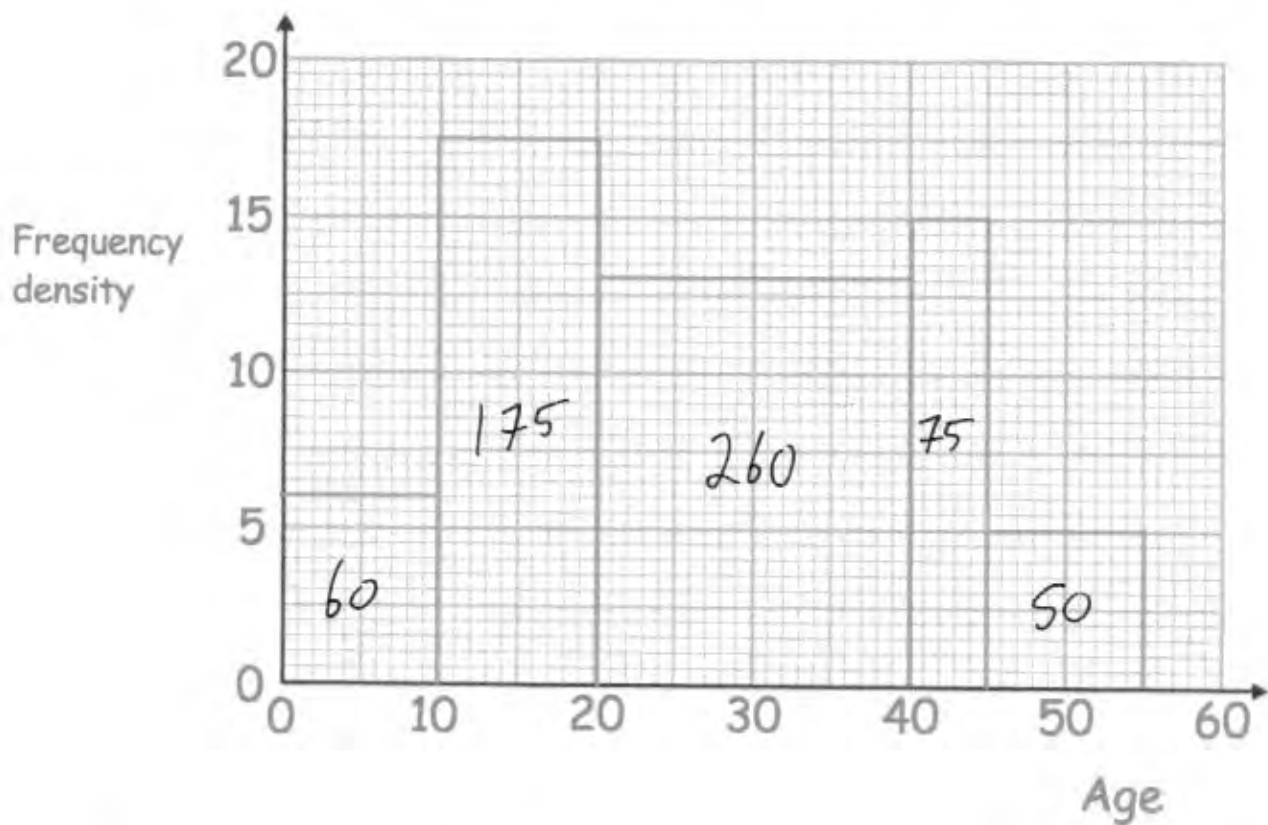
What percentage of visitors were over 40 years old?

Over 40 : 75 + 50 = 125

total : 620

$\frac{125}{620} \times 100$

20.16%

(3)

12. The incomplete table and histogram give some information about the weights of dogs.
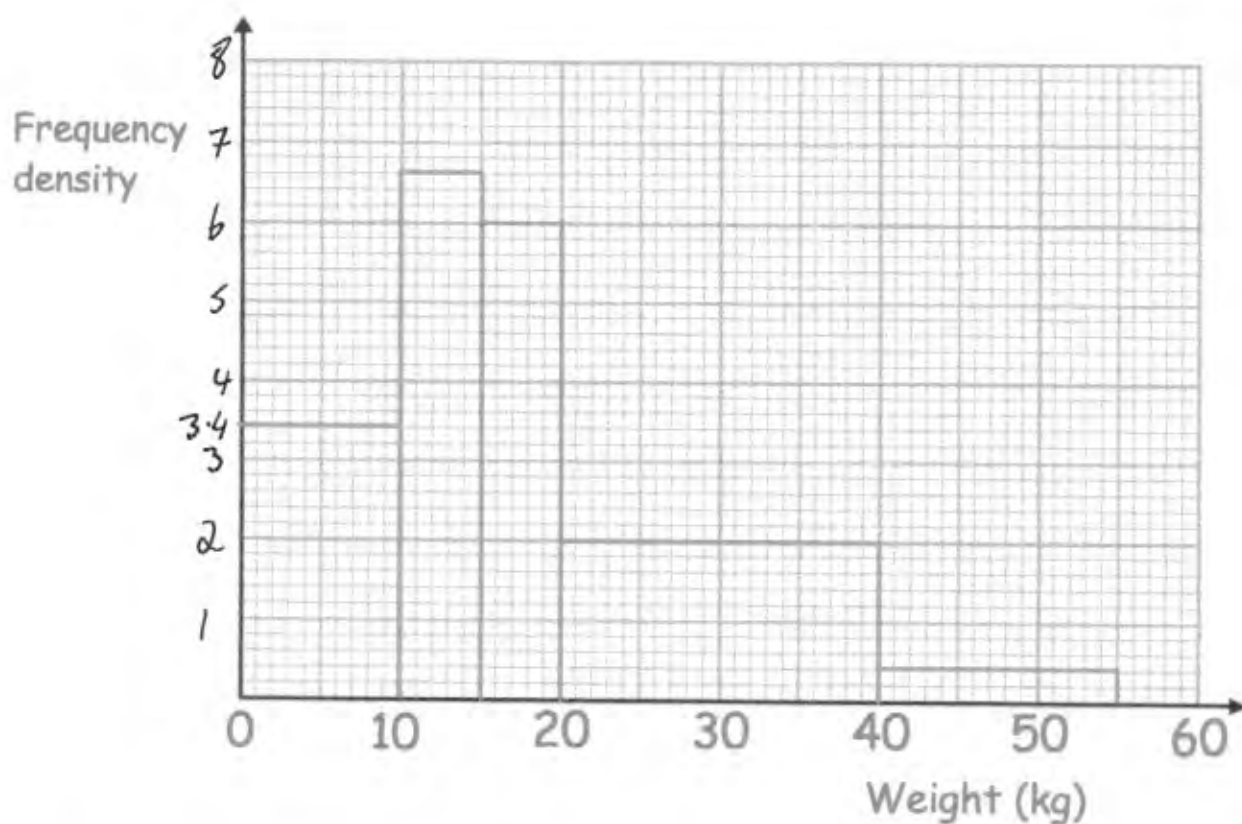
Use the information in the histogram to complete the frequency table.

weight (w kg)	Frequency
0 < w ≤ 10	34
10 < w ≤ 15	33
15 < w ≤ 20	30
20 < w ≤ 40	40
40 < w ≤ 55	6

$$10 \times \boxed{3.4} = 34$$

$$5 \times \boxed{6} = 30$$

$$20 \times \boxed{2}$$

(2)

13. The table and histogram give some information about the heights of plants in a greenhouse.

Frequency density
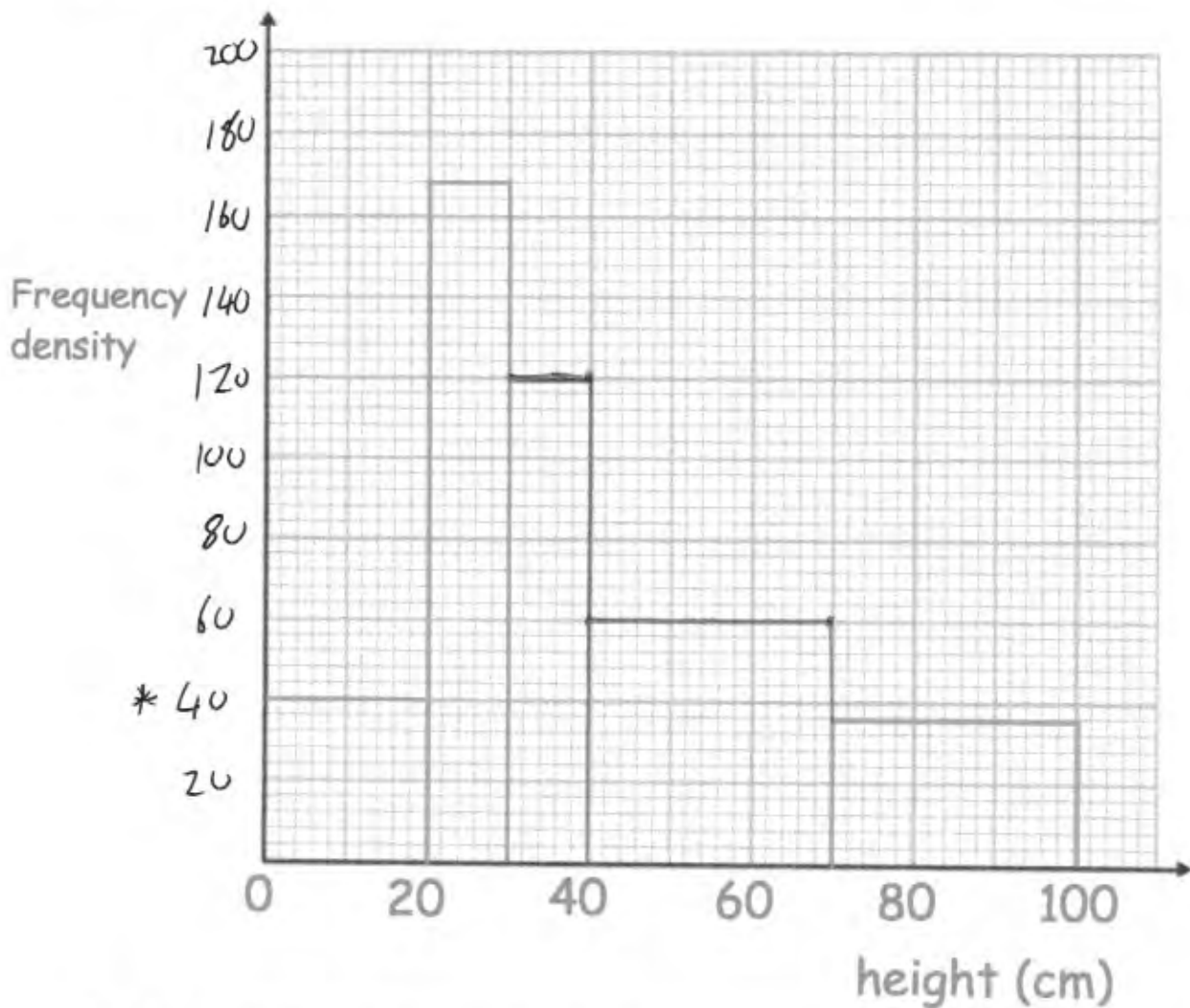
height (cm)

(a) Use the histogram to complete the frequency table.

Height (h cm)	Frequency
0 < h ≤ 20	800
20 < h ≤ 30	1680
30 < h ≤ 40	1200
40 < h ≤ 70	1800
70 < h ≤ 100	1080

*
40
$20 \times \square = 800$
$10 \times 168 = 1680$
$1200 \div 10 = 120$
$1800 \div 30 = 60$
$30 \times 36 = 1080$

(2)

(b) Use the table to complete the histogram.

(2)

14. The histogram shows information about how far 150 children swam, when trying to get their swimming certificates.
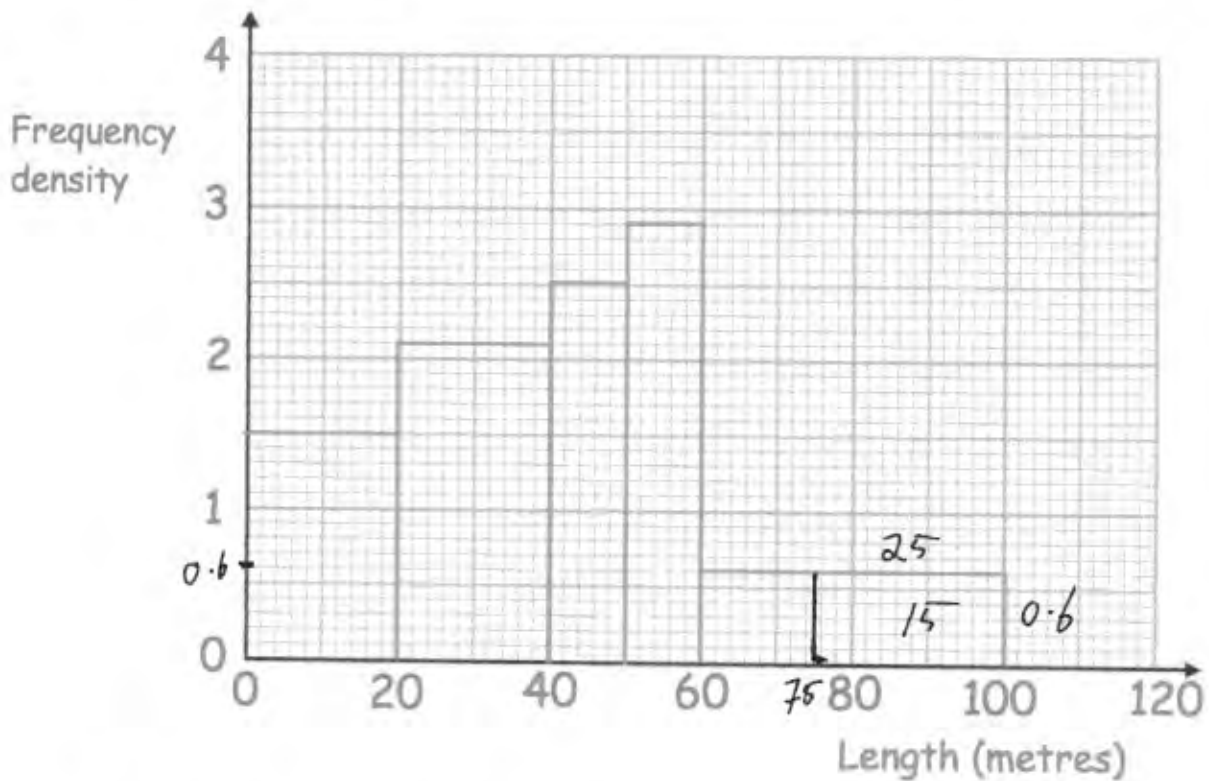
(a) Complete this frequency table.

Length, l metres	Frequency
0 < l ≤ 20	30
20 < l ≤ 40	42
40 < l ≤ 50	25
50 < l ≤ 60	29
60 < l ≤ 100	24

20 × 2·1

10 × 2·9

(2)

(b) 10% of the swimmers swam further than y metres.
Calculate an estimate of y.

$0.6 \times \boxed{} = 15$

25

10% of 150 = 15

y
|————————————————|————|
      90%   10%

75 m
....
(2)

© Corbettmaths 2015
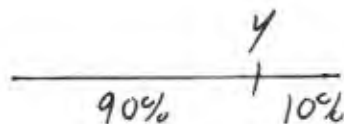
15. The histogram shows the speeds in miles per hour of 82 cars on a road.

135 squares

140 squares

125 little squares

50 little squares

0   20 25 30 35 40 42 45 49 50 55 60 65

Speed, miles per hour
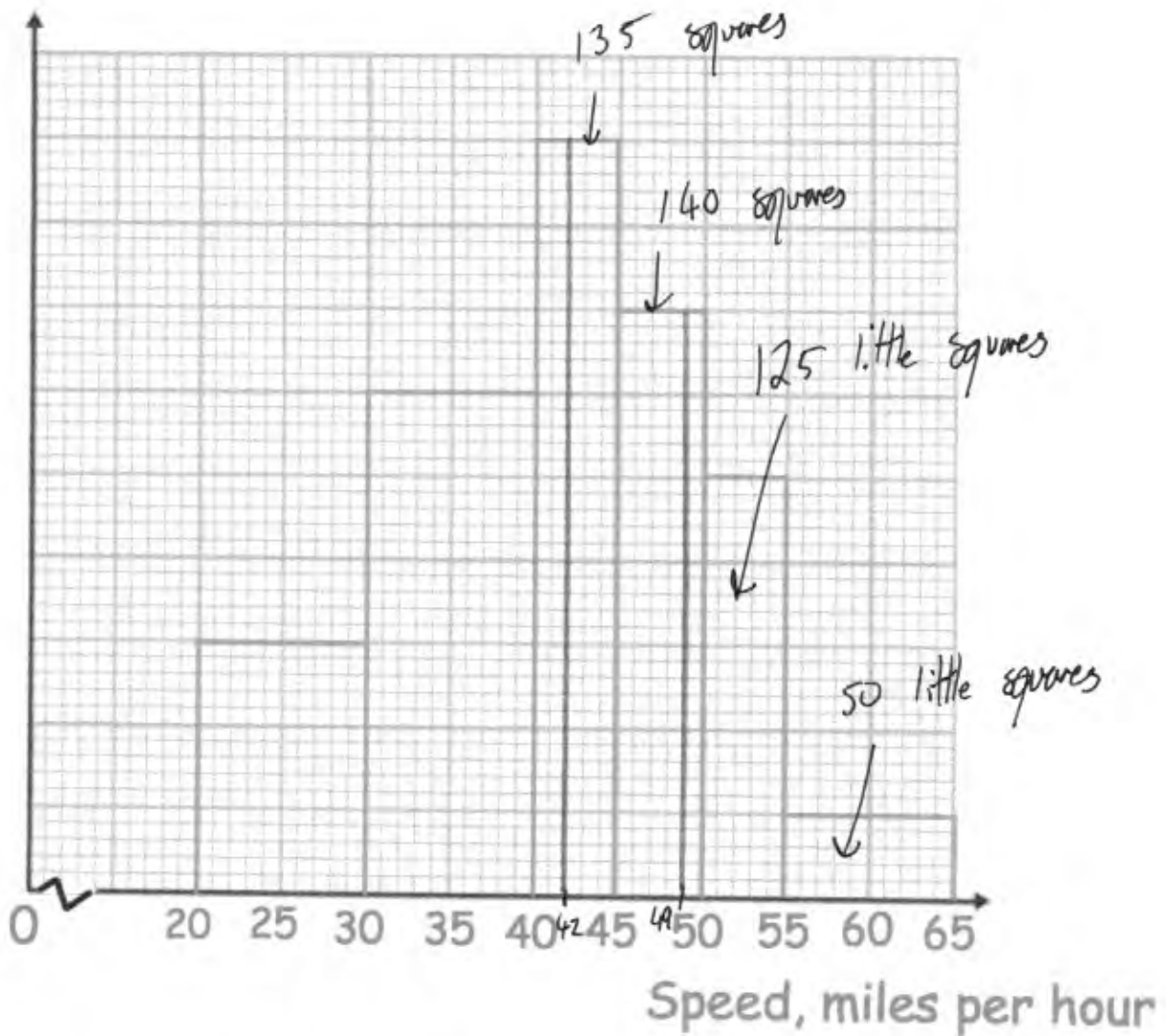
14 cars were travelling over 50 mph.

Calculate an estimate of the number of cars that were travelling between 42 and 49 mph.

175 squares = 14 cars

12.5 squares = 1 car.

275 ÷ 12.5 = 22 cars

..........22..........

(4)

16. The histogram shows the weights in kilograms of 504 athletes.

105 squares

300 squares

55 squares

20 squares

0   40 50 60 70 80 90 100 110 120 130

Weight, kilograms
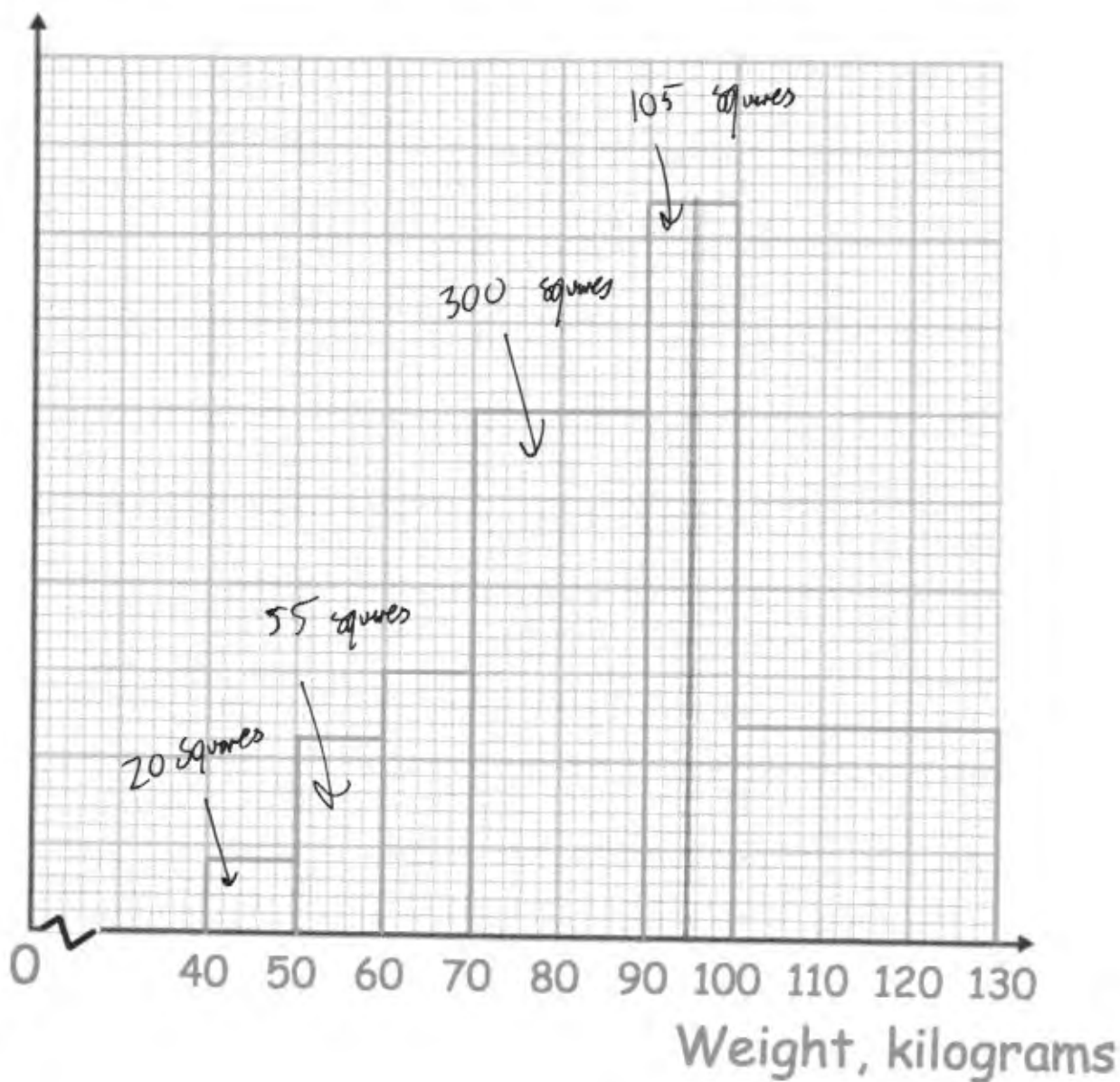
45 athletes weigh under 60kg.
Calculate an estimate of the number of athletes between 70 and 95kg.

45 athletes = 75 squares

1 athlete = 1⅔ squares

405 ÷ 1⅔ = 243

243

(4)

17. The histograms shows information about the time taken by 140 students to complete a puzzle.
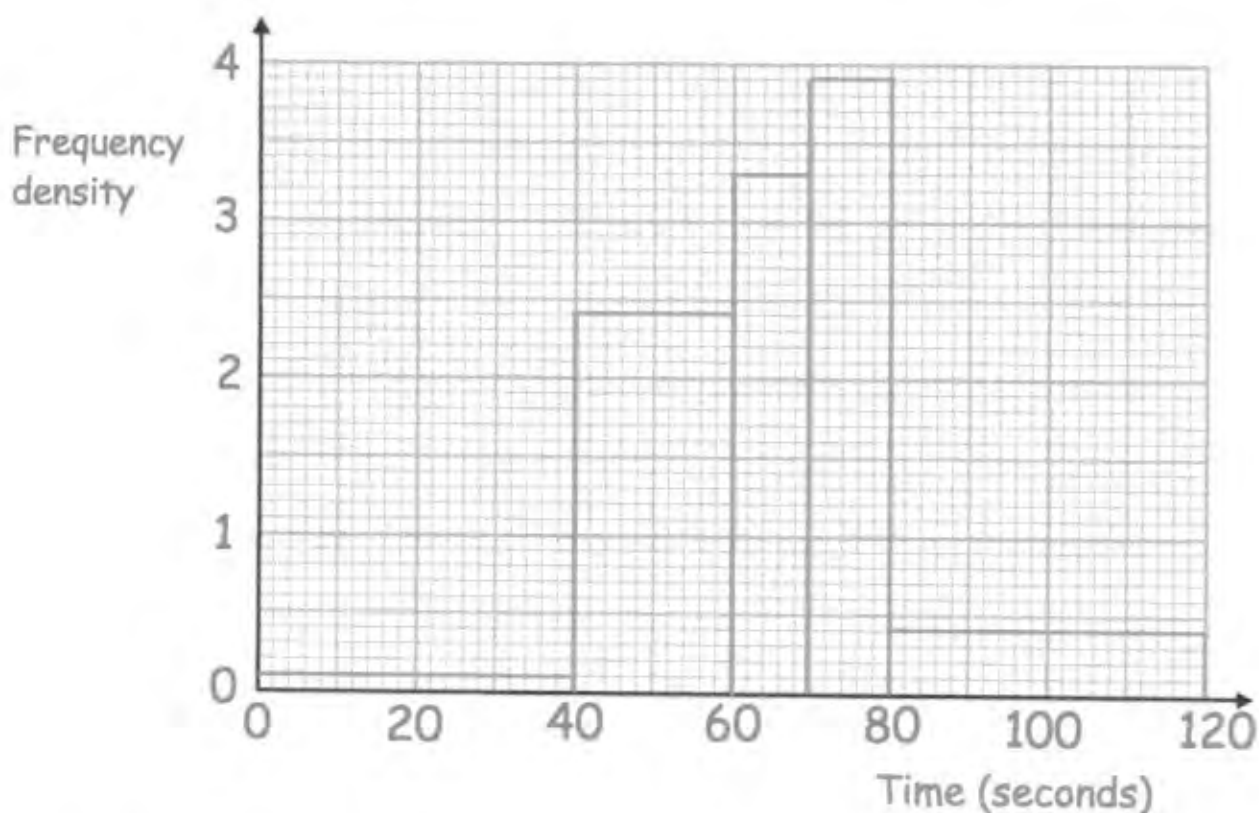
(a) Complete this frequency table.

Time, t seconds	Frequency
0 < t ≤ 40	4
40 < t ≤ 60	48
60 < t ≤ 70	33
70 < t ≤ 80	39
80 < t ≤ 120	16

20×2.4

10×3.9

✳

(2)

(b) Calculate an estimate of the median.

70th value

$$60 + \frac{18}{33} \times 10 =$$

65·455 seconds
....
(3) to 3 dp.

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18. The histogram shows the weights of 700 dogs.
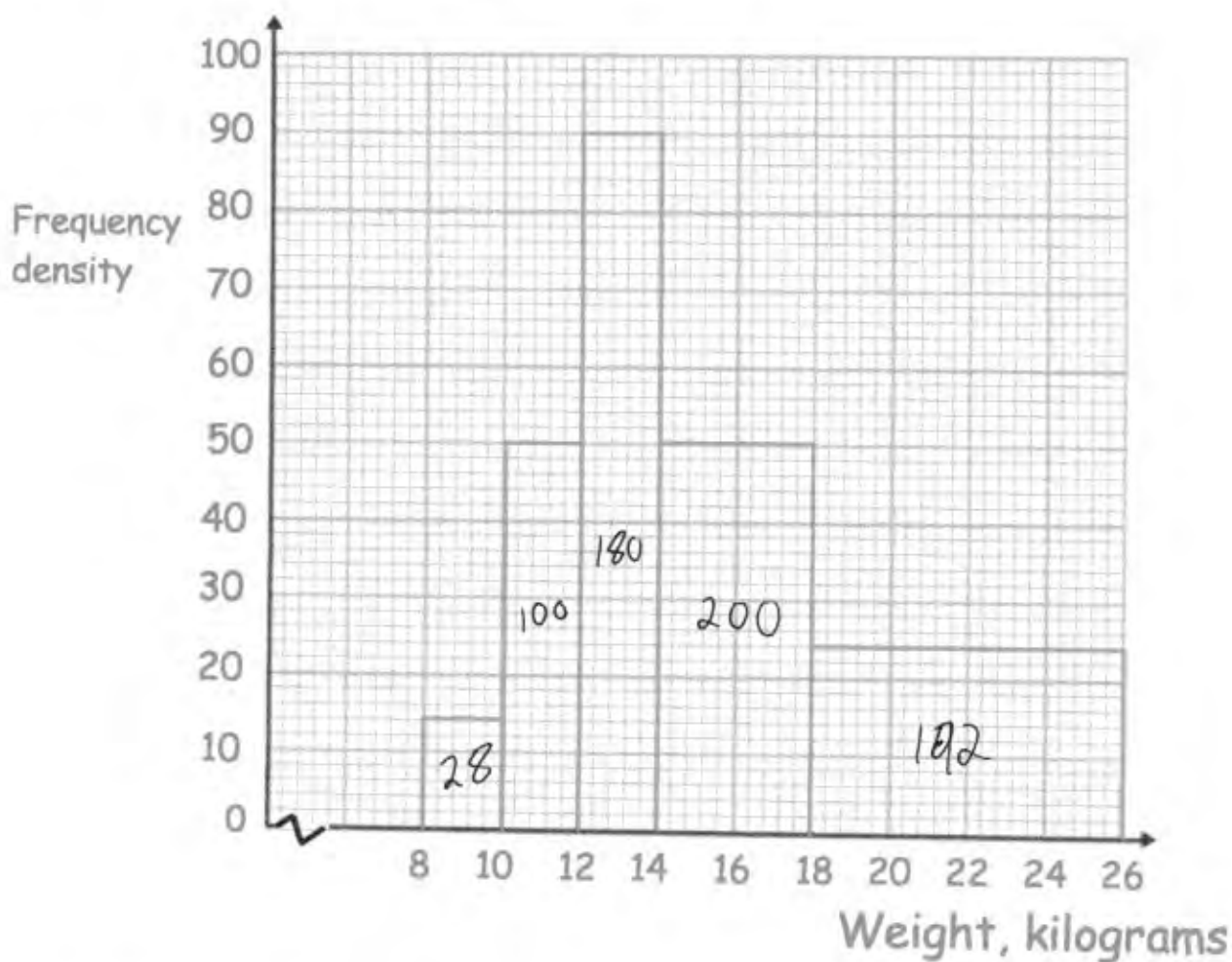
(a) Calculate an estimate of the median.

350th :

42 into. $14 \leqslant w < 18$

$14 + \dfrac{42}{200} \times 4$

$\underline{14\cdot84}$

(3)

(b) Calculate an estimate of the upper quartile.

525th

17 into $18 \leqslant w < 26$

$18 + \dfrac{17}{192} \times 8$

$\underline{18\cdot708}$

(3)

Name:

Exam Style Questions

Percentages:
of an amount (calculator)
increasing/decreasing by

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 235
Video 238
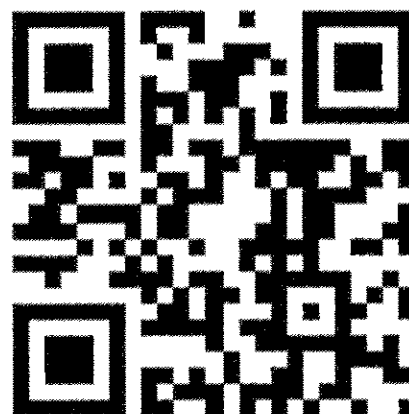
1. Calculate 7% of 340

$$1\% = 340 \div 100 = 3.4 \qquad \text{or} \qquad 340 \times 0.07$$

$$7\% = 3.4 \times 7 =$$

.........23.8.........

(2)

2. Find 56% of $8200

$$\text{or} \quad 8200 \times 0.56$$

$$1\% = 82$$
$$56\% = 4592$$

$..........4592.........

(2)

3. Calculate 83% of 9000

$$\text{or} \quad 9000 \times 0.83$$

$$1\% = 90$$
$$83\% = 7470$$

.........7470.........

(2)

4. Calculate 3.5% of 140g

$$1\% = 1.4$$
$$3.5\% = 4.9$$

$$\text{or} \quad 140 \times 0.035$$

.........4.9.........g

(2)

5. Find 18.2% of £25,000

$$1\% = 250$$

$$18.2\% = 4550$$

$$\text{or} \quad 0.182 \times 25000$$

£.....4550.....

(2)

6. Increase £2400 by 9%

or 2400×1.09

$1\% = 24$
$9\% = 216$

$2400 + 216$

£ ....2616....
(2)

7. Increase 40 miles by 43%

or 40×1.43

$1\% = 0.4$
$43\% = 17.2$

$40 + 17.2$

....57.2....miles
(2)

8. Decrease 18000 by 6%

or 18000×0.94

$1\% = 180$
$6\% = 1080$

$18000 - 1080$

....16920....
(2)

9. Decrease 712kg by 24%

or 712×0.76

$1\% = 7.12$
$24\% = 170.88$

$712 - 170.88$

....541.12....kg
(2)

10. Increase 7900 by 37.4%

or 7900×1.374

$1\% = 79$
$37.4\% = 2954.6$

$7900 + 2954.6$

....10854.6....
(2)

11. Oliver's salary is £18,000 and he is due to get an increase of 4%.
How much will this increase be?

18000×0.04

$1\% = 180$ or

$4\% = 720$

£ 720

(2)

---

12. A new TV is priced at £320
In a sale it is reduced by 45%

or 320×0.55

Calculate the sale price

$1\% = 3.2$

$45\% = 144$

$320 - 144 =$

£ 176

(3)

---

13. Joanne sees this special offer in a shop.

Special Offer

iPod   £189
Headphones   £25

Buy both items and receive a 4% discount

Joanne buys both items.

or 214×0.96

How much does she pay?

$189 + 25 = 214$

$1\% = 2.14$

$4\% = 8.56$ $214 - 8.56$

£ 205.44

(3)

14. Barry earns £1300 a month. He spends 30% of this money on rent and 12% on bills.

How much of the £1300 has he left?

or $1300 \times 0.3 = 390$
$1300 \times 0.12 = 156$

$1300 - 390 - 156 = 754$

Rent
1% = 13
30% = 390

Bills
1% = 13
12% = 156

$1300 - 390 - 156$

£ 754

(3)

---

15. A carton of orange juice contains 540ml.
A special offer carton contains an extra 35%.

How many millilitres of orange juice are in the special offer carton?

1% = 5.4
35% = 189

or 540×1.35

$540 + 189$

729 ml

(3)

---

16. There are 52800 fans at a football match between Rovers and City.
37% of the fans support Rovers.

How many fans at the match support City?

63% support City

1% = 528
63% = 33264

or 52800×0.63

33264

(3)

17. In 2000 the population of a country was 4,580,000
By 2015, the population had increased by 18%

Work out the population in 2015

or 4580000×1.18

$1\% = 45800$
$18\% = 824400$

5404400
....

(3)

18.
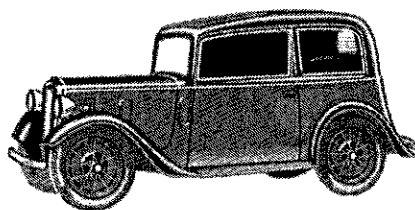
A vintage car was bought for £9,400
Since then the value of the car has increased by 29%

Calculate the value of the car.

$1\% = 94$

or 9400×1.29

$29\% = 2726$

£ 12126
....

(3)

19. James is buying a table.
He finds the same table for sale in two different shops.

Table World
£140
Prices include VAT

Tables'R'us
£120
Prices do not include VAT

When buying the table, the rate of VAT was 17.5%

$1\% = 1.2$
$17.5\% = 21$

Which shop is better value?
You must show your working.

$120 \times 1.175 = £141$ with vat

Table World
....
(3)

20. Harriet travelled from Bath to Cardiff.
Her average speed was 58 miles per hour.

There is traffic on the return journey.
Her average speed is reduced by 23%

Work out the average speed on the return journey.

58×0.77

or

$1\% = 0.58$
$23\% = 13.34$
$58 - 13.34$

44.66 .mph
(3)

21.   Georgina needs to buy petrol for her car.

Her car can hold 70 litres of petrol.
There are already 20 litres of petrol in the tank.   Needs 50 litres
Georgina is going to fill up the petrol tank.

The price of petrol is 115.9p per litre
Georgina has a voucher that gives her 3% off the price of petrol.

How much does Georgina have to pay for the petrol?

$$50 \times 115.9 = 5795p \quad or \quad £57.95$$

$$1\% = 0.5795$$
$$3\% = 1.7385$$

She saves £1.74 (or £1.73)

$$£57.95 - £1.74$$

£ _56.21_

or 56.22   (5)

22. The table gives information about the number of people voting for each party at an election.

Party	Number of Votes
Gold Party	12598
Pink Party	9112
Brown Party	20059
Purple Party	4466

Total   46235

There are 52852 people who can vote
The target was that 88% of people would vote.

Was the target met?

88% of 52852 = 46509.76   (46509 or 46510)

No the target was not met.

(3)

23.   A ball is dropped from a height of 3m and is allowed to bounce repeatedly.
       Each time it rises to a height which is 80% of the height it fell from.

       What height does the ball rise to after the second bounce.

1st bounce $= 300 \times 0.8 = 240$ cm

2nd bounce $= 240 \times 0.8 = 192$ cm

1.92 ....m

(3)

---

24.   James bought a house.
       In the first year the value of the house decreased by 10%.
       In the second year the value of the house increased by 10%.

       Is the house worth more, less, or the same as what James paid for it?
       Explain your answer.

If the house cost £100,000

1st year $= £90,000$

2nd year $= £99,000$

$\pounds x$

1st year $= 0.9x$

2nd year $= 0.9x \times 1.1$
$= 0.99x$

less

Overall 1% less   (3)

25. Cerys wants to invest £4000 for two years.

Banks'R'us
Compound Interest
6% for the first year
1.5% for each extra year

The Best Bank
Compound Interest
5% for the first year
2.5% for each extra year

Southern Bank
Compound Interest
7% for the first year
0.5% for each extra year

At the end of two years, Cerys wants to have as much money as possible.

Which bank should she invest her £4000 in?

Banks 'R' us   1st year = £4240
                  2nd year = £4303.60

The Best Bank   1st year = £4200
                  2nd year = £4305

Southern Bank   1st year = £4280
                  2nd year = £4301.40

....
(4)

The Best Bank

Name:

Exam Style Questions

Scatter Graphs

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 165
Video 166
Video 167
Video 168

1. The value of cars in a used car garage are recorded below.
The scatter graph shows this information.
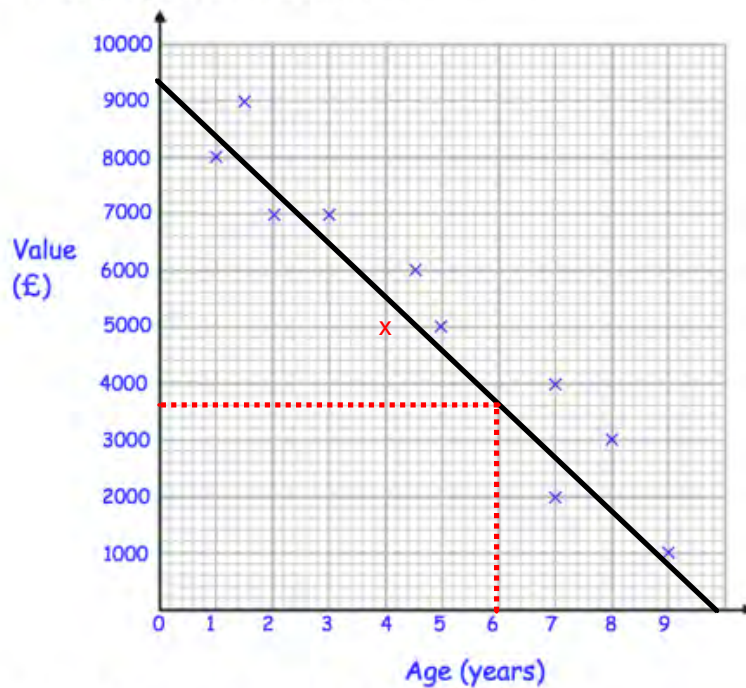
Another car arrives at the garage.
It is 4 years old and worth £5000.

(a) Show this information on the scatter graph.

(1)

(b) Describe the correlation between the value of the car and the age of the car.

negative correlation
....
(1)

The next car that arrives is 6 years old.

(c) Estimate the value of the car.

this may vary slightly based   3600
on your line of best fit.   £.......................
(2)

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2. The table shows the time spent revising and the test scores of ten students.

Time spent revising (hours)	9	0.5	1	4	6	2	3	7	5	8
Test result (%)	90	20	38	62	68	32	46	70	60	86

The first seven points have been plotted on this scatter diagram.
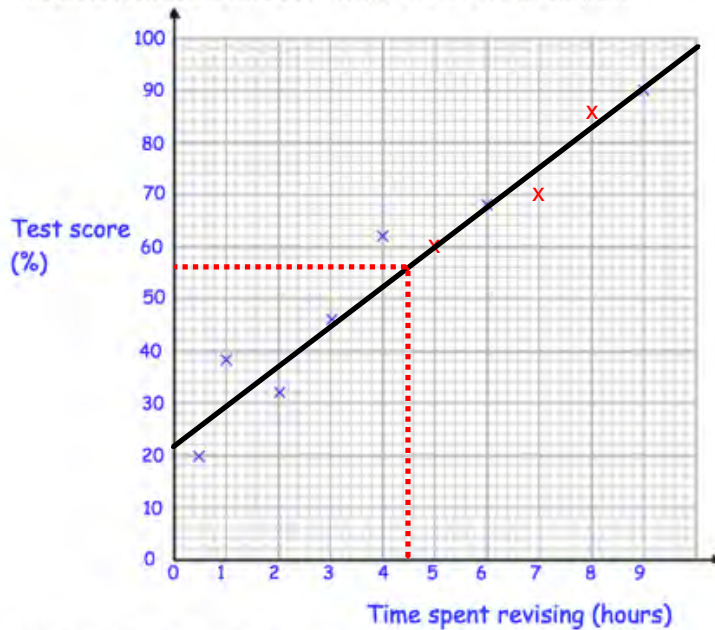
(a) Complete the scatter diagram.

(1)

(b) Describe the relationship shown in the scatter diagram.

As the time spent revising increases, so does the test score. (positive correlation)

(1)

(c) Draw a line of best fit on your scatter diagram.

(1)

(d) Another student has spent 4.5 hours revising.
Use your line of best fit to estimate their test result.

this may vary slightly based on your line of best fit.

56

...................%

(1)

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3. The scatter graph shows information about the heights and arm spans of ten students in a school.

Arm Span (cm) vs Height (cm)
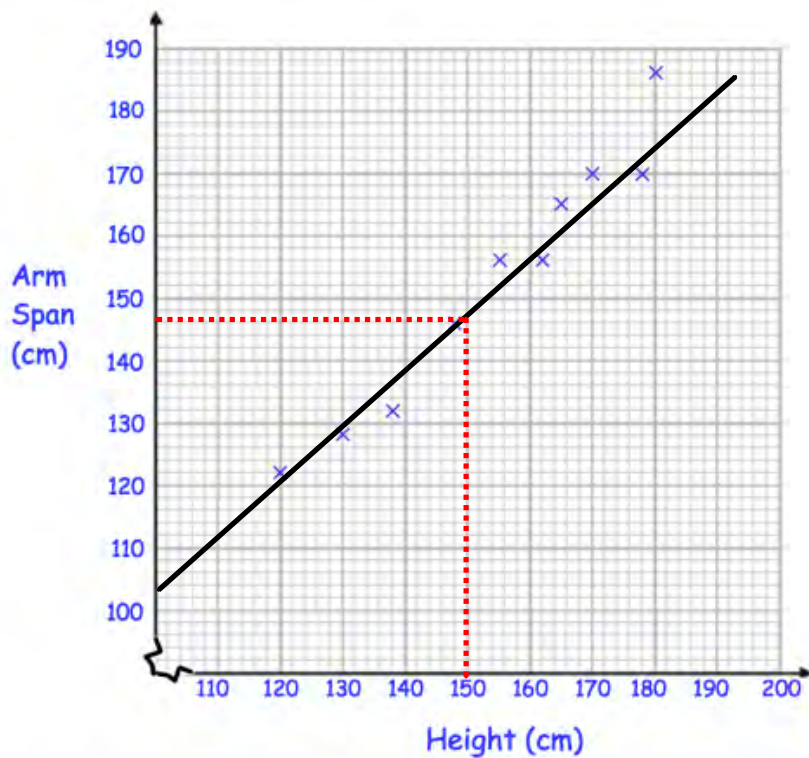
(a) What type of correlation does this scatter graph show?

positive

(1)

Another student has a height of 150cm.

(b) Estimate the arm span of this student.

this may vary slightly based on your line of best fit.

147

.........................cm

(2)

4. The table shows the charge (£) by plumbers for jobs of different duration (hours).

Job duration (hours)	1	2	3	3	5	6	6
Charge (£)	60	80	104	116	128	140	160

(a) Plot the data on the scatter graph below.

(2)

Charge (£)
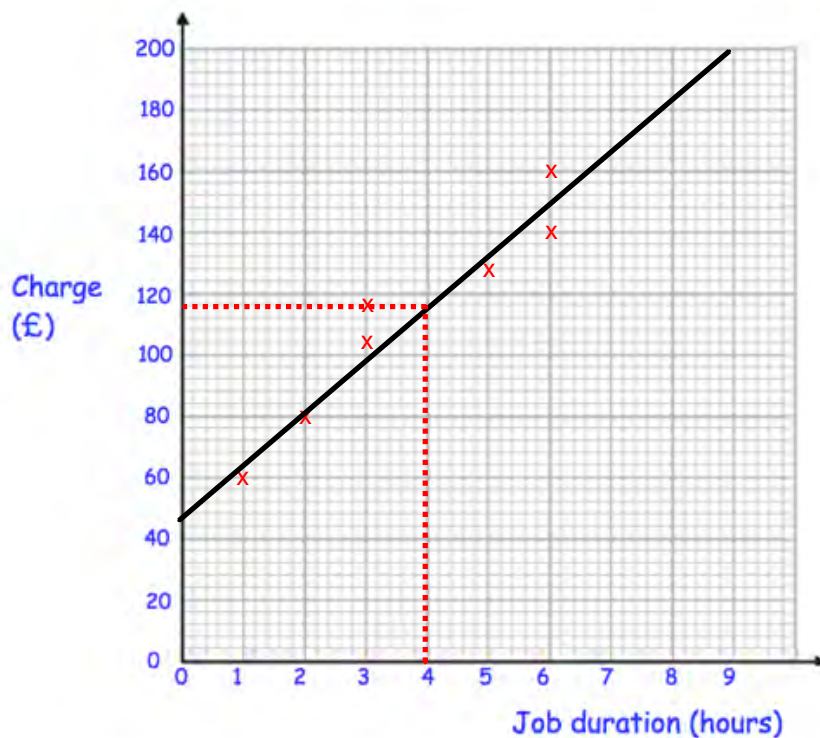
Job duration (hours)

(b) Describe the correlation.

There is a positive correlation, which means as the job duration increases, so does the charge.

(1)

(c) Draw a line of best fit on the scatter graph.

(1)

(d) Use your line of best fit to estimate the charge for a 4 hour job.

this may vary slightly based
on your line of best fit.

£ 116

(1)

(e) Explain why it may **not** be appropriate to use your line of best fit to estimate the charge for a job lasting 12 hours.

It is beyond the range of the data.
It is extrapolation, therefore
unreliable.

(1)

5. Some rugby players take two tests, one measuring speed and the other measuring strength.
Each test is marked out of 200.

The scatter graph compares the results.
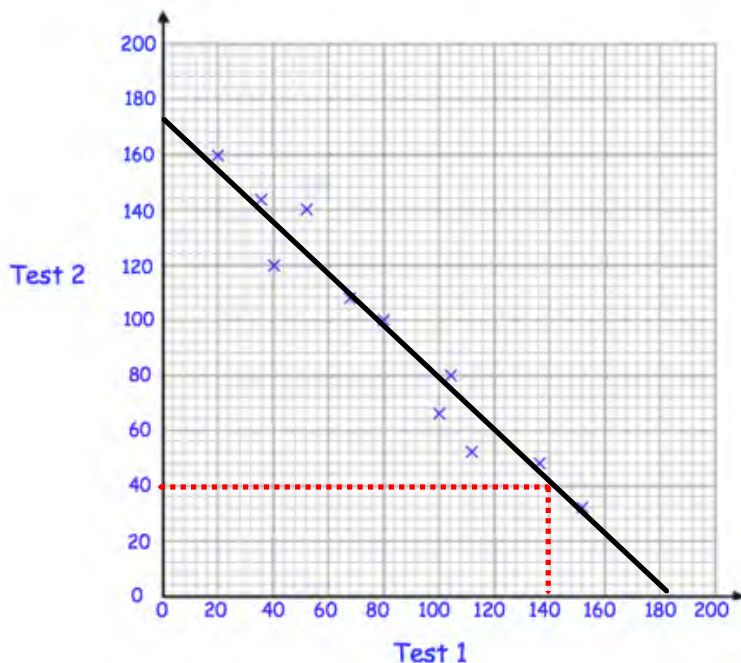
(a) What type of coordinate does this scatter graph show?

negative

(1)

(b) Draw a line of best fit on the scatter graph.

(1)

Brian scores 40 in Test 2.

(c) Estimate his score in Test 1.

this may vary slightly based
on your line of best fit.

£ 140

(1)

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6. A shop sells umbrellas.

The scatter graph shows information about the number of umbrellas sold each week and the rainfall that week, in millimetres.

Umbrellas sold

Rainfall (millimetres)
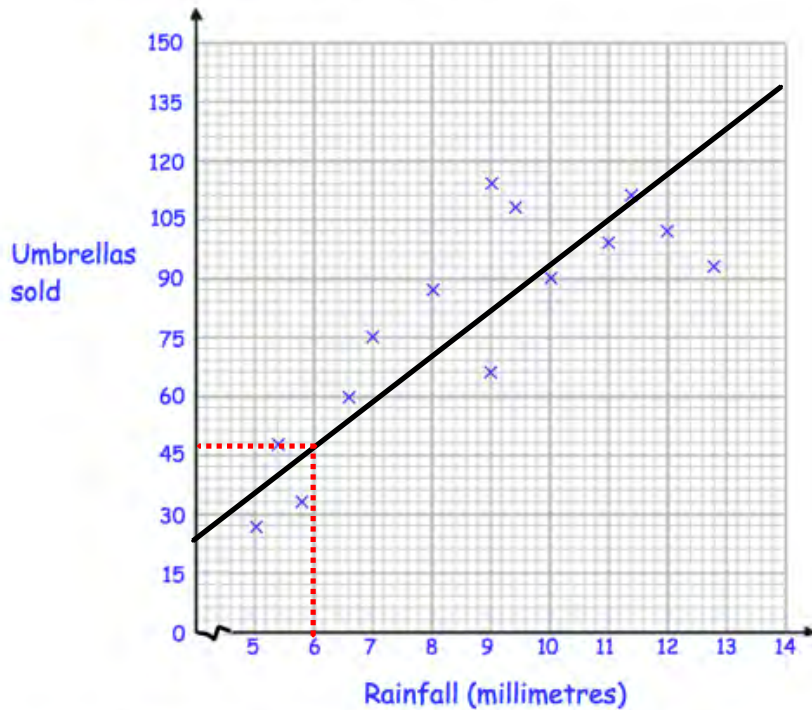
(a) Describe the relationship between the rainfall and umbrellas sold.

As the rainfall increases, the number of umbrellas sold increases.

(1)

(b) What is the most number of umbrellas sold in one week?

114

(1)

(c) What is the greatest amount of rainfall in one week?

12.8mm

....

(1)

(d) In how many weeks did the shop sell over 105 umbrellas?

3

....

(1)

In another week, there was 6mm of rain.

(e) Estimate the number of umbrellas sold.

48

....

this may vary slightly based
on your line of best fit.

(2)

(f) Explain why it may **not** be appropriate to use your line of best fit to estimate the number of umbrellas sold in a week with 25mm of rainfall.

It is beyond the range of the data.
It is extrapolation, therefore
unreliable.

(1)

7. The table below shows information about the monthly rent of an apartment and the distance of the apartment from a city centre, in miles.

Distance (miles)	3.2	1.5	5.7	8.2	0.7	0.9	4.4	5.8	9.3	0.4
Monthly rent (£)	340	420	250	190	500	470	300	260	170	510

(a) Plot the data on the scatter graph below.
Clearly label your axes.

(3)
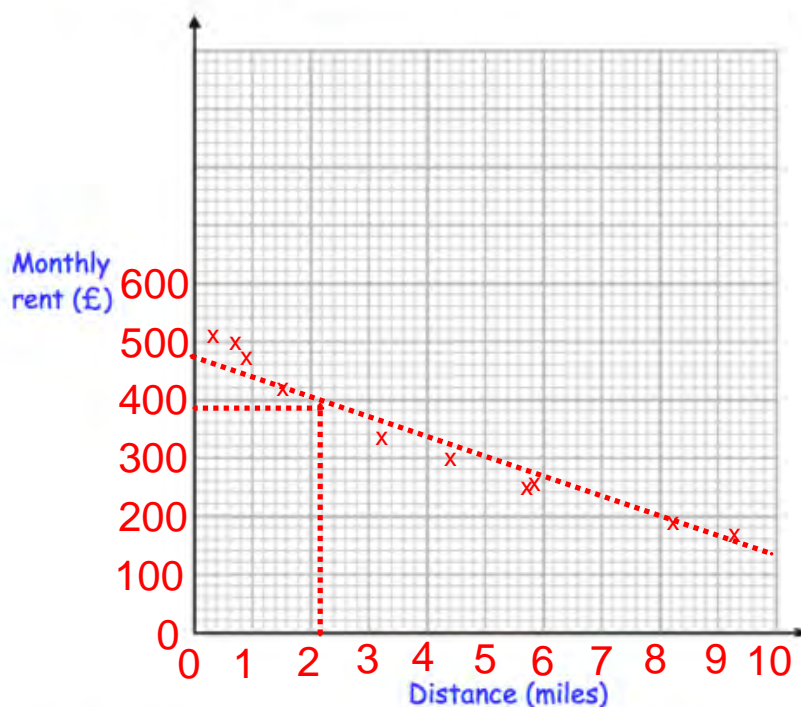
(b) Describe the relationship between the distance from the city centre and the monthly rent.

As the distance from the city centre increases, the monthly rent decreases. It is a negative correlation.

(1)

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An apartment is 2.2 miles from the city centre.

(c) Find an estimate for the monthly rent

this may vary slightly based
on your line of best fit.

£ 380

(2)

8. Match each scatter graph to the best description of the type and strength of correlation.

Strong positive correlation

Weak positive correlation

No correlation
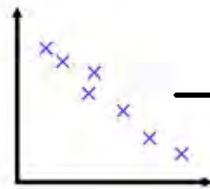
Weak negative correlation

Strong negative correlation

(2)

9. Eleven students sit examinations in Art, Maths and Biology.
Information about the results are shown in the scatter graphs below.
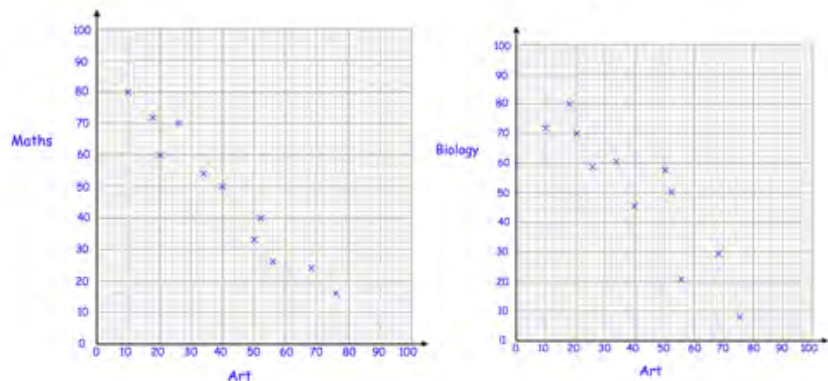
(a) Describe the correlation between the maths scores and art scores.

negative correlation
....
(1)

(b) Describe the correlation between the biology scores and art scores.

negative correlation
....
(1)

(c) Describe the correlation between the biology scores and maths scores.

positive correlation
....
(1)

Name:

Exam Style Questions

Standard Form

Corbettmαths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 300
Video 301
Video 302
Video 303

1. Write the following numbers in standard form.

(a) 40000

$$4 \times 10^4$$

(1)

(b) 5600

$$5.6 \times 10^3$$

(1)

(c) 41200000

$$4.12 \times 10^7$$

(1)

(d) 0.00000008

$$8 \times 10^{-8}$$

(1)

(e) 0.000345

$$3.45 \times 10^{-4}$$

(1)

2. Write 37341000000 in standard form.

$$3.7341 \times 10^{10}$$

(1)

3. Write 0.000000000000000412 in standard form.

4.12×10^{-13}

(1)

4. Calculate, writing your answer in standard form

$(2.05 \times 10^5) \times (8.17 \times 10^3)$

1.67485×10^9

(2)

5. Work out, giving each answer in standard form.

(a)

$(4 \times 10^5) \times (2 \times 10^4)$

8×10^9

(2)

(b)

$(5 \times 10^6) \times (7 \times 10^8)$

35×10^{14}

3.5×10^{15}

(2)

6. Work out, giving each answer in standard form.

(a)

$(3 \times 10^4) \div (6 \times 10^{-3})$

0.5×10^7
5×10^6

5×10^6

(2)

(b)

$(2.1 \times 10^{-5}) \div (7 \times 10^{-4})$

0.3×10^{-1}
3×10^{-2}

3×10^{-2}

(2)

(c)

$(5 \times 10^4)^2$

$5 \times 10^4 \times 5 \times 10^4$
25×10^8

2.5×10^9

(2)

7. Mr Holland has 2500kg of rice.

(a) Write 2500 kg in grams.
Give your answer in standard form.

2500000

2.5×10^6 g

(2)

(b) One grain of rice weighs 0.03g
Write the weight of one grain of rice in standard form.

3×10^{-2} g

(1)

(c) How many grains of rice are there in 2500kg of rice?
Give your answer in standard form.

$(2.5 \times 10^6) \div (3 \times 10^{-2})$

$8.33.. \times 10^7$ 8.33×10^7

(2)

8. (a) Write five million in standard form.

5000000

5×10^6

(1)

(b) Write three hundred thousand in standard form.

300000

3×10^5

(1)

(c) Work out five million multiplied by three hundred thousand.
Give your answer in standard form.

15×10^{11}
1.5×10^{12}

1.5×10^{12}

(2)

9. A calculator displays a number in standard form.

8.1×10^{-5}

Write the number as an ordinary number.

0.000081

0.000081

(1)

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10. The table gives the circumference, in metres, of planets in the solar system.
The circumferences are given to an accuracy of 3 significant figures.

Planet	Circumference (metres)
Mercury	1.54×10^7
Venus	3.81×10^7
Earth	4.01×10^7
Mars	2.13×10^7
Jupiter	4.39×10^8
Saturn	3.66×10^8
Uranus	1.59×10^8
Neptune	1.55×10^8

(a) Which planet has the largest circumference?

Jupiter
(1)

(b) Which planet has the smallest circumference?

Mercury
(1)

(c) Write 1.54×10^7 as an ordinary number.

15400000
(1)

(d) Work out the diameter of Neptune.
Give your answer in standard form.

$d = c \div \pi$

$1.55 \times 10^8 \div \pi$

4.934×10^7
(2)

11. The number of visitors to some tourist attractions is shown in the table below.

The King's Palace	5.4 million
Castle	923,840
Theme Park	1.43×10^7
Science Museum	4,192,900

(a) Write the number of visitors to the Theme Park as an ordinary number.

14300000

(1)

(b) Write the number of visitors to the Castle in standard form.

9.2384×10^5

(1)

(c) How many more people visited the Theme Park than the Science Museum

14300000
- 4192900
10107100

10,107,100

(2)

12. The distance of the moon to the Earth is 384,400 km.
The speed of light is 2.998×10^8 m/s.

Work out how long it will take light to travel from the moon to the Earth.
Include suitable units.

$t = \dfrac{d}{s}$

$t = \dfrac{384\,400\,000}{2.998 \times 10^8} = 1.28$ seconds

....

(3)

---

12. a, b and c are standard form numbers.

$a = 5.4 \times 10^4 \qquad b = 4.9 \times 10^5 \qquad c = 4 \times 10^6$

(a) Calculate b – a

490000
$-\ 54\,000$
$\overline{436000}$

4.36×10^5

....

(2)

(b) Calculate c^2

$4 \times 10^6 \times 4 \times 10^6$
16×10^{12}

1.6×10^{13}

....

(2)

(c) Calculate ac

$5.4 \times 10^4 \times 4 \times 10^6$
21.6×10^{10}

2.16×10^{11}

....

(2)

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13. The population of England is 5.301×10^7
    The number of people who live in London is 8.308×10^6

    What percentage of the population of England live in London?

    $$\frac{8.308 \times 10^6}{5.301 \times 10^7} \times 100$$

    15.67%

    (2)

14. Find the value of $(2.19 \times 10^8) \times (3.52 \times 10^3)$.
    Give your answer in standard form.

    7.7088×10^{11}

    (2)

15. Work out $(4.5 \times 10^7) \div (5 \times 10^{-2})$
    Give your answer in standard form.

    0.9×10^9
    9×10^8

    (2)

16. (a) Write 5930000000 in standard form.

5.93×10^{9}

(1)

(b) Write 8.024 x 10⁻⁴ as an ordinary number.

0.0008024

(1)

(c) c = 2 x 10⁶ and y = 6 x 10⁵

$$w^2 = \frac{cy}{c-y}$$

Work out the value of w.
Give your answer in standard form correct to 2 significant figures.

$w^2 = \frac{12 \times 10^{11}}{1400\,000} = 857142.8571$

$w = 925.82..$
$w = 930$

9.3×10^{2}

(3)

17. Work out (1.52 x 10⁵) + (5.4 x 10⁴)
Give your answer in standard form.

$\begin{array}{r} 152000 \\ +\ 54000 \\ \hline 206000 \end{array}$

2.06×10^{5}

(3)

18. The Earth is approximately a sphere of diameter 12742 km.
The surface area of a sphere is given by the formula $A = 4\pi r^2$

Calculate the surface area of the Earth.
Give your answer in metres and in standard form.

$d = 12742000 m$

$r = 6371000 m$

$SA = 4 \times \pi \times 6371000^2$

5.1×10^{14} ......m³

(3)

Name:

Exam Style Questions

Stratified Sampling

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 281

1. The table shows information about the inhabitants of a village.

Age	Population Size
0 - 20	693
21 - 40	1203
41 - 60	802
Over 60	405

3103

Bernard is going to carry out a survey about the local library.
He wants to find out how often people have been to the library in the last year.

Bernard decides to take a stratified sample.

(a) Explain why it is appropriate to take a stratified sample.

There are significantly different amounts of people in each group.

(1)

Bernard takes a stratified sample of 100.

(b) Calculate the number of each age group that Bernard should choose.

$$\frac{693}{3103} \times 100 = 22.33\cdots$$

$$\frac{1203}{3103} \times 100 = 38.7639\cdots$$

$$\frac{802}{3103} \times 100 = 25.84\cdots$$

$$\frac{405}{3103} \times 100 = 13.05\cdots$$

0 - 20 22

21 - 40 39

41 - 60 26

Over 60 13

(3)

2. There are 180 employees in a school.

The table shows the number of each type of employee in the school.

Teachers	Teaching Assistants	Admin	Other
94	16	41	29

(a) A stratified sample of size 50 is required.
Calculate the number of each type of employee that should be chosen.

$$\frac{94}{180} \times 50 = 26.1$$

$$\frac{16}{180} \times 50 = 4.4...$$

$$\frac{41}{180} \times 50 = 11.388...$$

$$\frac{29}{180} \times 50 = 8.055...$$

Teachers ....26.......

Teaching Assistants ....5.......

Admin ....11.......

Other ....8.......

(3)

(b) Describe a method to obtain a stratified sample of size 50 from the employees in the school.

Assign each member of staff a number (e.g teachers 1 to 94, Teaching assistants 95 to 110 etc) then select 26 numbers at random from 1 to 94, 5 numbers at random from 95 to 110 and 50 on

(2)

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3. The table shows the home countries of rugby referees on a course.

Ireland	Wales	Scotland
8	28	44

80

÷ 8 =   *1*   *3.5*   *5.5*   *divide by 8*

(a) David wants to take a stratified sample of size 10 from the referees.

Calculate the number of referees from each country that David should select.

Ireland $\frac{8}{80} \times 10 = \frac{1}{10} \times 10 = 1$

Wales $\frac{28}{80} \times 10 = \frac{7}{20} \times 10 = 3.5$

Scotland $\frac{44}{80} \times 10 = \frac{11}{20} \times 10 = 5.5$

Ireland .... *1* .... *1* .....

Wales .... *4 or 3* .....

Scotland .... *5* .... *6* .....

(3)

---

4. There are 300 students in years 7, 8, 9 and 10 in a school.

Year 7	Year 8	Year 9	Year 10
72	108	66	54

12   *18*   *11*   *9*

A stratified sample of 50 is planned.   *divide by 6*
Calculate the number of people that should be sampled from each year group.

Year 7 .... *12* .....

Year 8 .... *18* .....

Year 9 .... *11* .....

Year 10 .... *9* .....

(3)

5. Declan works in a confectioners.

He is asked to test a sample of 40 chocolates stratified by type of chocolate.
The table shows the number of each type of chocolate in the shop.

Type	Milk	Dark	White	Total
Number	600	220	130	950

Calculate the number of dark chocolates required for his stratified sample.

$$\frac{220}{950} \times 40 = 9.263\ldots$$

........9........

(3)

6. There are 300 passengers on a flight.

A stratified sample is taken.

The table shows some information.

Type	Adult Male	Adult Female	Children
Number on flight	132	108	60
Number in sample	22	18	10

Complete the table.

(3)

7. A cricket club has 400 members.
A stratified sample of member is taken, by age group.

The table shows some information.

	Junior	18 - 39	40 - 59	Senior
Members	75	100	120	105
Number in sample	15	20	24	21

Complete the table.

(3)

---

8. A teacher decides to carry out a survey about school dinners.
She is going to ask students in year 4, year 5 and year 6.

The numbers in the school are shown.

Year 4	Year 5	Year 6
100	120	135

total 355

A stratified sample is taken.
40 year 4 students are selected.

Work out the number of year 6 students selected.

$$\frac{100}{355} \times n = 40$$

$$100n = 14200$$

$$n = 142$$

$$\frac{135}{355} \times 142 = 54$$

........54........

(2)