1 200 people recorded the time they spent on social media one day.

The table shows the results.

Time, t (mins)	Frequency	Midpoint	
$0 \leqslant t < 30$	24	15	360
$30 \leqslant t < 50$	76	40	3040
$50 \leqslant t < 60$	52	55	2860
$60 \leqslant t < 90$	48	75	3600
	Total = 200		

①

1 (a) Work out an estimate of the mean time.

[3 marks]

$24 \times 15 = 360$ $52 \times 55 = 2860$

$76 \times 40 = 3040$ $48 \times 75 = 3600$

mean = $\dfrac{360 + 3040 + 2860 + 3600}{200}$

$= \dfrac{9860}{200}$ ①
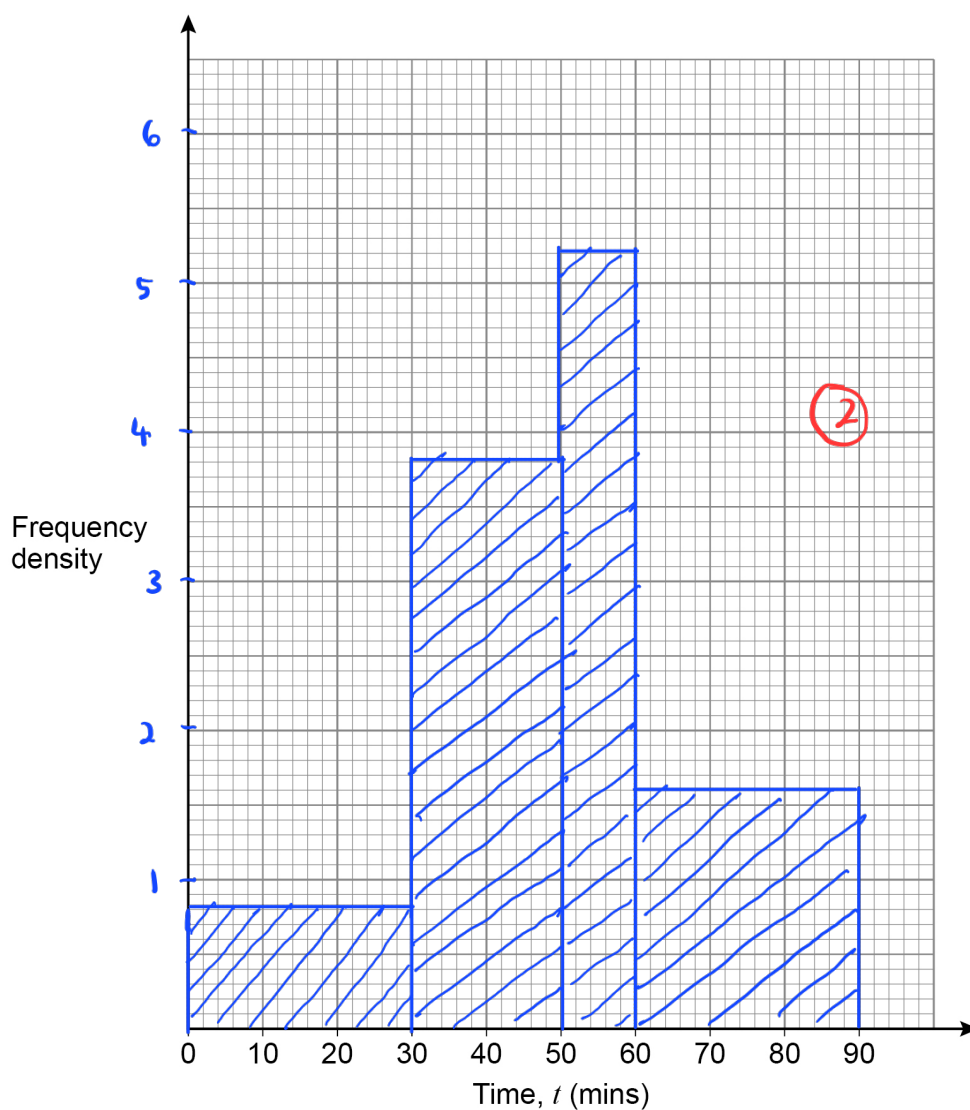
$= 49.3$

Answer   49.3 ①   mins

1 (b)   Draw a histogram to represent the results.

[4 marks]

Time, t (mins)	Frequency	Class width	Frequency density
$0 \leqslant t < 30$	24	30	6.8
$30 \leqslant t < 50$	76	20	3.8
$50 \leqslant t < 60$	52	10	5.2
$60 \leqslant t < 90$	48	30	1.6

①

①

②

Frequency density

Time, t (mins)

2   102 boys and 85 girls took a test.

The table shows information about the mean marks.

	Boys	Girls
Number of students	102	85
Mean mark	68.5	72.4

The pass mark for the test was 70

Was the mean mark for **all** of these students greater than the pass mark?

You **must** show your working.

[3 marks]

Total students ; 102 + 85 = 187

Total boys marks : 102 × 68·5 = 6987 ①

Total girls marks ; 85 × 72·4 = 6154

Total students marks : 6987 + 6154 = 13 141

mean students mark : $\dfrac{13\ 141}{187}$ ① = 70·27... ①

Yes. The mean marks are greater than 70.

3   Six positive numbers have

a mean of 10

a range of 19

Four of the numbers are   12   7   15   3

Work out the other two numbers.

[3 marks]

Total numbers : $10 \times 6 = 60$

$60 - 12 - 7 - 15 - 3 = 23$ ①

Since range is 19, the other two numbers are

2 and 21. (since $2 + 21 = 23$)

①

①

Answer   2   and   21

4   A school play takes place each day from Monday to Friday.

Here are the attendances on four of the days.

Monday	Tuesday	Wednesday	Thursday
72	83	88	97

For all **five** days, the mean attendance is 90

Work out the attendance on Friday.

[3 marks]

Total attendance = 90 × 5 = 450 ①

Friday = 450 - (72 + 83 + 88 + 97)

= 450 - 340 ①

= 110 ①

Answer   110

5   Sunita is x years old.

Beth is one year younger than Sunita.

Joel is double Sunita's age.

The mean of their ages is 5

How old is **Joel**?

[5 marks]

Beth : $x - 1$

Joel : $2x$

Total their ages : $3 \times 5 = 15$ ①

①

$x + x - 1 + 2x = 15$ ①

$4x = 16$

$x = 4$ ①

Joel $= 2(4) = 8$ ①

Answer   8

6   Here is a list of 11 whole numbers in numerical order.

The lower quartile, median, upper quartile and highest value are missing.

5	8	12	13	19	24	25	28	30	34	41

②   36 + 5 = 41

- median = 2 × lower quartile
- upper quartile = 2.5 × lower quartile
- range = 2 × interquartile range

Complete the list.

[2 marks]

let LQ = x

median = $2x$

uQ = $2.5x$

range = $2(2.5x - x)$

    = $3x$

when $x = 12$, median = 24, uQ = 30, range = 36

7   A company has 123 employees.

Information about their hourly rates of pay is shown in the table.

Hourly rate, £p	Number of employees
$10 \leqslant p < 14$	66
$14 \leqslant p < 20$	32
$20 \leqslant p < 40$	15
$40 \leqslant p < 100$	10
	Total $= 123$

The owner of the company uses the data to make two statements.

Statement A

"Over 30% of employees have an hourly rate that is more than £17"

Statement B

"The average hourly rate of pay is more than £20"

---

7 (a)   Work out an estimate of the mean to support **Statement B**.
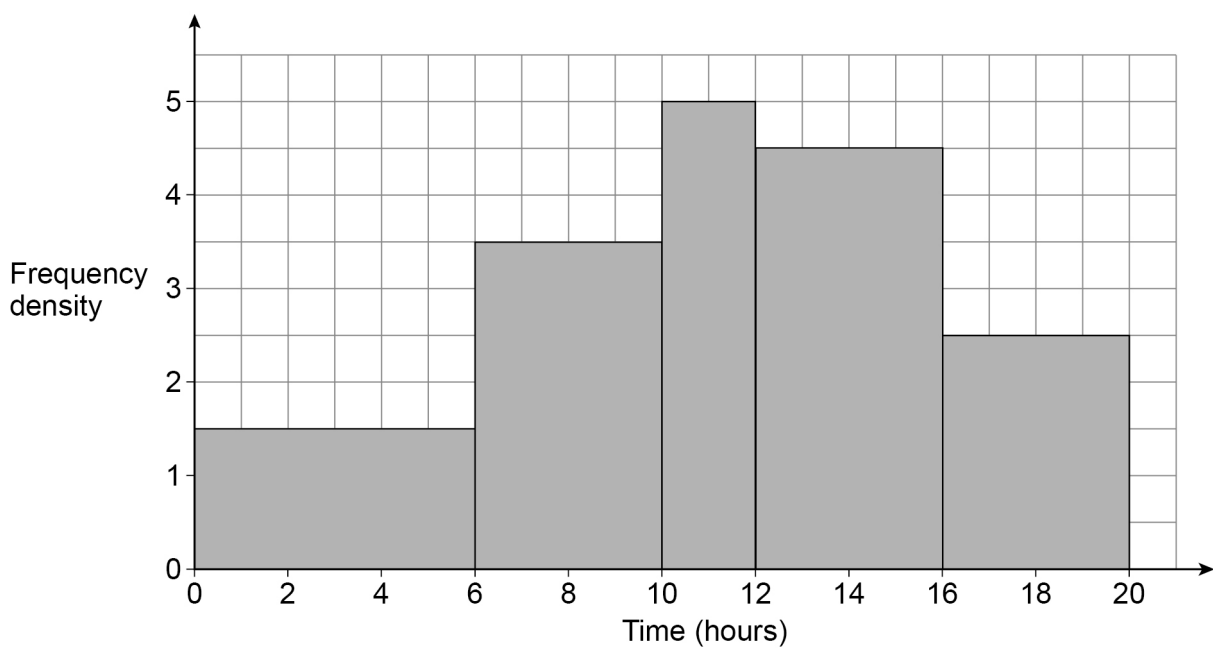
[3 marks]

$$mean = \frac{(66 \times 12) + (32 \times 17) + (15 \times 30) + (10 \times 70)}{123} \quad \textcircled{1}$$

$$= \frac{792 + 544 + 450 + 700}{123}$$

$$= \frac{2486}{123} \quad \textcircled{1}$$

$$= £20.21 \quad \textcircled{1}$$

8   61 students recorded how many hours they spent revising for a test.

The histogram represents the results.

8 (a) Work out an estimate of the mean time the 61 students spent revising.

You may use the table to help you.

[4 marks]

	A	B	A × B
Time, x (hours)	**Frequency**	**Midpoint**	
$0 \leqslant x < 6$	9	3	27
$6 \leqslant x < 10$	14	8	112 ①
$10 \leqslant x < 12$	10	11	110
$12 \leqslant x < 16$	18	14	252
$16 \leqslant x < 20$	10	18	180

$6 \times 1.5 = 9$, $4 \times 3.5 = 14$, $2 \times 5 = 10$, $4 \times 4.5 = 18$, $4 \times 2.5 = 10$

①

$$\text{mean} = \frac{27 + 112 + 110 + 252 + 180}{61}$$

$$= \frac{681}{61 ①} = 11.16 ①$$

Answer $\underline{\hspace{1cm} 11.16 \hspace{3cm}}$ hours

8 (b) Give a reason why the answer to part (a) is an estimate.

[1 mark]

The midpoints are estimates ①

9   The table shows information about the ages of members of two clubs.

	Median age (years)	Interquartile range of ages (years)
Swimming club	21.2	7.3
Cycling club	29.7	4.6

Compare the average age and consistency of ages for the members of the two clubs.

[2 marks]

Average   Average age of cycling club members are higher than swimming club since the median age is higher. ✓ ①

Consistency   Age of members in cycling club is more consistent compared to swimming club since the IQR is lower. ✓ ①

10   Liam takes part in long jump competitions.

Here is some information about 40 of his jumps.

Length of jump, d metres	Number of jumps	Midpoint	
$7.0 \leqslant d < 7.4$	15	7.2	
$7.4 \leqslant d < 7.8$	18	7.6	
$7.8 \leqslant d < 8.2$	7	8.0	
	Total = 40		

Work out an estimate of the mean distance of these 40 jumps.

Give your answer as a decimal.

[3 marks]

$$\text{mean} = \frac{(7.2 \times 15) + (7.6 \times 18) + (8.0 \times 7)}{15 + 18 + 7}$$ ✓①

$$= \frac{108 + 136.8 + 56}{40}$$ ✓①

$$= \frac{300.8}{40} = 7.52$$ ✓①

Answer _____ 7.52 _____ m