

* on #25, Range 47, IQR 22 → go ahead and add now

19a. [2 marks]

A data set has a mean of 20 and a standard deviation of 6.

Each value in the data set has 10 added to it. Write down the value of

(i) the new mean; 30

(ii) the new standard deviation. 6

19b. [3 marks]

Each value in the original data set is multiplied by 10.

(i) Write down the value of the new mean.

200

(ii) Find the value of the new variance.

$$6^2 \cdot 10^2 = \underline{\underline{3600}}$$

20a. [2 marks]

A box contains 100 cards. Each card has a number between one and six written on it. The following table shows the frequencies for each number.

Number	1	2	3	4	5	6
Frequency	<u>26</u>	<u>10</u>	<u>20</u>	k	<u>29</u>	<u>11</u>

Calculate the value of k .

$$26 + 10 + 20 + 29 + 11 \rightarrow 96$$
$$100 - 96 = 4 = k$$

20b. [5 marks]

Find

(i) the median; 3

(ii) the interquartile range.

$$Q_1 = 1 \quad \text{IQR} = Q_3 - Q_1 = 5 - 1 = 4$$

$$Q_3 = 5$$

21a. [2 marks]

The ages of people attending a music concert are given in the table below.

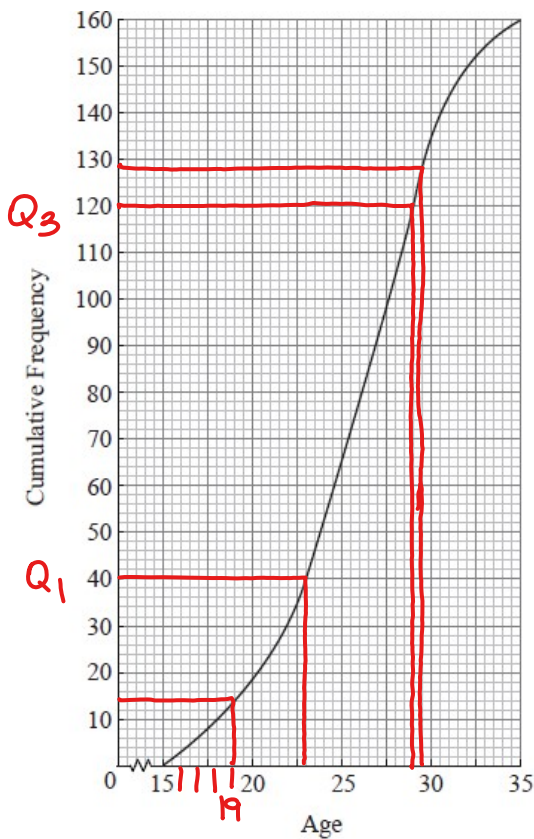
Age	$15 \leq x < 19$	$19 \leq x < 23$	$23 \leq x < 27$	$27 \leq x < 31$	$31 \leq x < 35$
Frequency	14	26	52	52	16
Cumulative Frequency	14	40	92	p	160

Find p .

$$\begin{array}{r} + 92 \\ + 52 \\ \hline 144 \end{array} \qquad \begin{array}{r} - 160 \\ - 16 \\ \hline 144 \end{array}$$

21b. [5 marks]

The cumulative frequency diagram is given below.



Use the diagram to estimate

(i) the 80th percentile;

$$(.80)(160) \text{ or } \frac{(20)(160)}{32} \qquad 160 - 32 = 128$$

29.5

128

(ii) the interquartile range.

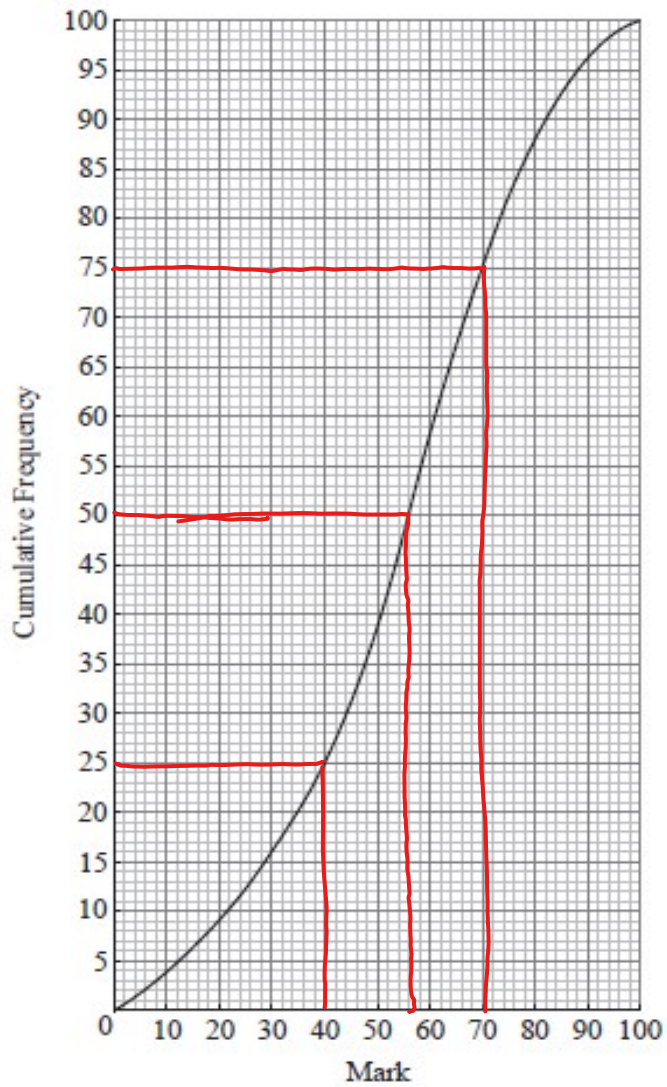
75% $Q_3 = 29$

$$29 - 23 = 6$$

25% $Q_1 = 23$

22a. [2 marks]

The cumulative frequency curve below represents the marks obtained by 100 students.



Find the median mark.

56

22b. [3 marks]

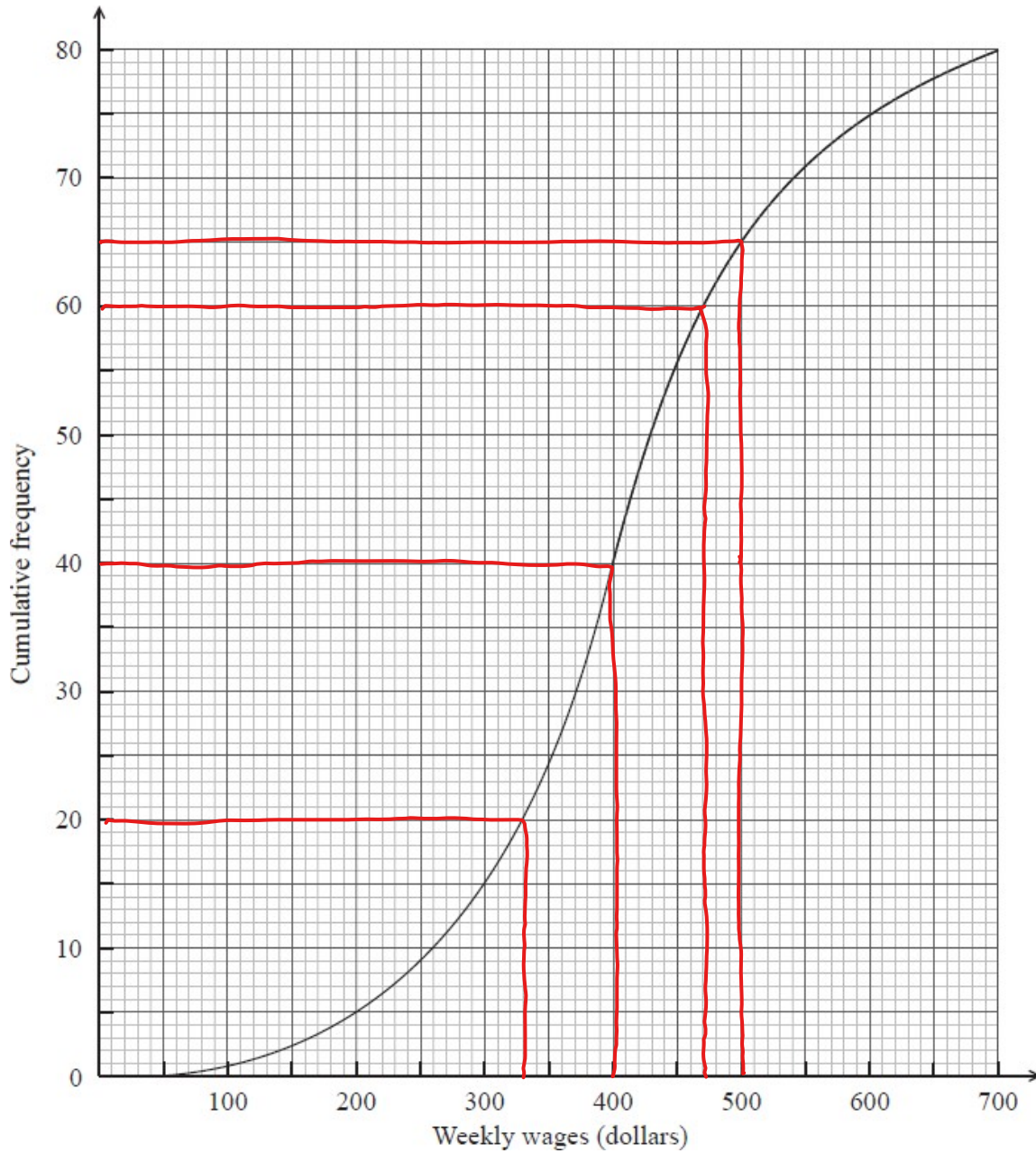
Find the interquartile range.

$$Q_3 - Q_1$$

$$70 - 40 = 30$$

23a. [4 marks]

The weekly wages (in dollars) of 80 employees are displayed in the cumulative frequency curve below.



(i) Write down the median weekly wage.

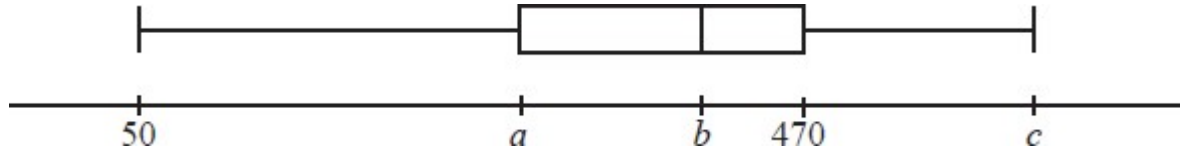
\$400

(ii) Find the interquartile range of the weekly wages.

\$470 - \$330 = \$140

23b. [3 marks]

The box-and-whisker plot below displays the weekly wages of the employees.



Write down the value of

- (i) a ; 330
(ii) b ; 400
(iii) c ; 700

23c. [3 marks]

Employees are paid \$ 20 per hour.

Find the median number of **hours** worked per week.

$$\frac{\$400}{\$20/\text{hr}} = 20$$

23d. [5 marks]

Find the number of employees who work more than 25 hours per week.

$$25 \times \$20 = 500$$

$$500 \rightarrow 65 \text{ workers}$$

$$80 - 65 = 15$$

24a. [4 marks]

A running club organizes a race to select girls to represent the club in a competition.

The times taken by the group of girls to complete the race are shown in the table below.

Time t minutes	$10 \leq t < 12$	$12 \leq t < 14$	$14 \leq t < 20$	$20 \leq t < 26$	$26 \leq t < 28$	$28 \leq t < 30$
Frequency	50	20	p	40	20	20
Cumulative Frequency	50	70	<u>120</u>	q	180	200

Find the value of p and of q .

$$p = 50 \quad q = 160$$

24b. [3 marks]

A girl is chosen at random.

(i) Find the probability that the time she takes is less than 14 minutes.

$$\frac{70}{200} = \frac{7}{20}$$

(ii) Find the probability that the time she takes is at least 26 minutes.

$$\frac{20}{200} = \frac{1}{10} \quad \frac{20}{200} = \frac{1}{10}$$

$$\frac{1}{10} + \frac{1}{10} = \frac{2}{10} = \frac{1}{5}$$

24c. [4 marks]

A girl is selected for the competition if she takes less than x minutes to complete the race.

Given that 40% of the girls are not selected,

(i) find the number of girls who are not selected;

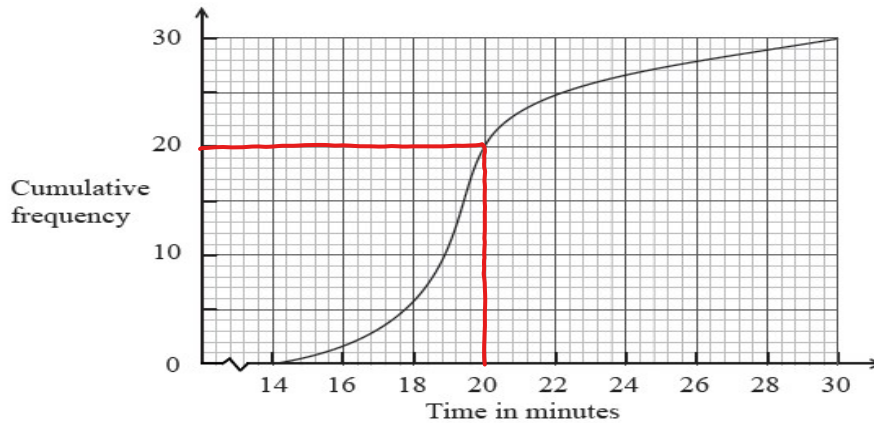
$$40(200) = 80$$

(ii) find x .

$$x = 20$$

24d. [4 marks]

Girls who are not selected, but took less than 25 minutes to complete the race, are allowed another chance to be selected. The new times taken by these girls are shown in the cumulative frequency diagram below.



(i) Write down the number of girls who were allowed another chance.

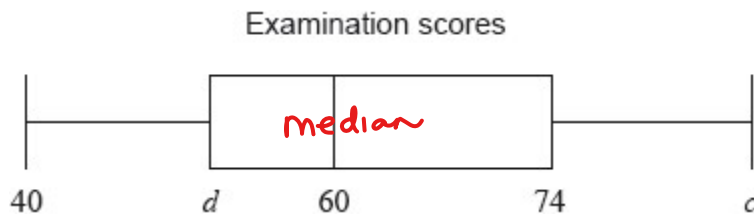
30

(ii) Find the percentage of the whole group who were selected.

$$120 \text{ already selected} + 20 \text{ newly selected} = \frac{140}{200} = \underline{70\%}$$

25. [4 marks]

The following box-and-whisker plot represents the examination scores of a group of students.



Range 47 (Max - Min)
IQR: 22 ($Q_3 - Q_1$)

Find the value of

(i) c; $40 + 47 = 87$

(ii) d. $74 - 22 = 52$

26a. [2 marks]

A school collects cans for recycling to raise money. Sam's class has 20 students.

The number of cans collected by each student in Sam's class is shown in the following stem and leaf diagram.

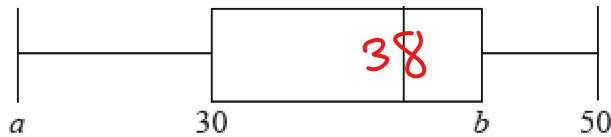
Stem	Leaf	Key: 3 1 represents 31 cans
2	0, 1, 4, 9, 9	
3	1, 7, 7, 7, 8, 8	
4	1, 2, 2, 3, 5, 6, 7, 8	
5	0	

Find the median number of cans collected.

38

26b. [3 marks]

The following box-and-whisker plot also displays the number of cans collected by students in Sam's class.



- Write down the value of a .
- The interquartile range is 14. Find the value of b .

(i) $a = 20$ (ii) $30 + 14 = 44$

26c. [3 marks]

Sam's class collected 745 cans. They want an average of 40 cans per student.

How many more cans need to be collected to achieve this target?

$(40)(20) = 800$ $800 - 745 = 55$

26d. [5 marks]

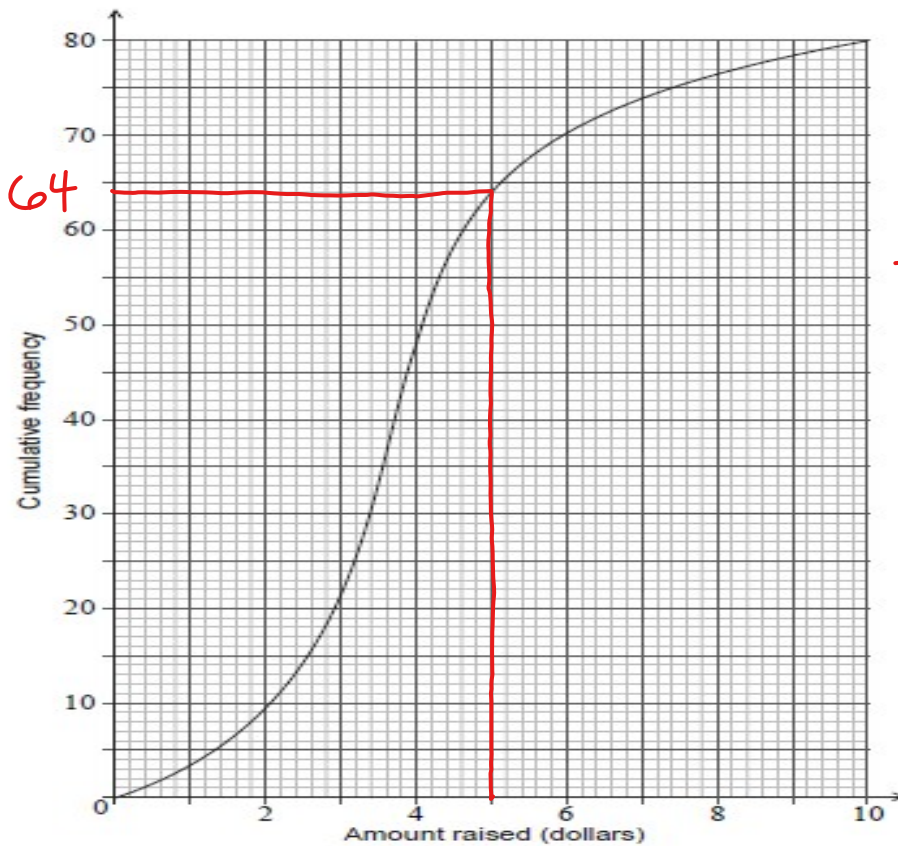
There are 80 students in the school.

The students raise \$0.10 for each recycled can.

(i) Find the largest amount raised by a student in Sam's class.

$$50(1) = \$5$$

(ii) The following cumulative frequency curve shows the amounts in dollars raised by all the students in the school. Find the percentage of students in the school who raised more money than anyone in Sam's class.



$$\begin{array}{r} -80 \\ +64 \\ \hline 16 \end{array}$$
$$\frac{16}{80} = \frac{1}{5}$$
$$= 20\%$$

26e. [2 marks]

The mean number of cans collected is 39.4. The standard deviation is 18.5.

Each student then collects 2 more cans.

(i) Write down the new mean.

$$39.4 + 2 = 41.4$$

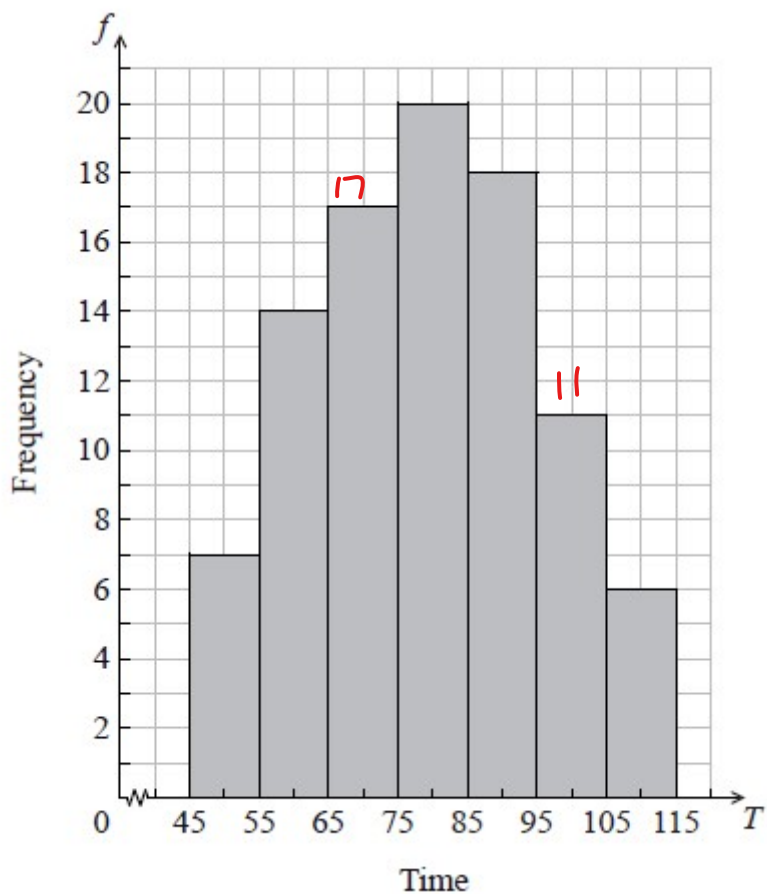
(ii) Write down the new standard deviation.

$$18.5$$

calculator

27a. [3 marks]

The histogram below shows the time T seconds taken by 93 children to solve a puzzle.



The following is the frequency distribution for T .

Time	$45 \leq T < 55$	$55 \leq T < 65$	$65 \leq T < 75$	$75 \leq T < 85$	$85 \leq T < 95$	$95 \leq T < 105$	$105 \leq T < 115$
Frequency	7	14	p	20	18	q	6

(i) Write down the value of p and of q .

$$p = 17 \quad q = 11$$

(ii) Write down the median class.

$$75 \leq T < 85$$

27b. [2 marks]

A child is selected at random. Find the probability that the child takes less than 95 seconds to solve the puzzle.

$$\frac{93-17}{93} = 817$$

27c. [2 marks]

Consider the class interval $45 \leq T < 55$.

- (i) Write down the interval width. 10
- (ii) Write down the mid-interval value. 50

27d. [4 marks]

Hence find an estimate for the

- (i) mean; $\bar{x} = 79.1$

- (ii) standard deviation.

$$\sigma_x = 16.4$$

not yet
27e. [2 marks]

John assumes that T is normally distributed and uses this to estimate the probability that a child takes less than 95 seconds to solve the puzzle.

Find John's estimate.