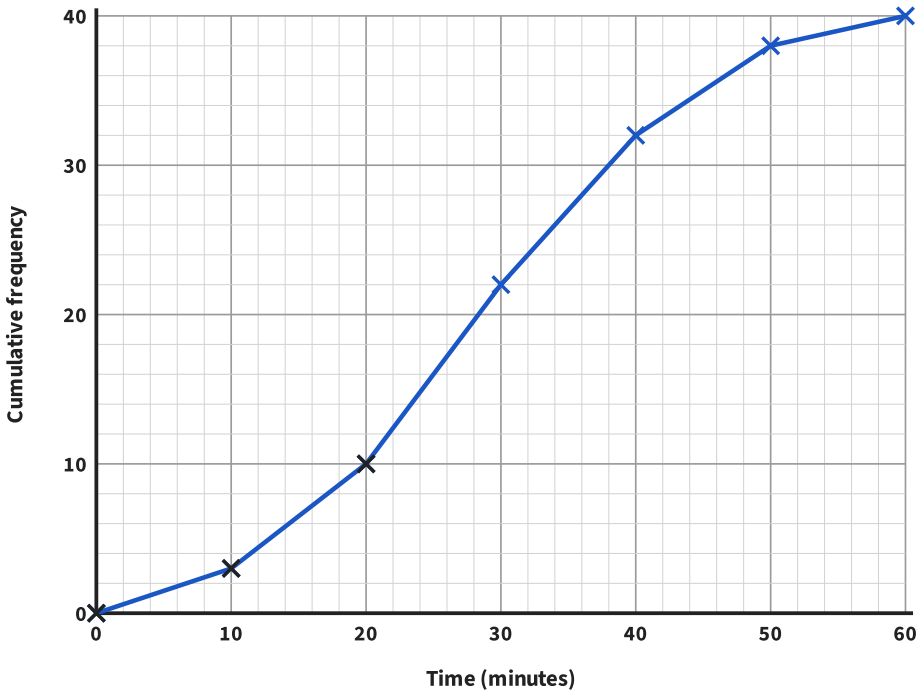


Cumulative Frequency

1 cumulative frequency = running total

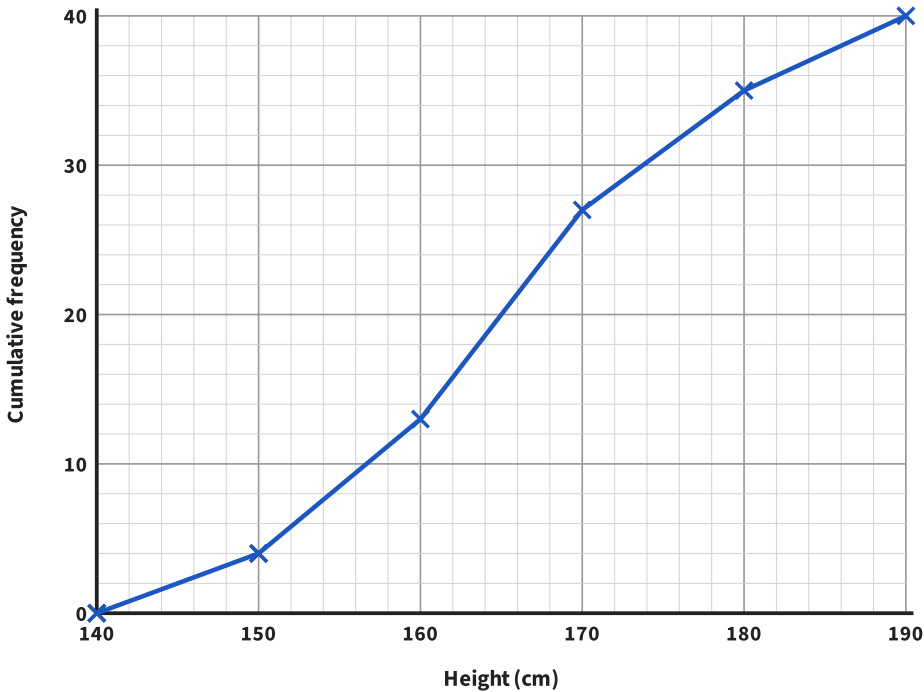
Complete the table, then draw the cumulative frequency graph. Plot each point at the top of its class.

Time (minutes)	Frequency	Cumulative frequency
$0 < t \leq 10$	3	3
$10 < t \leq 20$	7	10
$20 < t \leq 30$	12	22
$30 < t \leq 40$	10	32
$40 < t \leq 50$	6	38
$50 < t \leq 60$	2	40



2 Complete the table, then draw the cumulative frequency graph. Plot each point at the top of its class.

Height (cm)	Frequency	Cumulative frequency
$140 < h \leq 150$	4	4
$150 < h \leq 160$	9	13
$160 < h \leq 170$	14	27
$170 < h \leq 180$	8	35
$180 < h \leq 190$	5	40

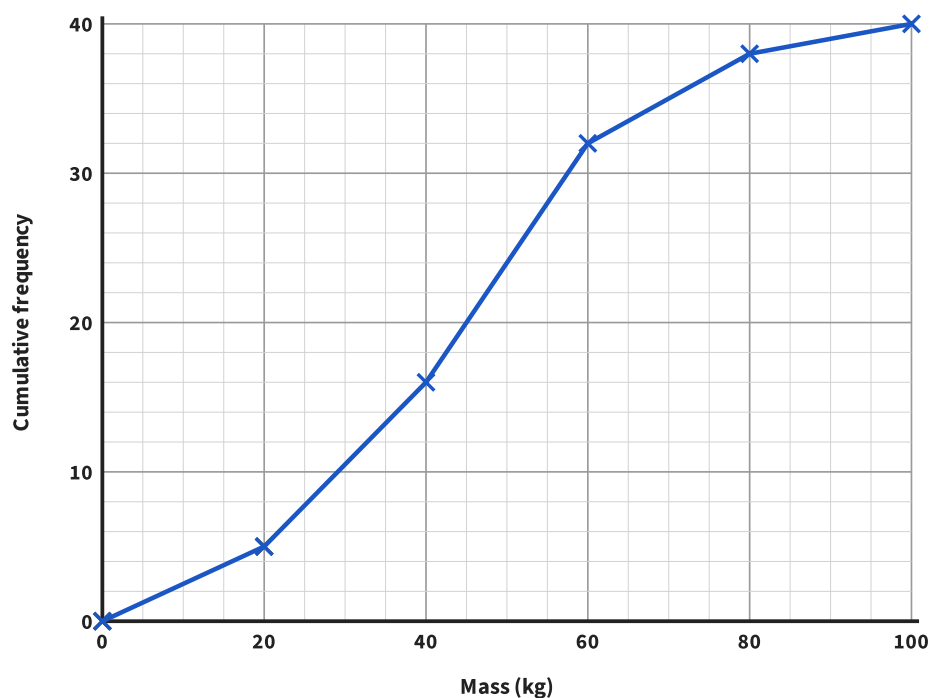


Cumulative Frequency

3

Complete the table, then draw the cumulative frequency graph. Plot each point at the top of its class.

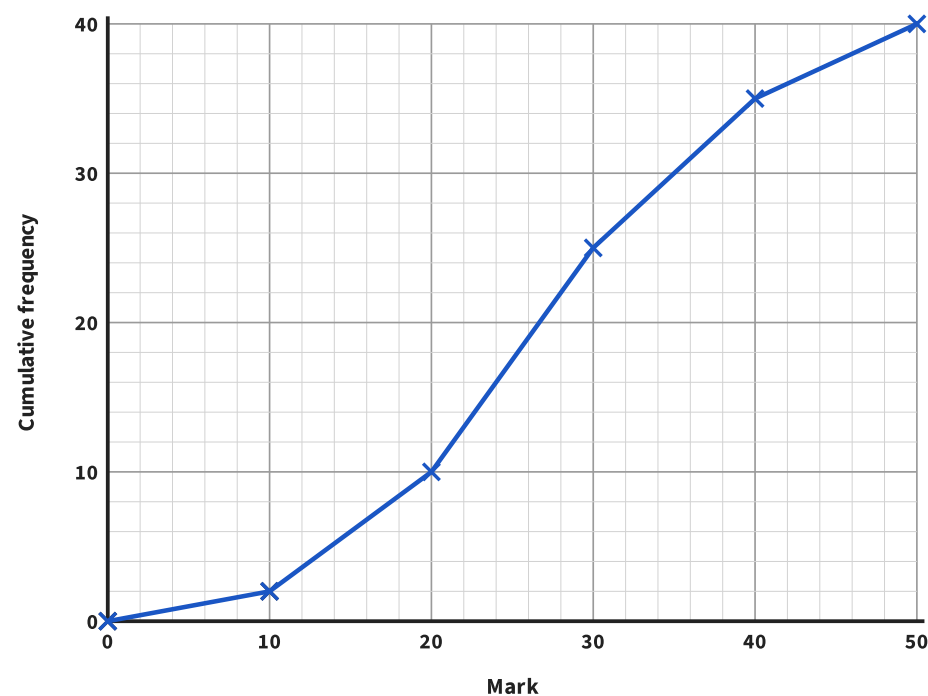
Mass (kg)	Frequency	Cumulative frequency
$0 < m \leq 20$	5	5
$20 < m \leq 40$	11	16
$40 < m \leq 60$	16	32
$60 < m \leq 80$	6	38
$80 < m \leq 100$	2	40



4

Complete the table, then draw the cumulative frequency graph. Plot each point at the top of its class.

Mark	Frequency	Cumulative frequency
$0 < m \leq 10$	2	2
$10 < m \leq 20$	8	10
$20 < m \leq 30$	15	25
$30 < m \leq 40$	10	35
$40 < m \leq 50$	5	40

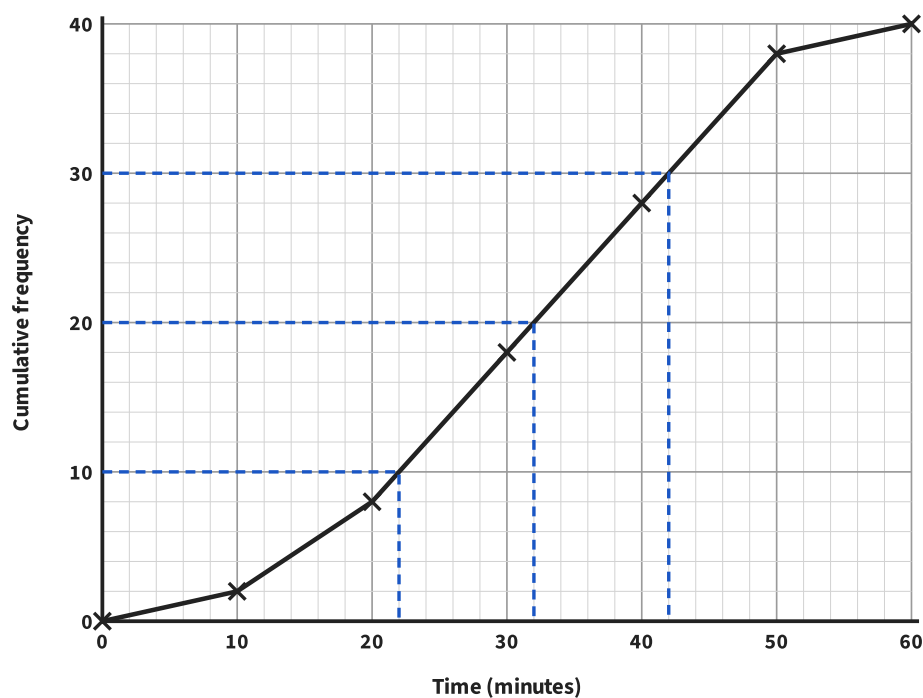


Cumulative Frequency

5 Notice the change!

There are 40 values. Use the graph to find the median, the quartiles and the interquartile range.

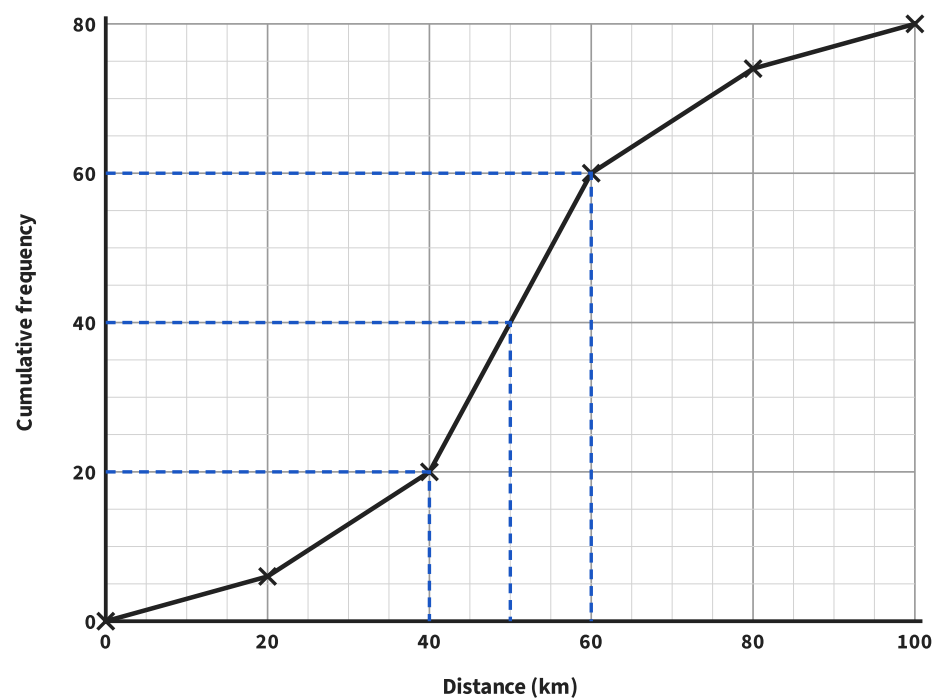
	how far up	→	read across
Lower quartile	10	→	22
Median	20	→	32
Upper quartile	30	→	42
Interquartile range	20		



6

There are 80 values. Use the graph to find the median, the quartiles and the interquartile range.

	how far up	→	read across
Lower quartile	20	→	40
Median	40	→	50
Upper quartile	60	→	60
Interquartile range	20		



Cumulative Frequency

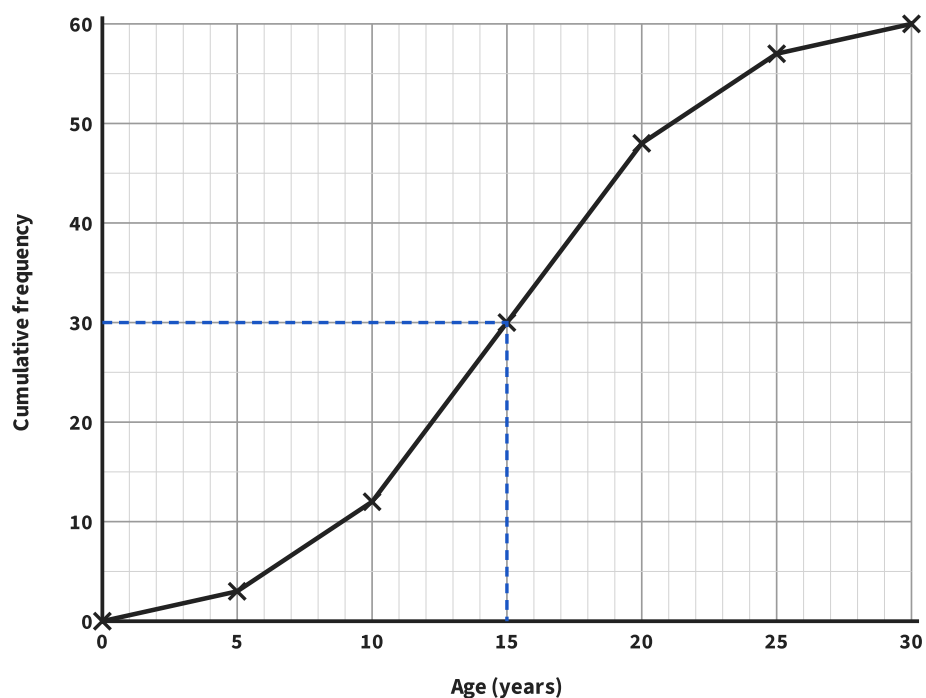
7 *Notice the change!*

There are 60 values. How many are less than 15?

Go up from 15 to the graph,
then across to the scale.

read up from 15: 30

Answer 30



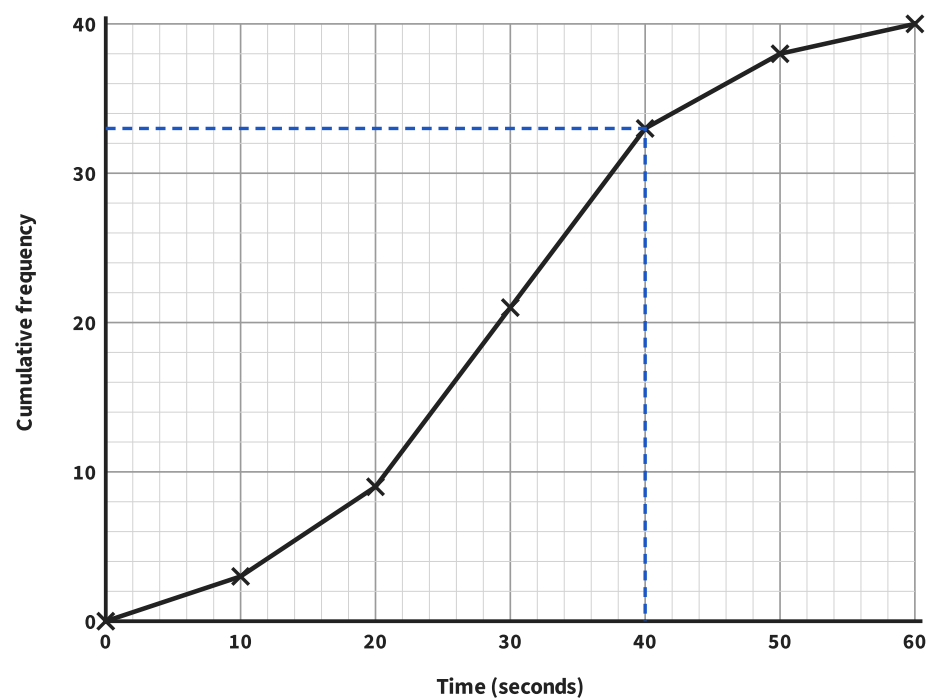
8

There are 40 values. How many are more than 40?

Go up from 40 to the graph,
then across to the scale.

40 - 33 = 7

Answer 7



Cumulative Frequency *further practice*

ANSWERS 

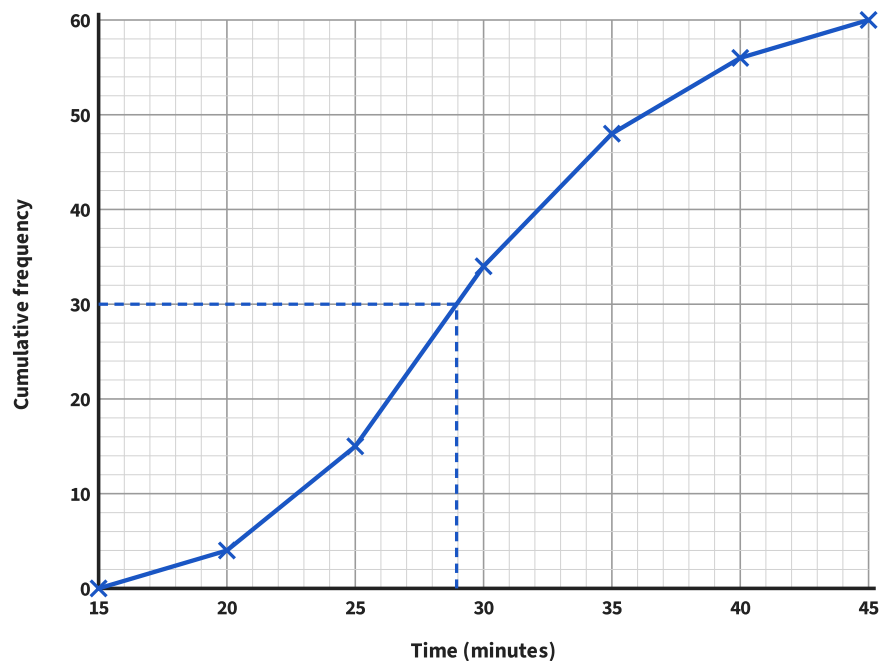
9



The table shows the times of 60 runners in a park run. (a) Complete the table and draw the cumulative frequency graph. (b) Use your graph to estimate the median time.

Time (minutes)	Frequency	Cumulative frequency
$15 < t \leq 20$	4	4
$20 < t \leq 25$	11	15
$25 < t \leq 30$	19	34
$30 < t \leq 35$	14	48
$35 < t \leq 40$	8	56
$40 < t \leq 45$	4	60

(b) Median about 29 minutes (accept 28 to 30)



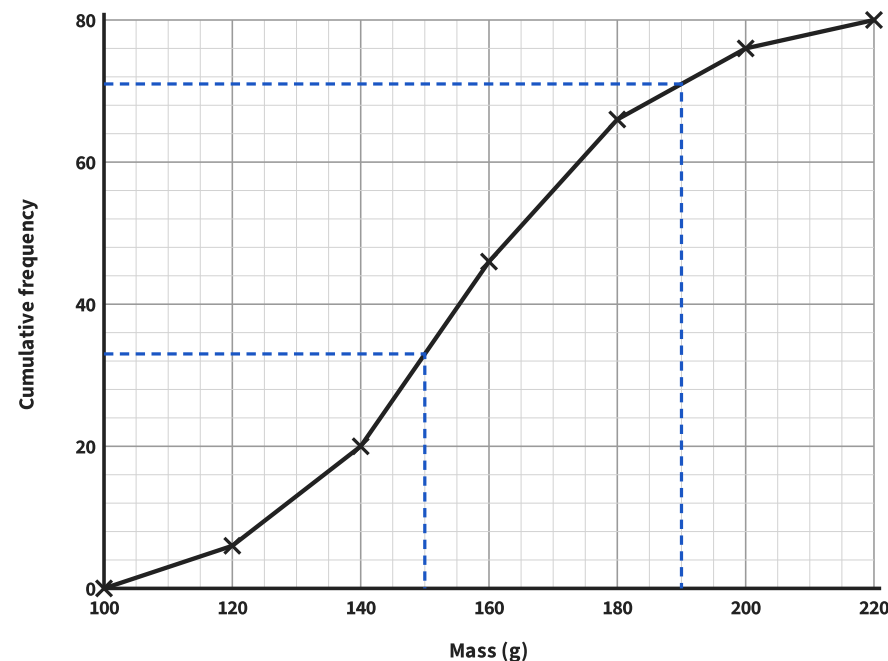
10



The graph shows the masses of 80 apples. Estimate how many apples have a mass between 150 g and 190 g.

Working about 71 below 190 g, about 33 below 150 g

Estimate $71 - 33 = 38$ (accept 34 to 42)

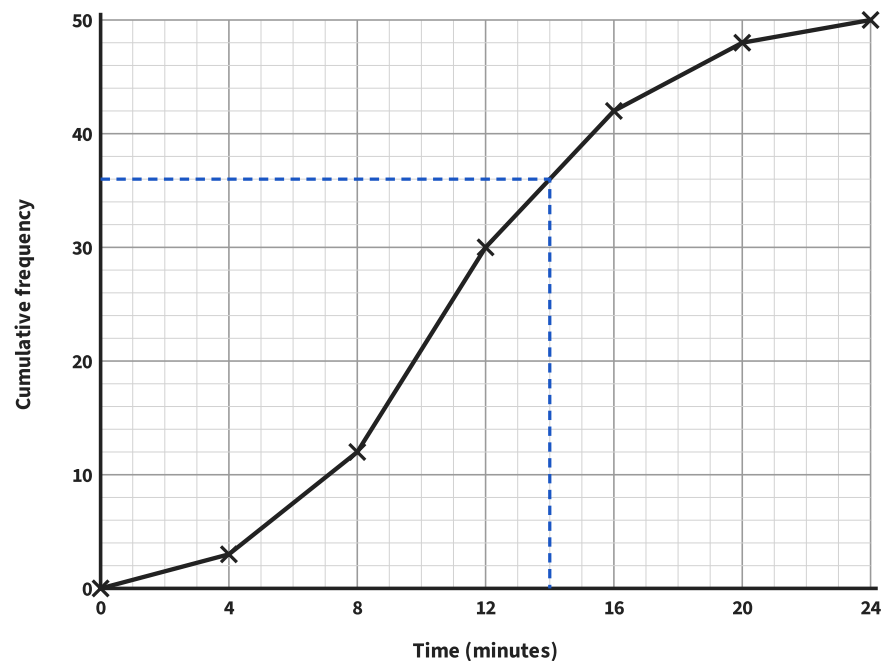


Cumulative Frequency *further practice*

11

The graph shows how long 50 students took to finish a puzzle.
Estimate the percentage of the students who took more than 14 minutes.

Working about 36 up to 14 minutes, so $50 - 36 = 14$ more
Percentage about 28% (accept 24% to 32%)

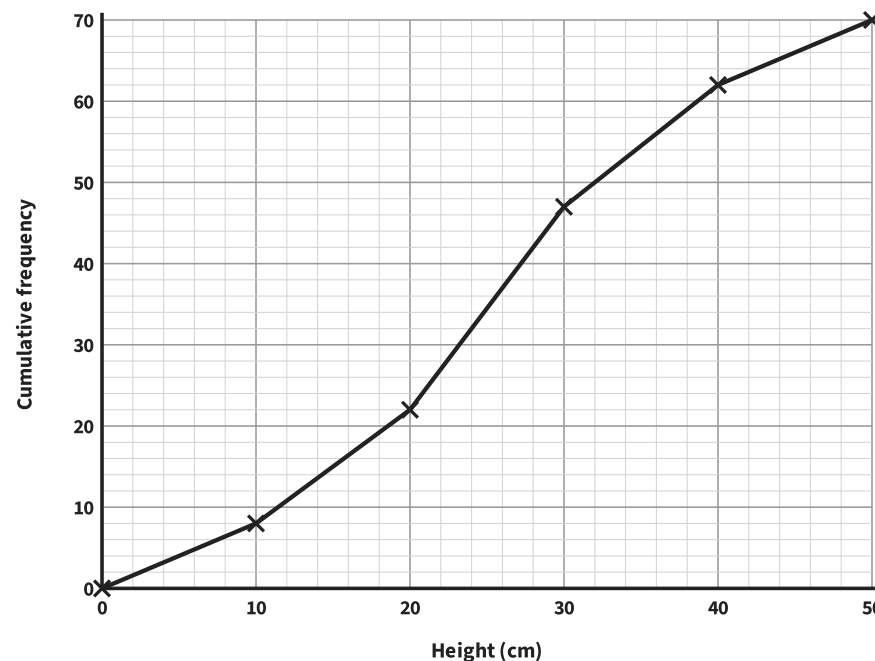


12

The graph shows the heights of 70 tomato plants. (a) Use the graph to complete the frequency table. (b) Which class contains the median height?

Height (cm)	$0 < h \leq 10$	$10 < h \leq 20$	$20 < h \leq 30$	$30 < h \leq 40$	$40 < h \leq 50$
Frequency	8	14	25	15	8
Cumulative frequency	8	22	47	62	70

(b) $20 < h \leq 30$



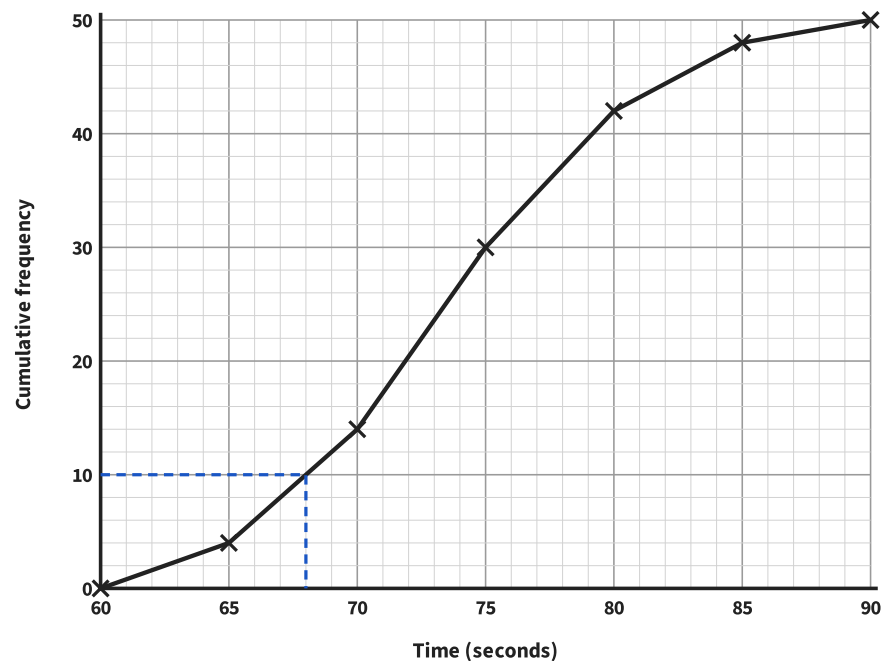
Cumulative Frequency *further practice*

13

The graph shows the times of 50 swimmers in a 100 m race. The fastest 20% of the swimmers are picked for the squad. Estimate the slowest time that gets a place.

Working 20% of 50 = 10 swimmers

Slowest time about 68 seconds (accept 67 to 69)



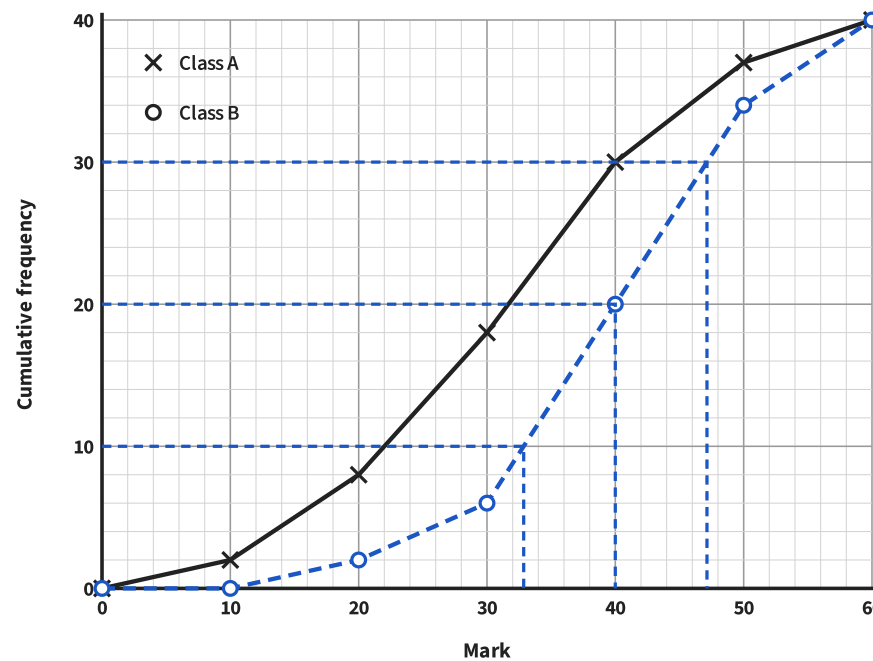
14

The graph shows the test marks of the 40 students in class A. (a) Complete the table for class B and draw its graph on the same axes, with circles and a dashed line. (b) Compare the marks of the two classes. Use the medians and the interquartile ranges.

Class B mark	$0 < m \leq 10$	$10 < m \leq 20$	$20 < m \leq 30$	$30 < m \leq 40$	$40 < m \leq 50$	$50 < m \leq 60$
Frequency	0	2	4	14	14	6
Cumulative frequency	0	2	6	20	34	40

Medians A about 32, B about 40: B did better on average

IQRs A about 18, B about 14: B's marks are more consistent



Cumulative Frequency *further practice*

ANSWERS 

15

A shop sends 120 parcels. Parcels heavier than 4.5 kg cost £5 to send and the rest cost £3. (a) Complete the table and draw the cumulative frequency graph.

(b) Estimate the total cost of sending the parcels.

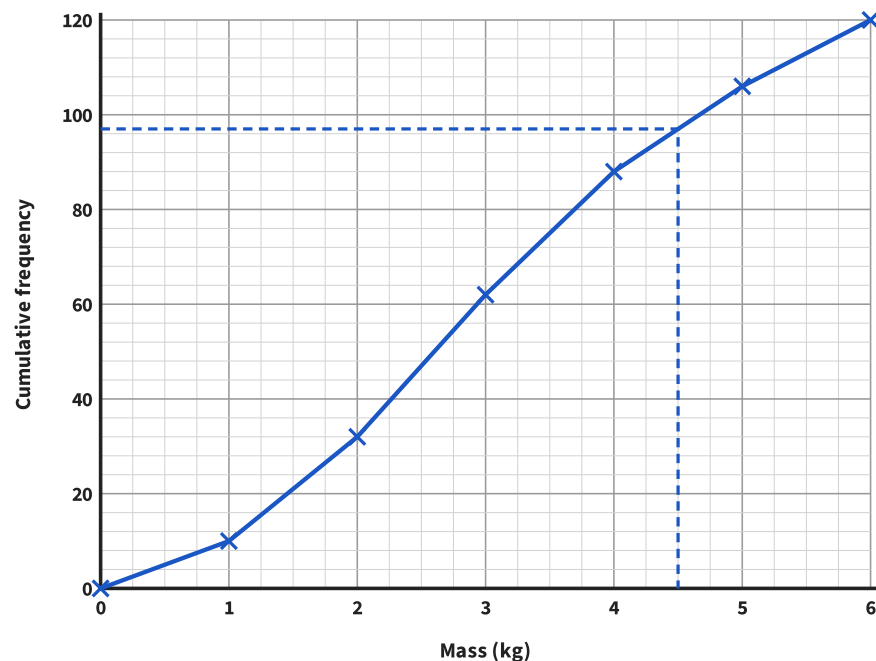
Mass (kg)	$0 < m \leq 1$	$1 < m \leq 2$	$2 < m \leq 3$	$3 < m \leq 4$	$4 < m \leq 5$	$5 < m \leq 6$
Frequency	10	22	30	26	18	14
Cumulative frequency	10	32	62	88	106	120

Working

about $120 - 97 = 23$ heavier than 4.5 kg

Cost

$23 \times £5 + 97 \times £3 = \text{about } £406$



16

The graph shows the heights of 40 trees in a wood. Max says more than a quarter of the trees are taller than 12 m. Is he right? Show how you decide.

Working

about $40 - 34 = 6$ taller than 12 m; a quarter of 40 is 10

Answer

No: only about 6 trees, fewer than 10

