## Cumulative Frequency Diagrams

1 Here is some information about the speeds of 60 cars in miles per hour.

| Speed, $S$ | Frequency |
| :---: | :---: |
| $0<S \leq 20$ | 4 |
| $20<S \leq 40$ | 13 |
| $40<S \leq 60$ | 33 |
| $60<S \leq 80$ | 10 |


| Speed | C. Frequency |
| :---: | :---: |
| $s \leqslant 20$ | 4 |
| $s \leqslant 40$ | 17 |
| $s \leqslant 60$ | 50 |
| $s \leqslant 80$ | 60 |

Draw a cumulative frequency graph.

Cumulative
frequency


2 Here is some information about the masses, in kilograms, of 40 cows in a field.

| Mass, $\boldsymbol{m}, \mathbf{( k g})$ | Frequency |
| :---: | :---: |
| $0<m \leq 200$ | 6 |
| $200<m \leq 400$ | 8 |
| $400<m \leq 600$ | 15 |
| $600<m \leq 800$ | 11 |


| Mass | C. Frequency |
| :--- | :---: |
| $m \leqslant 200$ | 6 |
| $m \leqslant 400$ | 14 |
| $m \leqslant 600$ | 29 |
| $m \leqslant 800$ | 40 |

2 (a) Draw a cumulative frequency graph.


2 (b) Use your graph to estimate the median mass of the 40 cows.
$\qquad$
$\qquad$


Answer $\qquad$ kg

2 (c) Use your graph to estimate the interquartile range of masses of the 40 cows.
[2 marks]
620
$-300$

Answer
320

2 (d) Cows that has a mass of less than 250 kg are considered small cows.
Use your graph to find an estimate for the proportion of the cows in the field that are small cows.
$\qquad$
8 small cows
40 total cows


3 Here is some information about the price of 100 items in a shop.

| Price (£x) | Frequency | Price | C.Frequency |
| :---: | :---: | :---: | :---: |
| $0 \leq x<10$ | 35 | $x \leqslant 10$ | 35 |
| $10 \leq x<20$ | 20 | $x \leqslant 20$ | 55 |
| $20 \leq x<30$ | 13 | $x \leqslant 30$ | 68 |
| $30 \leq x<40$ | 12 | $x \leq 40$ | 80 |
| $40 \leq x<50$ | 14 | $x \leqslant 50$ | 94 |
| $50 \leq x<60$ | 6 | $x \leqslant 60$ | 100 |

3 (a) Draw a cumulative frequency graph.

Cumulati
frequenc


3 (b) Use your graph to estimate the median price of the 100 items.
$\qquad$
$\qquad$
Answer £ $\qquad$ $17 \cdot 50$

3 (c) Use your graph to estimate the interquartile range of prices of the 100 items.
[2 marks]

$$
E 38.50-z 7.00
$$

$\qquad$
$\qquad$
$\qquad$

Answer £ $\qquad$

3 (d) Chris has $£ 23.00$
One of the items is selected at random.
Use your graph to estimate the probability that Chris can afford to buy the item.
59 items less than $223.00^{12 \text { ma }}$
100 items total
$\qquad$
$\qquad$

$$
\frac{59}{100}
$$

Answer $\qquad$

4 Here is some information about the times taken for 120 people to solve a maths problem.

| Time, $\boldsymbol{t}$, (seconds) | Frequency | Time | C.Frequency |
| :---: | :---: | :---: | :---: |
| $0<t \leq 20$ | 8 | $t \leq 20$ | 8 |
| $20<t \leq 40$ | 24 | $t \leq 40$ | 32 |
| $40<t \leq 60$ | 33 | $t \leqslant 60$ | 65 |
| $60<t \leq 80$ | 30 | $t \leqslant 80$ | 95 |
| $80<t \leq 100$ | 19 | $t \leqslant 100$ | 114 |
| $100<t \leq 120$ | 6 | $t \leq 120$ | 120 |

4 (a) Draw a cumulative frequency graph.
Cumulative


4 (b) Use your graph to estimate the median time taken by the 120 people.
$\qquad$
$\qquad$


Answer $\qquad$ seconds

4 (c) Use your graph to estimate the interquartile range of times taken to solve the maths problem.
$\qquad$
$77-38$
$\qquad$
$\qquad$

Answer $\qquad$ seconds

4 (d) Everyone who solved the problem in less than 25 seconds wins a prize.
Use your graph to find an estimate for the percentage of people that won a prize.
14 people win a prize 120 people total $\frac{14}{120} \times 100$


Answer $\qquad$ \%

5 The cumulative frequency diagram shows information about the masses, in grams, of the potatoes that a farmer harvests.

Cumulative
frequency


5 (a) Use your graph to estimate the median mass of the potatoes.
$\qquad$
Answer 340
grams
5 (b) The farmer can only sell potatoes that have a mass between 240 g and 500 g . Use your graph to work out an estimate for the number of potatoes from that harvest that the farmer can sell.
[2 marks] $7600-2800$

Answer $\quad 4800$

6 The cumulative frequency diagram shows information about the ages, in years, of 180 people attending a cinema to watch a film.


The prices of different tickets are shown in the table below.

| Child <br> (18 years and under) | General Ticket | Senior <br> (60 years and over) |
| :---: | :---: | :---: |
| $£ 6.50$ | $£ 9.50$ | $£ 7.50$ |

Use the graph to work out an estimate for the total amount of money the cinema receives in ticket sales for the showing of this film.
[4 marks]
32 children 4 seniors
$180-32-4=144$ general
$32 \times 6.50+4 \times 7.50+144 \times 9.50$ Answer \& 1606

7 Peter throws the javelin 48 times and records the distances.
Here is some information about the distances $d$, in metres of his 48 throws.

| Distance, $\boldsymbol{d},(\boldsymbol{m})$ | $0<d \leq 15$ | $15<d \leq 30$ | $30<d \leq 45$ | $45<d \leq 60$ |
| :---: | :---: | :---: | :---: | :---: |
| Frequency | $a$ | $b$ | $c$ | $d$ |

7 (a) $\quad a: b: c: d=1: 2: 5: 4$ $\left.\begin{array}{lll|l}1: 2: 5: 4 & 12 \\ 4: 8 & 20 & 16 & 48\end{array}\right] \times 4$

Complete the cumulative frequency table.

| Distance, $\boldsymbol{d},(\boldsymbol{m})$ | $d \leq 15$ | $d \leq 30$ | $d \leq 45$ | $d \leq 60$ |
| :---: | :---: | :---: | :---: | :---: |
| Cumulative <br> Frequency | 4 | 12 | 32 | 48 |

7 (b) Draw a cumulative frequency graph for this information.
[2 marks]


