**1.** A botany student counted the number of daisies in each of 42 randomly chosen areas of 1 m by 1 m in a large field. The results are summarised in the following stem and leaf diagram.

| Number of daisies | | | | | | | | | 1 \| 1 means 11 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 2 | 3 | 4 | 4 | 4 | | (7) |
| 1 | 5 | 5 | 6 | 7 | 8 | 9 | 9 | | (7) |
| 2 | 0 | 0 | 1 | 3 | 3 | 3 | 3 | 4 | (8) |
| 2 | 5 | 5 | 6 | 7 | 9 | 9 | 9 | | (7) |
| 3 | 0 | 0 | 1 | 2 | 4 | 4 | | | (6) |
| 3 | 6 | 6 | 7 | 8 | 8 | | | | (5) |
| 4 | 1 | 3 | | | | | | | (2) |

(a) Write down the modal value of these data.

**(1)**

(b) Find the median and the quartiles of these data.

**(4)**

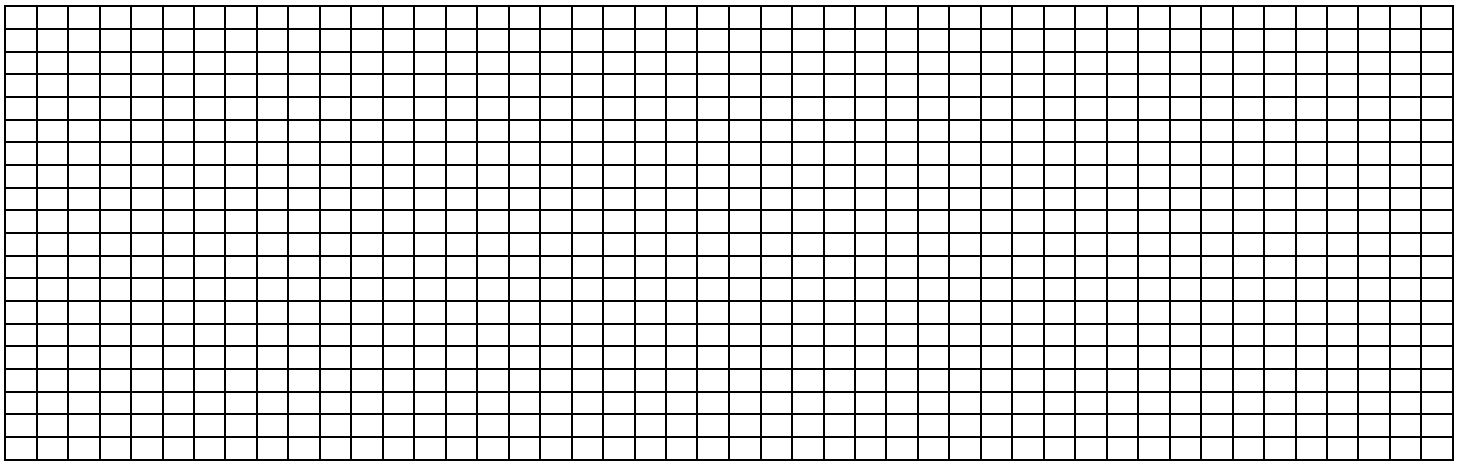
(c) On graph paper and showing your scale clearly, draw a box plot to represent these data.

**(4)**

(d) Comment on the skewness of this distribution.

**(1)**

**(Total 10 marks)**

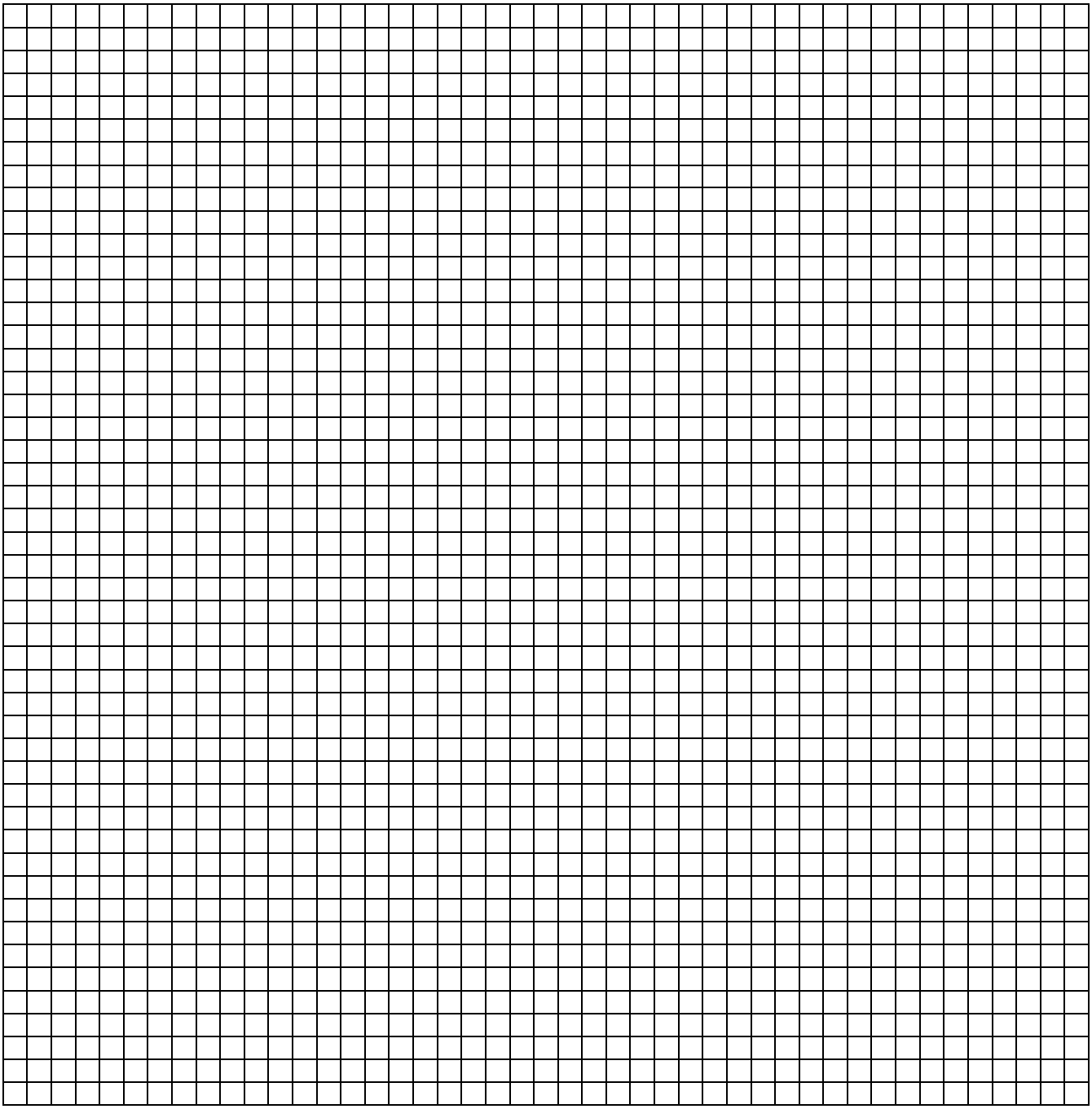


**2.** In a particular week, a dentist treats 100 patients. The length of time, to the nearest minute, for each patient's treatment is summarised in the table below.

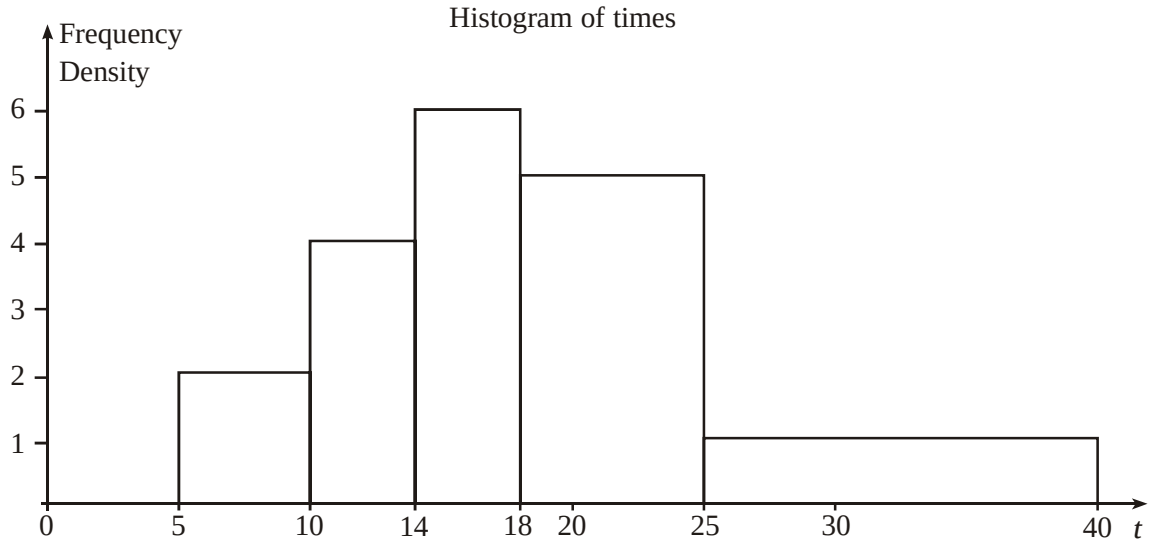
| Time (minutes) | 4 – 7 | 8 | 9 – 10 | 11 | 12 – 16 | 17 – 20 |
|---|---|---|---|---|---|---|
| Number of patients | 12 | 20 | 18 | 22 | 15 | 13 |

Draw a histogram to illustrate these data.

**(Total 5 marks)**



**3.**




The diagram above shows a histogram for the variable $t$ which represents the time taken, in minutes, by a group of people to swim 500m.

(a) Complete the frequency table for $t$.

| $t$ | 5–10 | 10–14 | 14–18 | 18–25 | 25–40 |
|---|---|---|---|---|---|
| Frequency | 10 | 16 | 24 | | |

**(2)**

(b) Estimate the number of people who took longer than 20 minutes to swim 500m.

**(2)**

(c) Find an estimate of the mean time taken.

**(4)**

(d) Find an estimate for the standard deviation of $t$.

**(3)**

(e) Find the median and quartiles for $t$.

**(4)**

One measure of skewness is found using $\dfrac{3(\text{mean} - \text{median})}{\text{standard deviation}}$.

(f) Evaluate this measure and describe the skewness of these data.

**(2)**

**(Total 17 marks)**

**4.** A person's blood group is determined by whether or not it contains any of 3 substances *A*, *B* and *C*.

A doctor surveyed 300 patients' blood and produced the table below

| **Blood Contains** | **No. of Patients** |
|---|---|
| only *C* | 100 |
| *A* and *C* but not *B* | 100 |
| only *A* | 30 |
| *B* and *C* but not *A* | 25 |
| only *B* | 12 |
| *A*, *B* and *C* | 10 |
| *A* and *B* but not *C* | 3 |

(a) Draw a Venn diagram to represent this information.

**(4)**

(b) Find the probability that a randomly chosen patient's blood contains substance *C*.

**(2)**

Harry is one of the patients. Given that his blood contains substance *A*,

(c) find the probability that his blood contains all 3 substances.

**(2)**

Patients whose blood contains none of these substances are called universal blood donors.

(d) Find the probability that a randomly chosen patient is a universal blood donor.

**(2)**

**(Total 10 marks)**

**5.** A keep-fit enthusiast swims, runs or cycles each day with probabilities 0.2, 0.3 and 0.5 respectively. If he swims he then spends time in the sauna with probability 0.35. The probabilities that he spends time in the sauna after running or cycling are 0.2 and 0.45 respectively.

(a) Represent this information on a tree diagram.

**(3)**

(b) Find the probability that on any particular day he uses the sauna.

**(3)**

(c) Given that he uses the sauna one day, find the probability that he had been swimming.

**(3)**

(d) Given that he did not use the sauna one day, find the probability that he had been swimming.

**(6)**

**(Total 15 marks)**