Ecological relationships and classification
Lesson 6 - Estimating Populations

Biology - Key Stage 3

Miss Lewis

Task

1. Calculate the frequency.
2. Calculate the total number of flowers.
3. Calculate the mean.

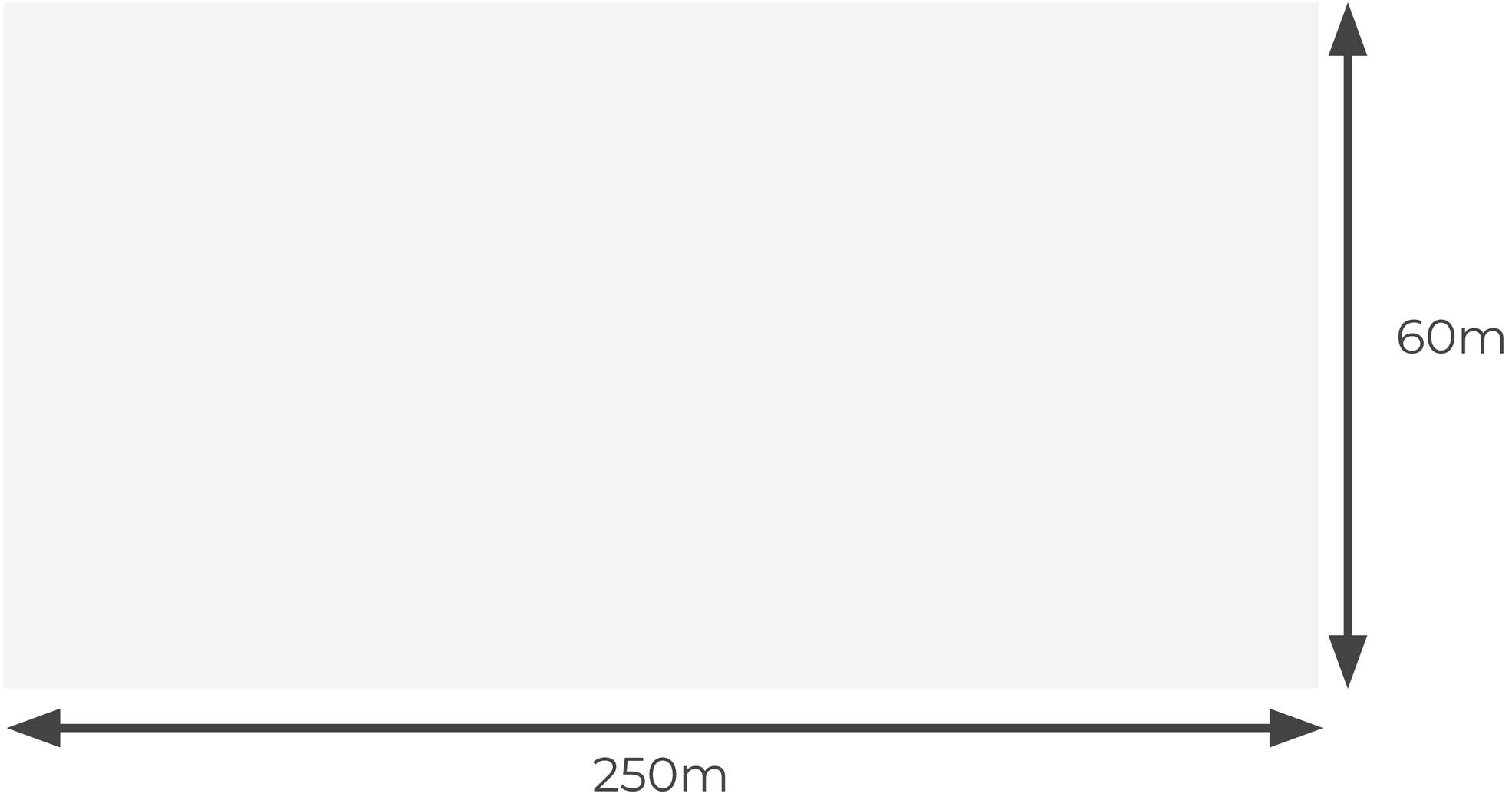
$$\text{Mean} = \frac{\text{Total number of organisms}}{\text{Frequency}}$$

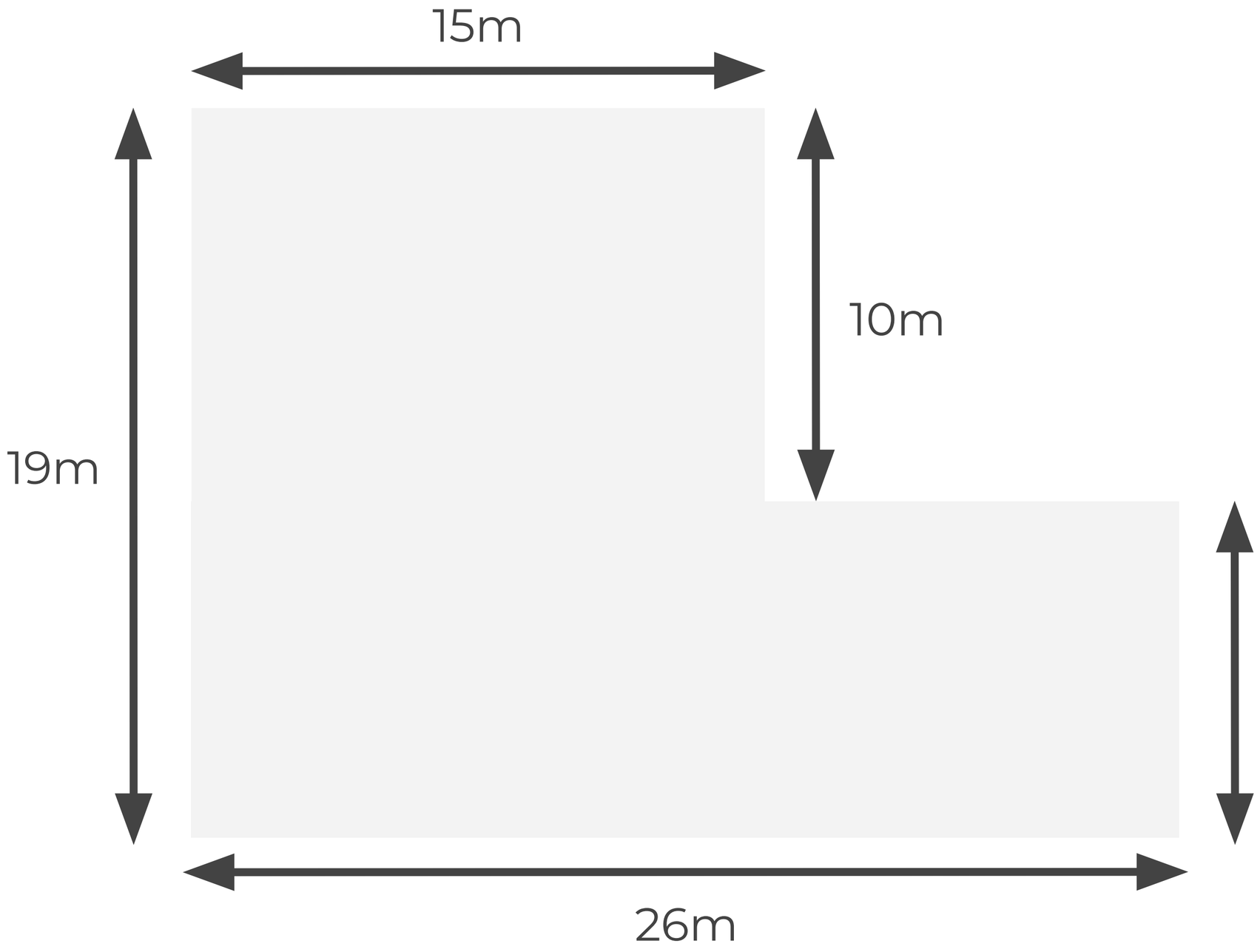
Number of flowers in the quadrat	Tally	Frequency	Total Number of Flowers
1	II		
2	𝍸 III		
3	𝍸		
4	II		
5	IIII		
6	𝍸		
7	III		
8	II		
9	I		
10	II		
Totals:			

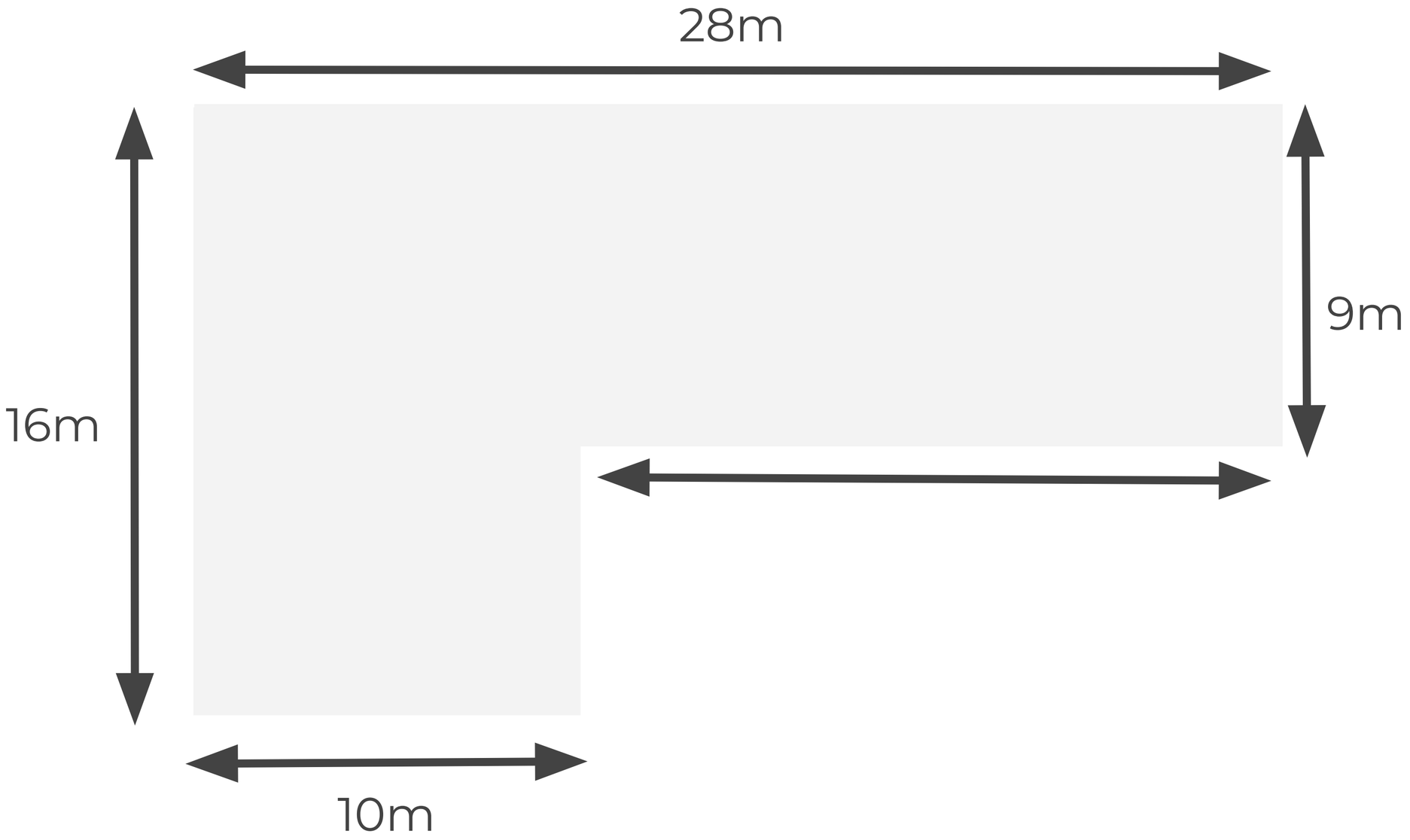
Task

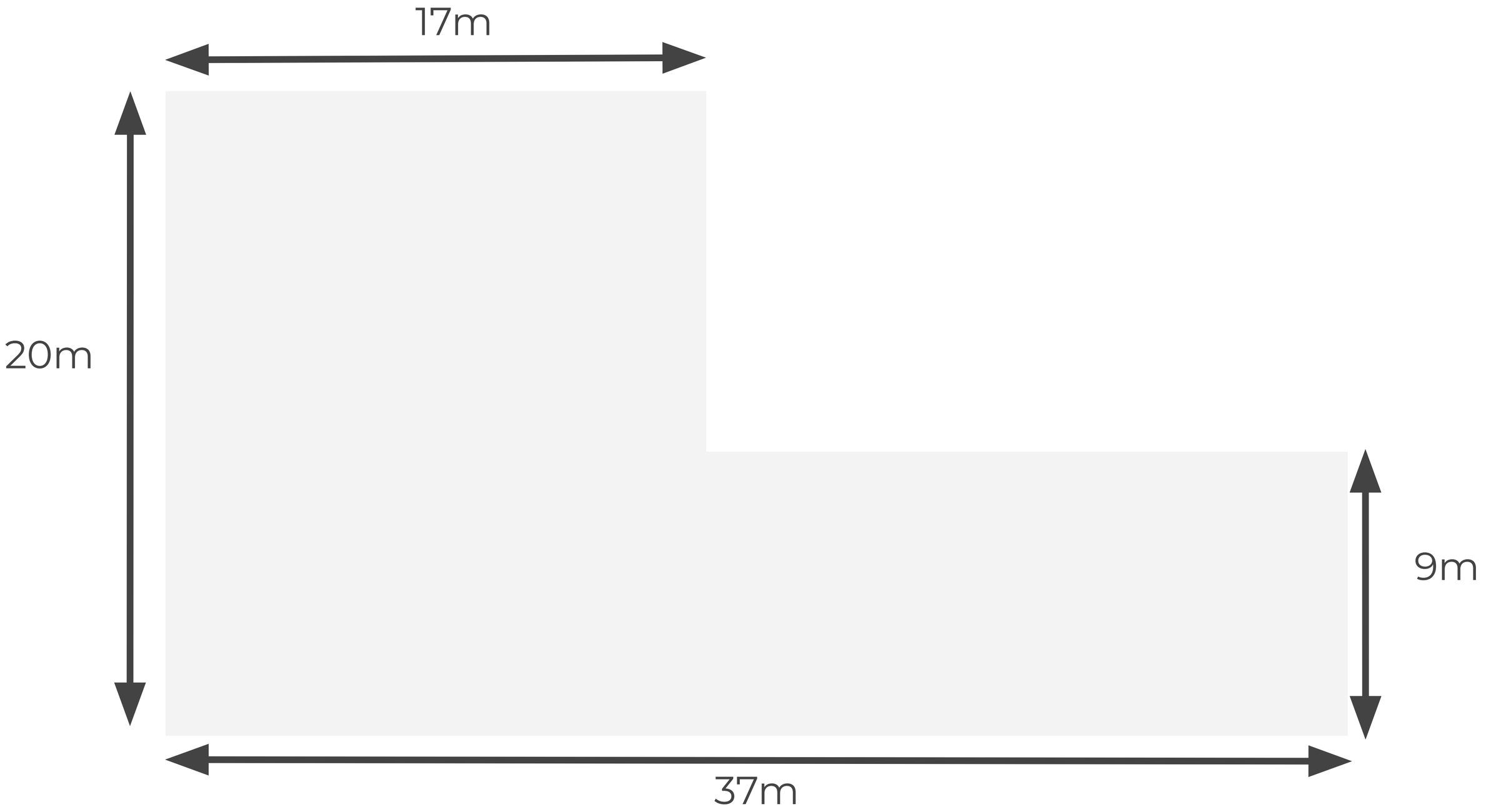
Calculate the mean number of flowers from the frequency table.

Number of flowers in the quadrat	Tally	Frequency	Total Number of Flowers
1	I		
2	IIII		
3	III		
4	IIII I		
5	IIII		
6	IIII		
7	II		
8	II		
9	III		
10	IIII		
Totals:			


60m
250m


15m
10m
19m
26m


28m
16m
9m
10m

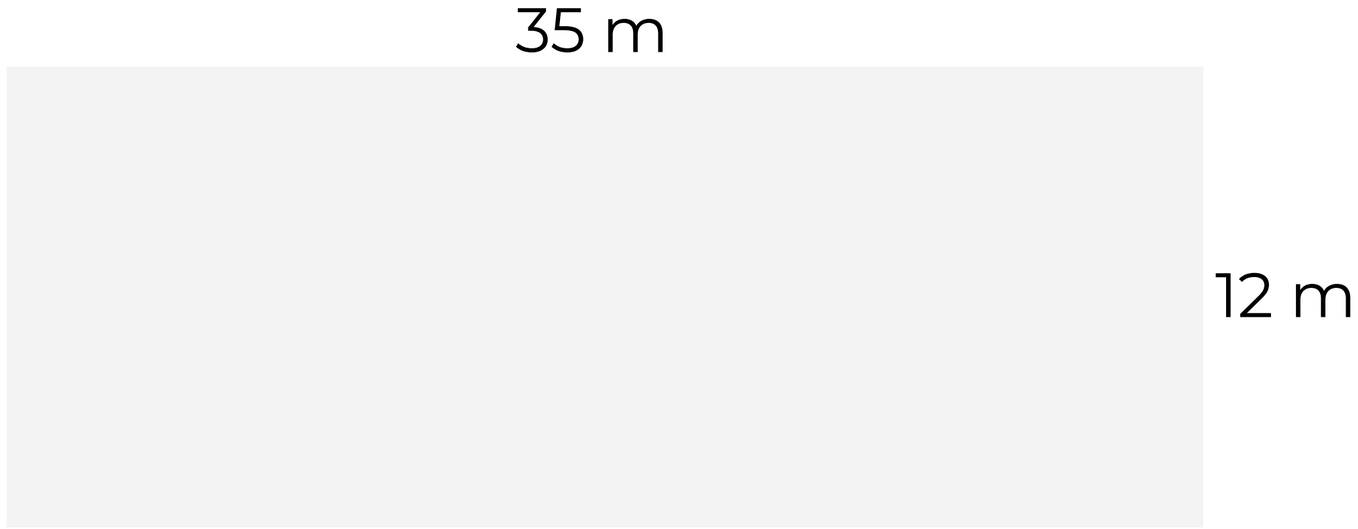

17m
20m
9m
37m

Step	Answer
1. Calculate area of your quadrat	
2. Calculate the area of your sampling site	
3. Calculate the number of quadrats that fit the sample area (multiplication factor) by: area of the sampling site ÷ area of the quadrat.	
4. Find the mean of your random samples	
5. Multiply the mean number by the number calculated in step 3 to calculate your estimated population of daisies. Round up your answer to the nearest whole number.	

Estimate the population of daisies in the field

A **0.5 m x 0.5 m** quadrat was placed randomly **10 times** on the site shown and the numbers of daisies recorded were as follows:

5, 0, 2, 6, 9, 1, 7, 2, 0, 13

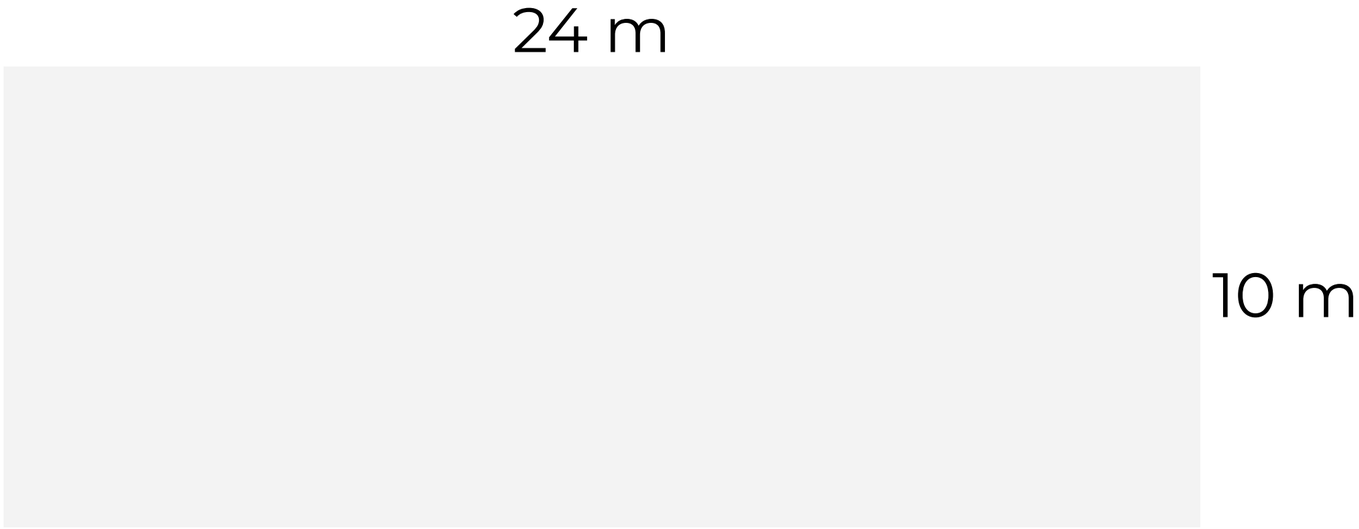


Step	Answer
1. Calculate area of your quadrat	
2. Calculate the area of your sampling site	
3. Calculate the number of quadrats that fit the sample area (multiplication factor) by: area of the sampling site ÷ area of the quadrat.	
4. Find the mean of your random samples	
5. Multiply the mean number by the number calculated in step 3 to calculate your estimated population of daisies. Round up your answer to the nearest whole number.	

Estimate the population of daisies in the field

A **0.5 m x 0.5 m** quadrat was placed randomly **10 times** on the site shown and the numbers of daisies recorded were as follows:

6, 1, 4, 12, 7, 0, 8, 3, 0, 10

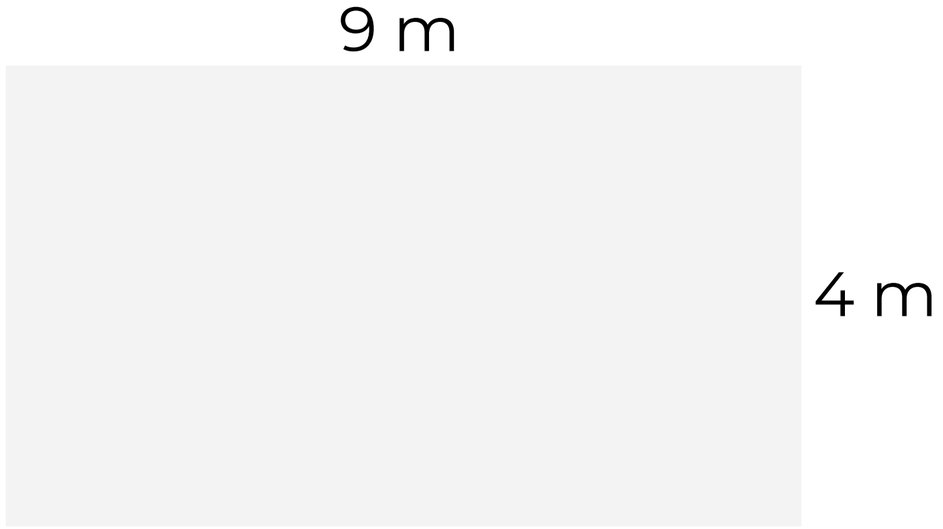


Step	Answer
1. Calculate area of your quadrat	
2. Calculate the area of your sampling site	
3. Calculate the number of quadrats that fit the sample area (multiplication factor) by: area of the sampling site ÷ area of the quadrat.	
4. Find the mean of your random samples	
5. Multiply the mean number by the number calculated in step 3 to calculate your estimated population of daisies. Round up your answer to the nearest whole number.	

Estimate the population of daisies in the field

A 0.5 m x 0.5 m quadrat was placed randomly 8 times on the site shown and the numbers of daisies recorded were as follows:

12, 16, 8, 1, 9, 5, 2, 11



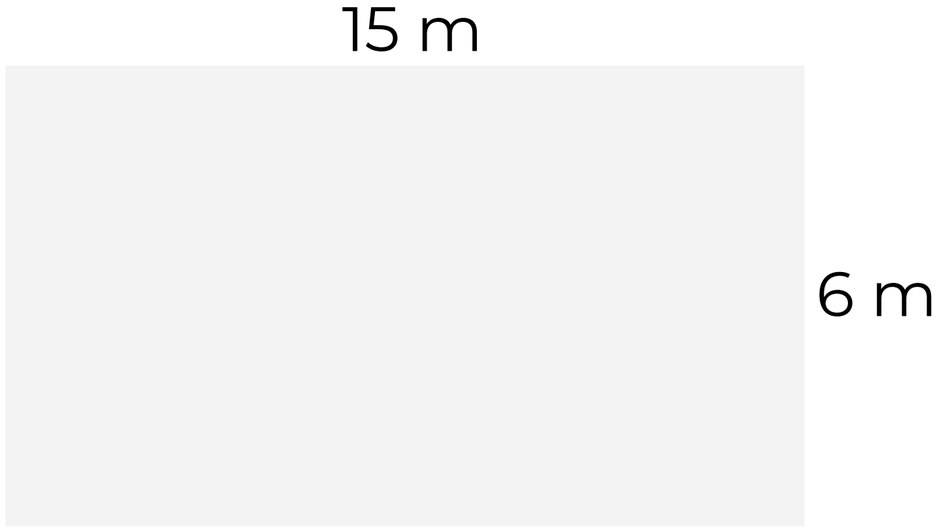
Step	Answer
1. Calculate area of your quadrat	
2. Calculate the area of your sampling site	
3. Calculate the number of quadrats that fit the sample area (multiplication factor) by: area of the sampling site ÷ area of the quadrat.	
4. Find the mean of your random samples	
5. Multiply the mean number by the number calculated in step 3 to calculate your estimated population of daisies. Round up your answer to the nearest whole number.	

Estimate the population of daisies and dandelions in the field

A 0.5 m x 0.5 m quadrat was placed randomly 8 times on the site shown and the numbers of daisies and dandelions recorded were as follows:

Daisies: 0, 12, 3, 3, 9, 12, 8, 11, 0, 15

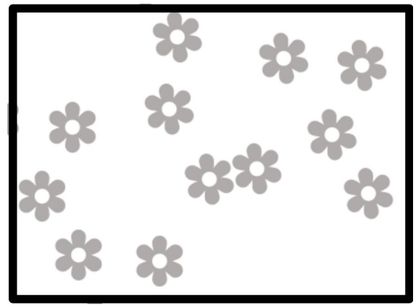
Dandelions: 1, 4, 2, 6, 6, 2, 3, 6, 4, 7



÷

Step	Answer
1. Calculate area of your quadrat	
2. Calculate the area of your sampling site	
3. Calculate the number of quadrats that fit the sample area (multiplication factor) by: area of the sampling site ÷ area of the quadrat.	
4. Find the mean of your random samples	
5. Multiply the mean number by the number calculated in step 3 to calculate your estimated population of daisies. Round up your answer to the nearest whole number.	

Exam Style Question



The green in town measures 160 x 60 metres.

A student wanted to estimate the number of daisies are growing on the green. The student found an area where daisies were growing and placed a 1 m x 1 m quadrat in one position in that area. The image shows the daisies in the quadrat.

The student said: ‘This result shows that there are 115 200 daisies on the green. How did the student calculate this?

Hint: Think about the table.

Exam Style Question

The green in town measures 160 x 60 metres.

A student wanted to estimate the number of daisies are growing on the green. The student found an area where daisies were growing and placed a 1 m x 1 m quadrat in one position in that area.

The student's estimate is probably not accurate. How could you improve the student's method to give more accurate results?