

Biology B
Advanced
PAPER 3: General and Practical Principles in Biology

Wednesday 19 June 2024 – Morning

Time: 2 hours 30 minutes

Diagram Booklet

THIS DIAGRAM BOOKLET MUST BE RETURNED WITH THE QUESTION PAPER AT THE END OF THE EXAMINATION.

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

INSTRUCTIONS

There may be spare copies of some diagrams in case you need them.

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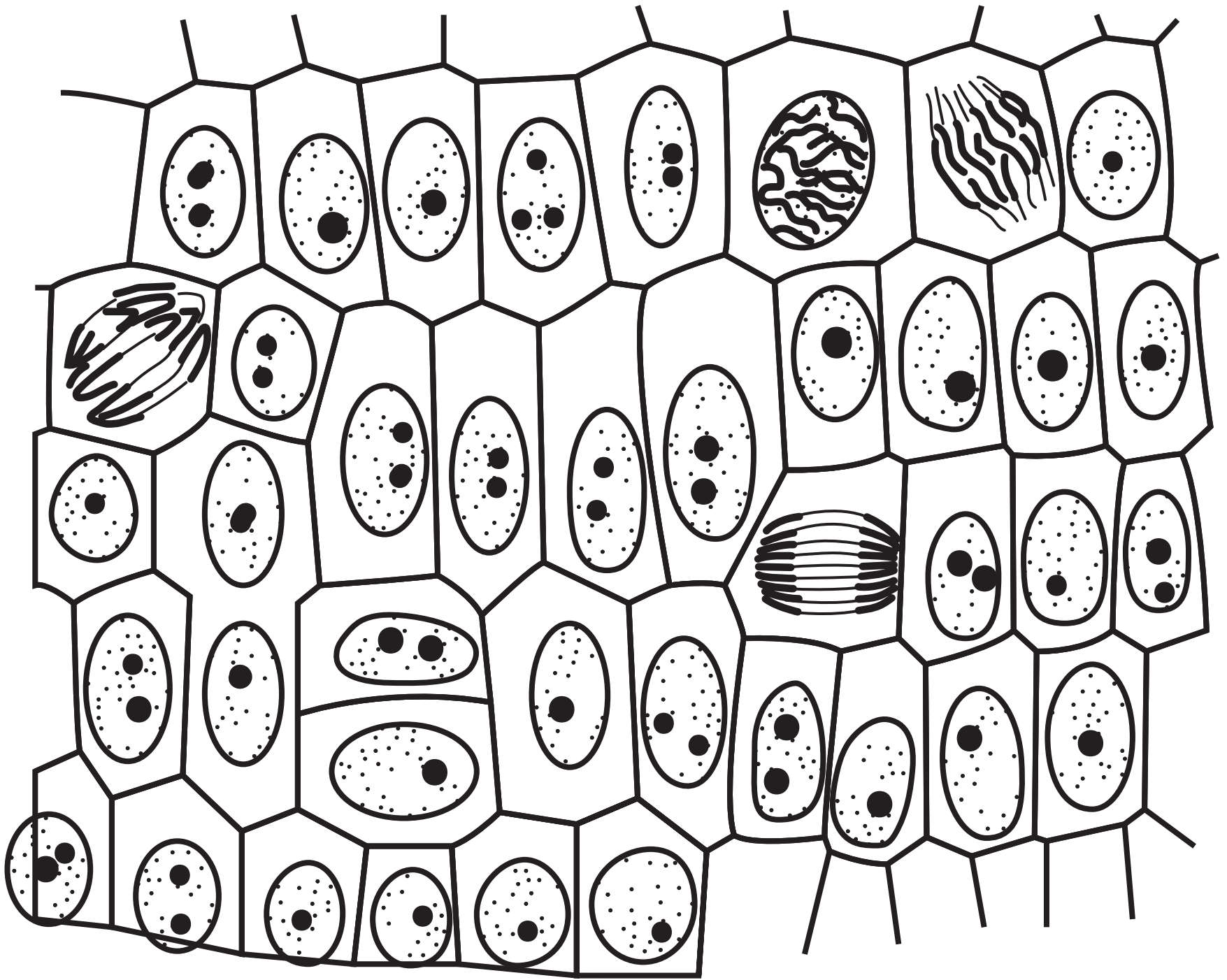
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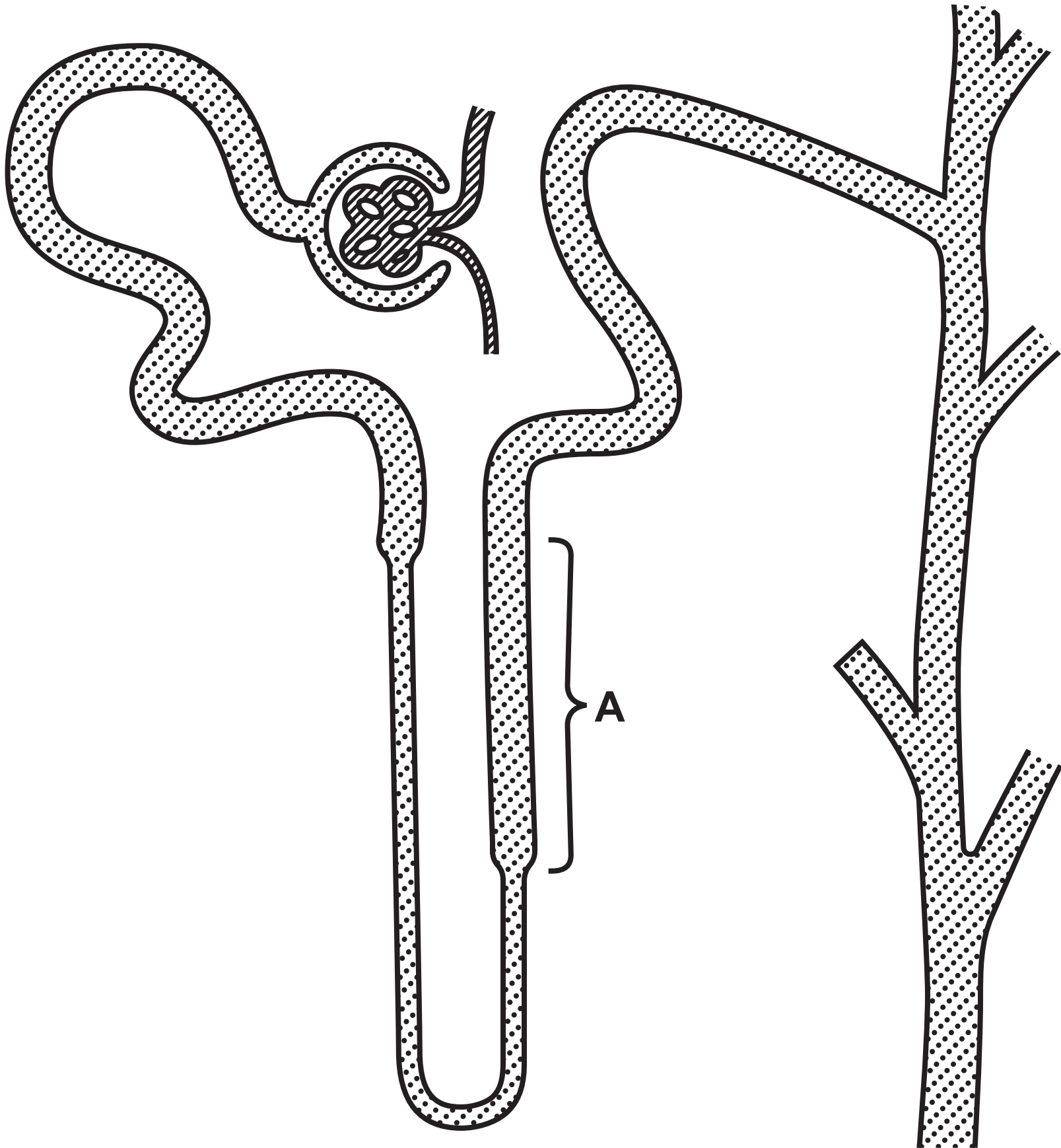
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Question 1(c)

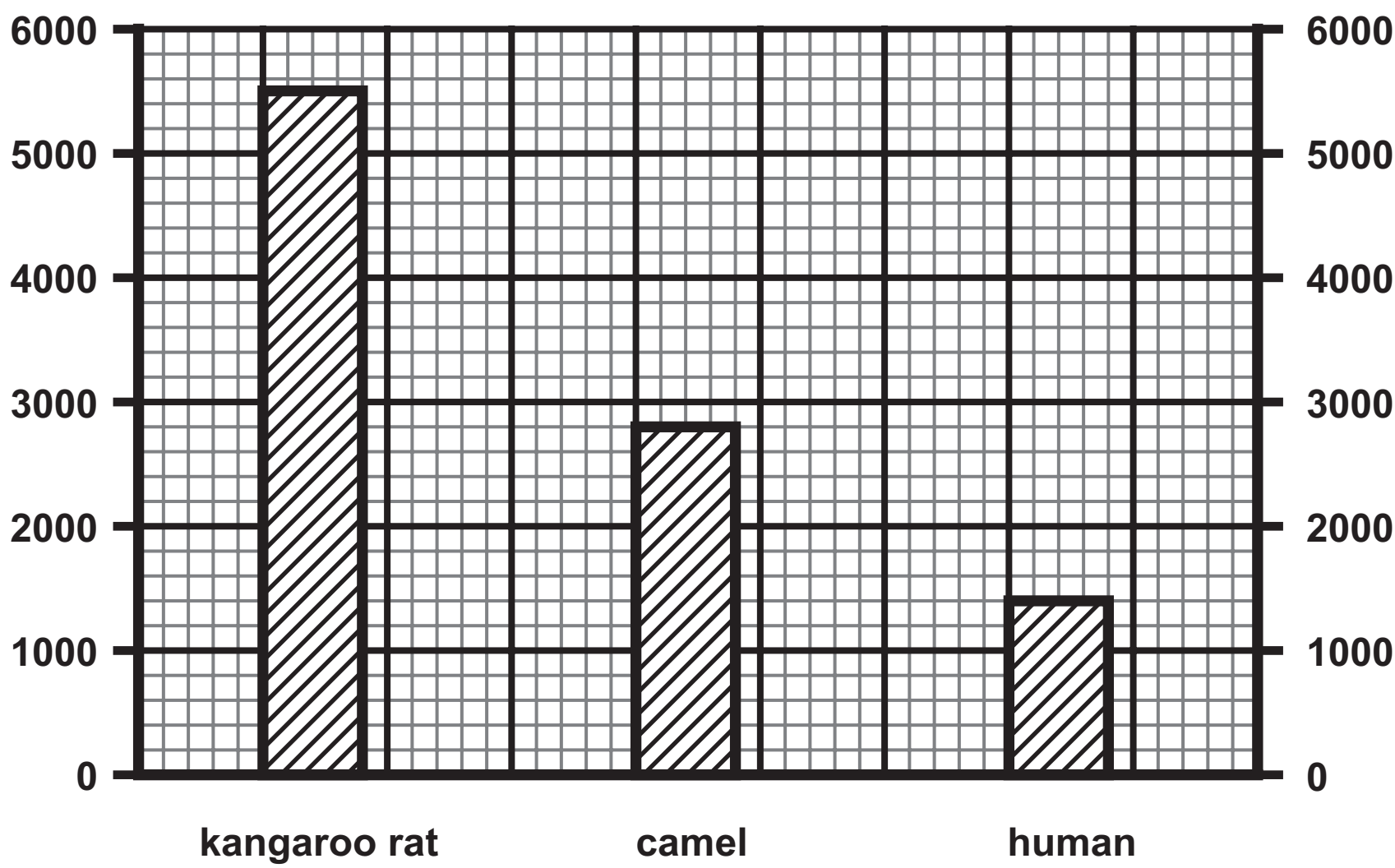


Question 2(a)

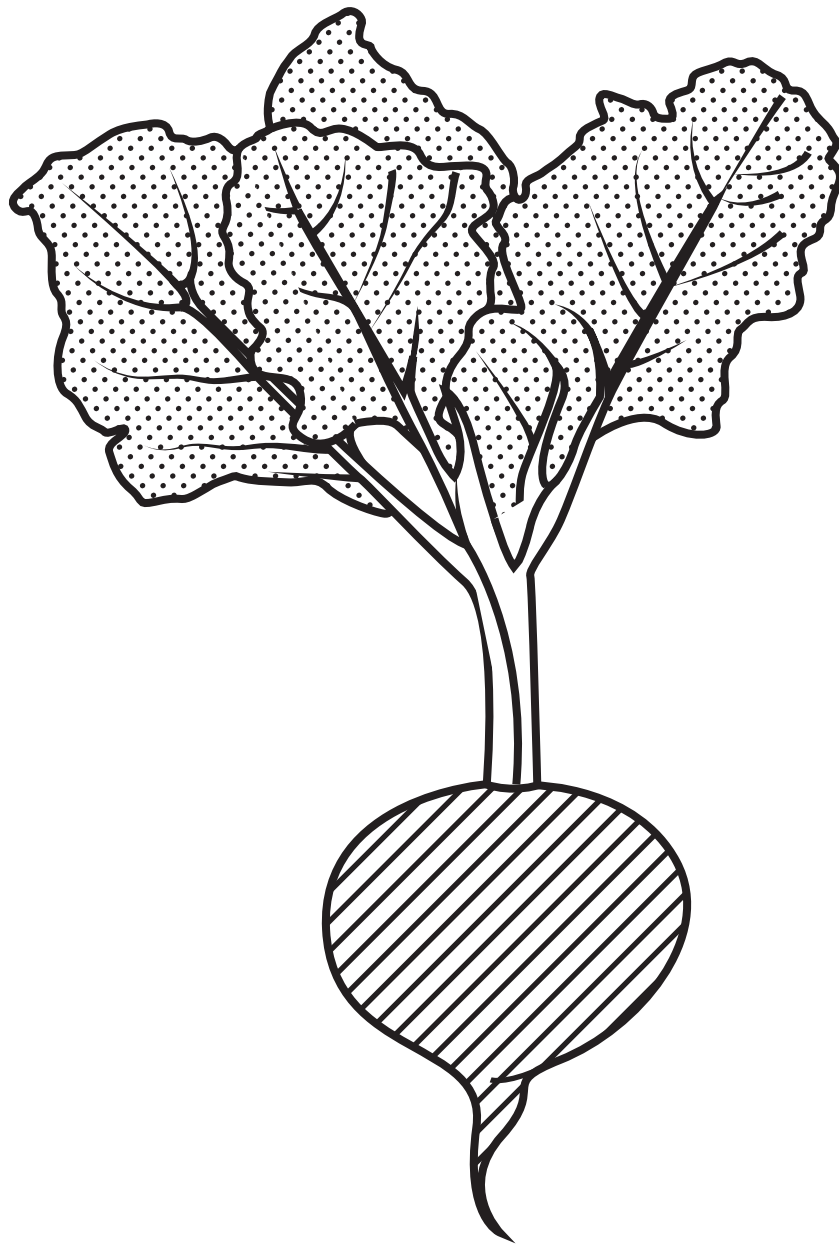


Question 2(b)

Urine concentration / a.u.

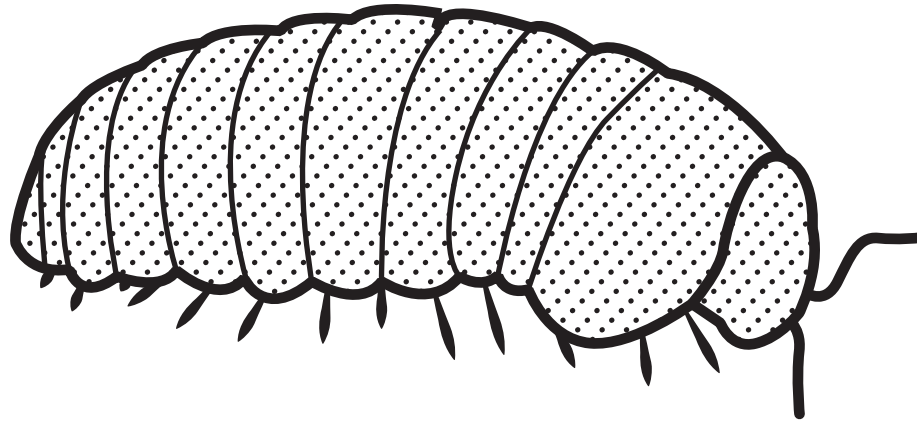


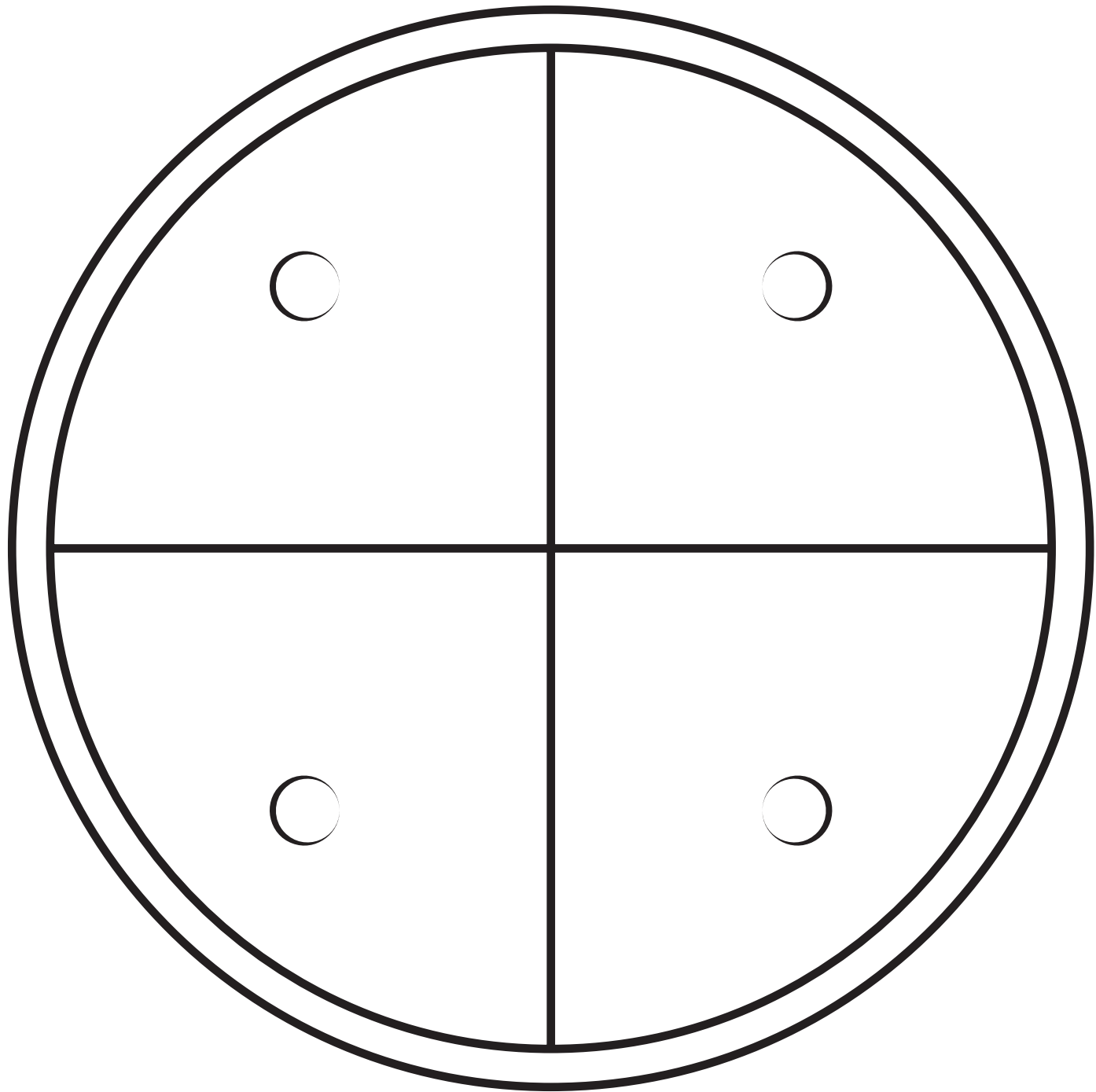
Question 3



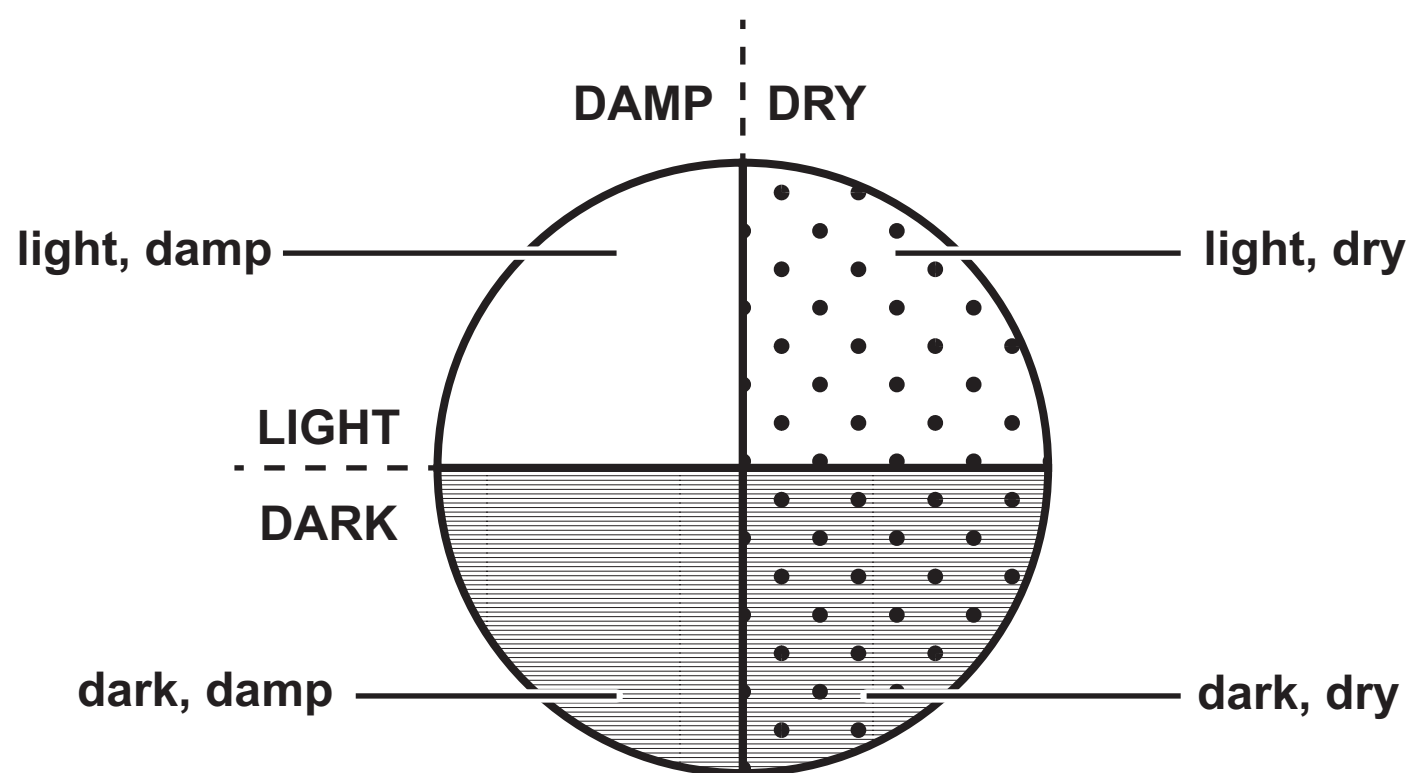
*Group 1 results were excluded from the calculations of the means.

Temperature / °C	Absorbance					Mean of groups 2--5
	Group 1*	Group 2	Group 3	Group 4	Group 5	
20	0·33	0·14	0·07	0·08	0·11	0·10
30	0·57	0·24	0·32	0·33	0·31	0·30
40	0·87	0·53	0·63	0·56	0·51	0·56
50	1·87	1·58	1·63	1·53	1·56	1·58
60	1·93	1·59	1·62	1·49	1·56	1·57

Question 4(a)**Magnified**

Question 4(b)**TOP VIEW****SIDE VIEW****(continued on the next page)****Turn over**

Question 4(b)

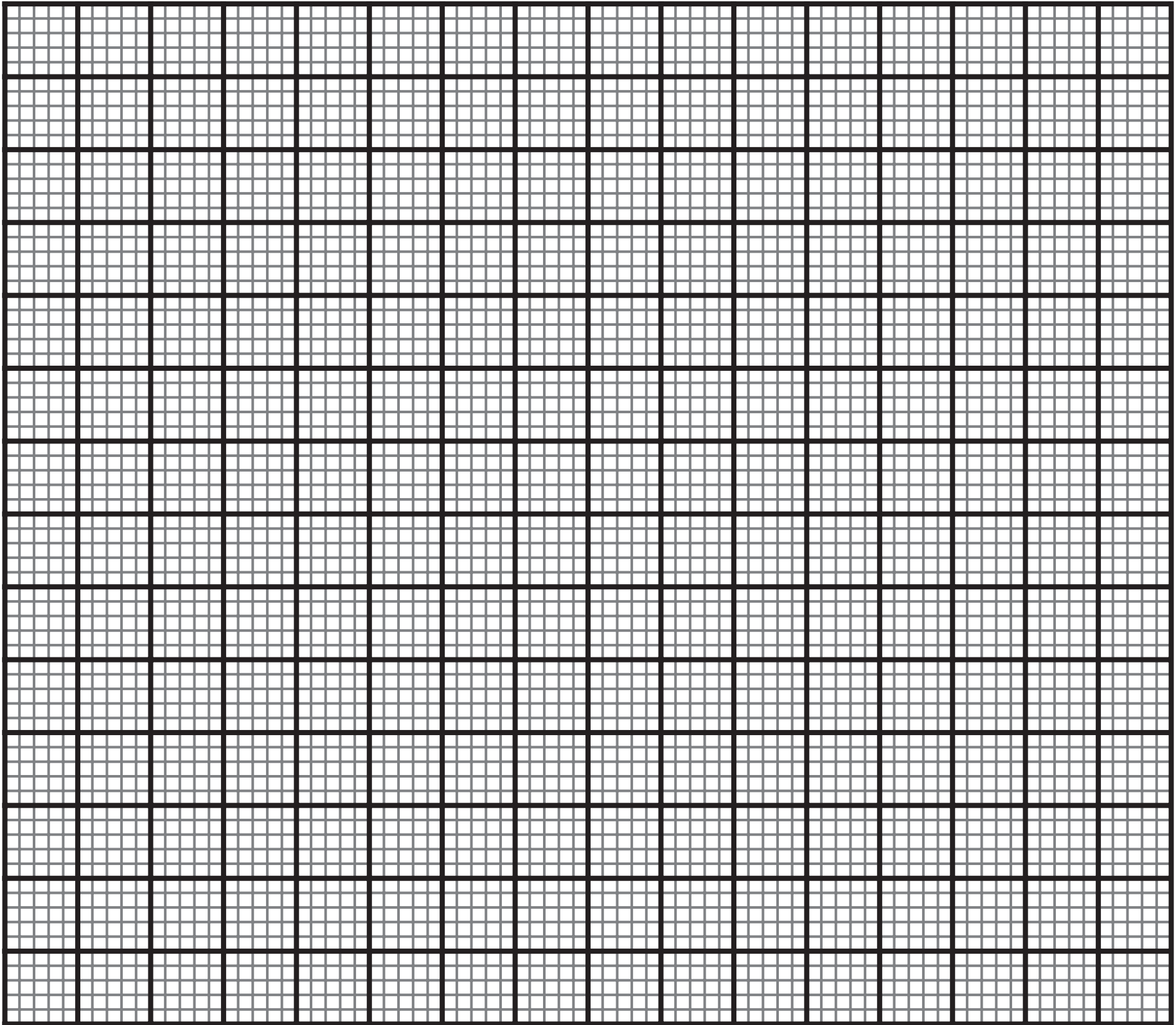


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Section	Number of woodlice in each section of the chamber after 5 minutes			
	Trial 1	Trial 2	Trial 3	Trial 4
Light and dry	2	1	0	2
Light and damp	4	4	1	5
Dark and dry	4	3	3	3
Dark and damp	10	12	16	10

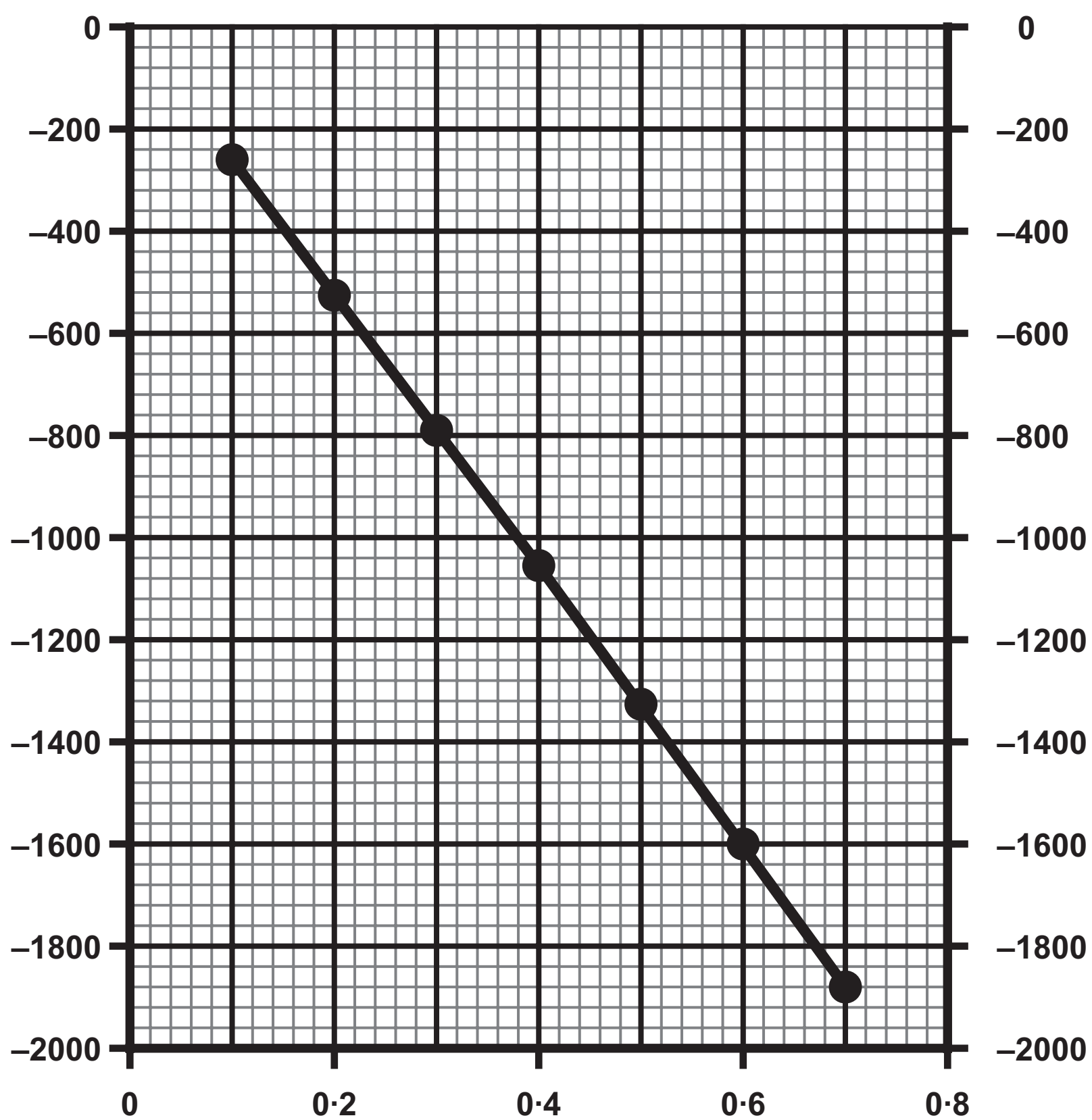
Question 5(a)(ii)

Concentration of sucrose solution / mol dm ⁻³	0·0	0·1	0·2	0·3	0·4	0·5	0·6	0·7	0·8
Mean percentage of plasmolysed cells (%)	0·0	1·3	4·0	31·9	59·6	76·3	92·5	99·4	99·8

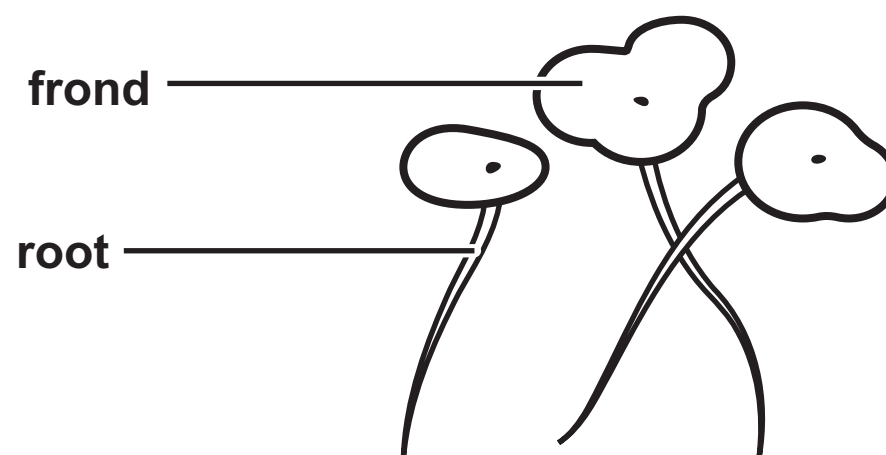


Question 5(a)(iv)

Osmotic potential / kPa

Concentration of cell sap / mol dm^{-3}

Question 6

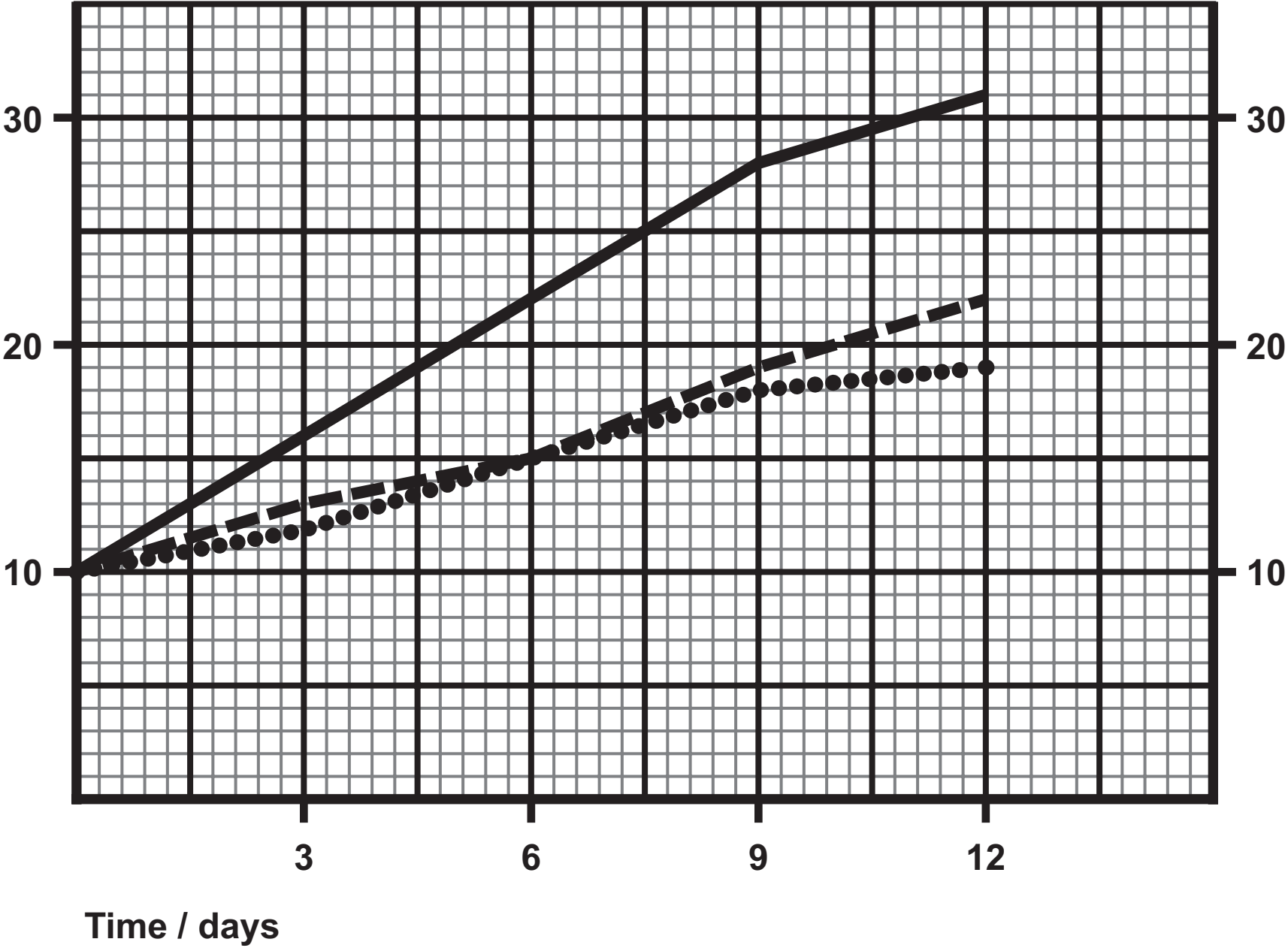


Question 6(a)

KEY

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- red filter
- blue filter

Number of plants



Question 6(b)

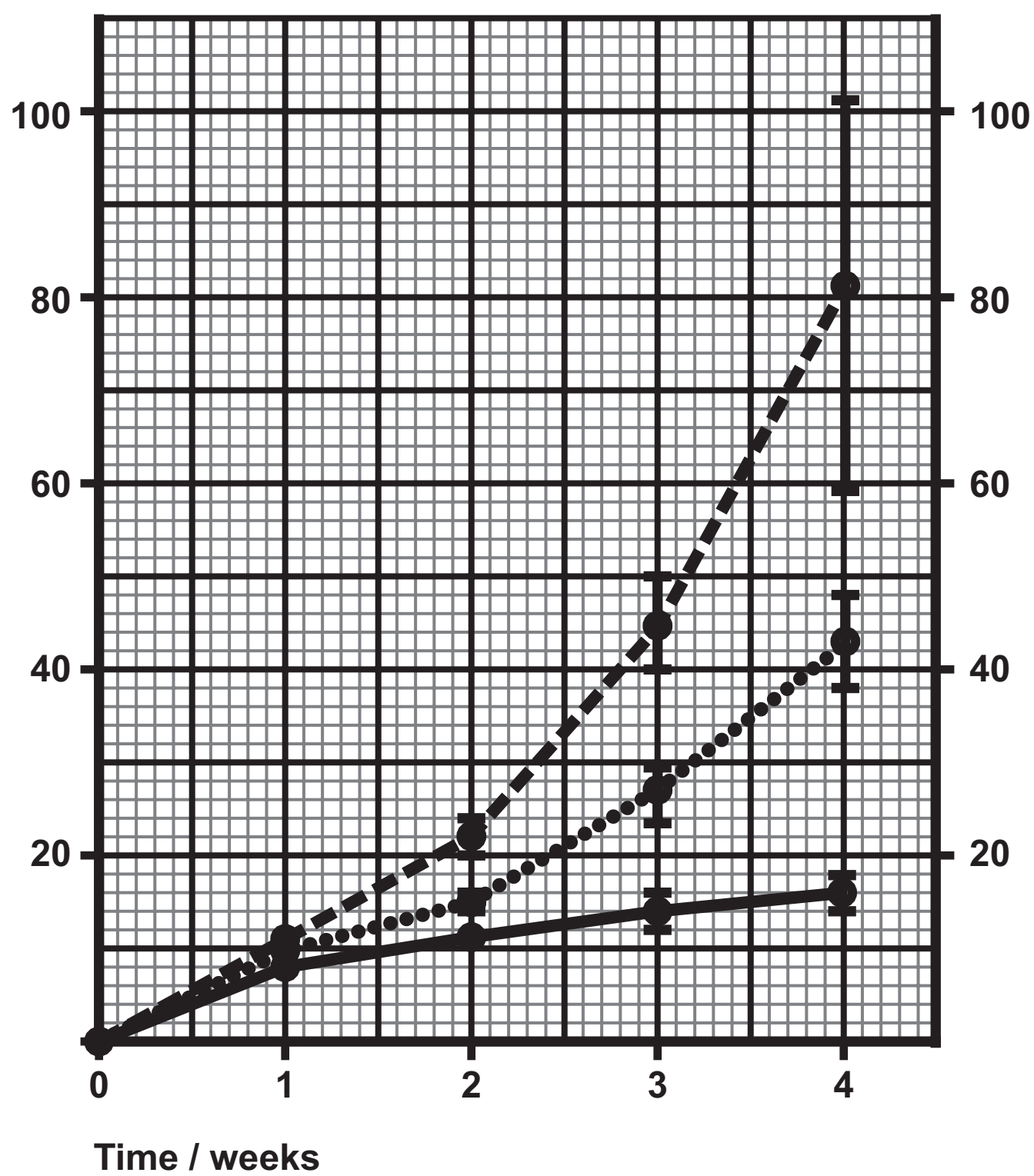
KEY

----- 1.5 cm^3 fertiliser per dm^3

..... 1.0 cm^3 fertiliser per dm^3

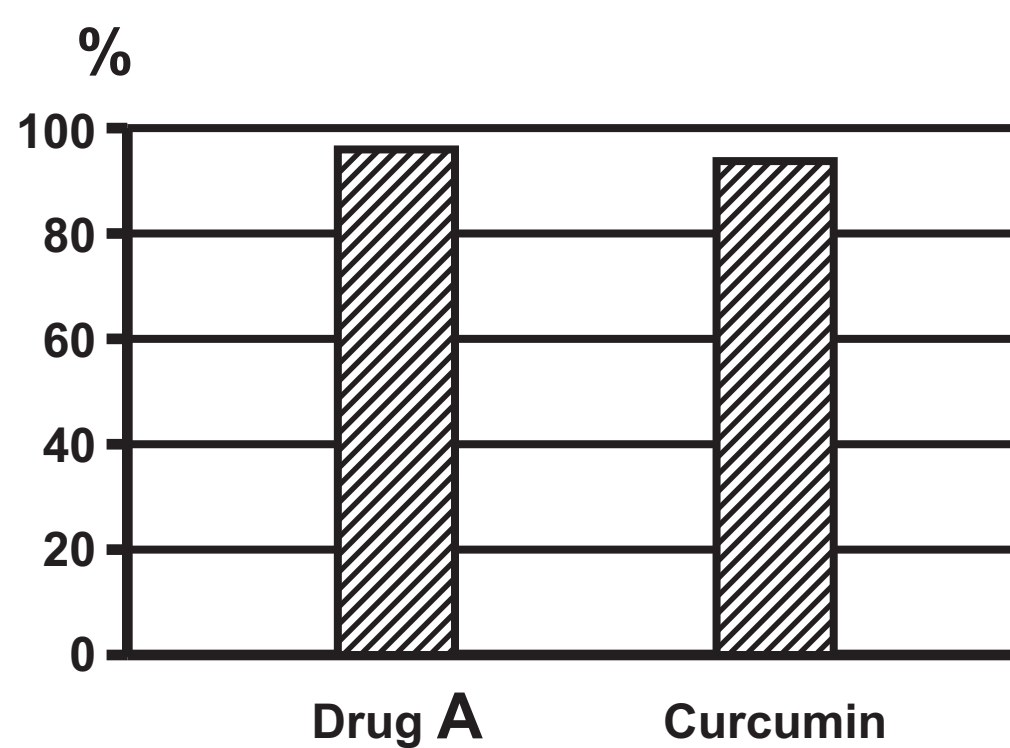
———— 0.5 cm^3 fertiliser per dm^3

Mean growth
of plants / a.u.

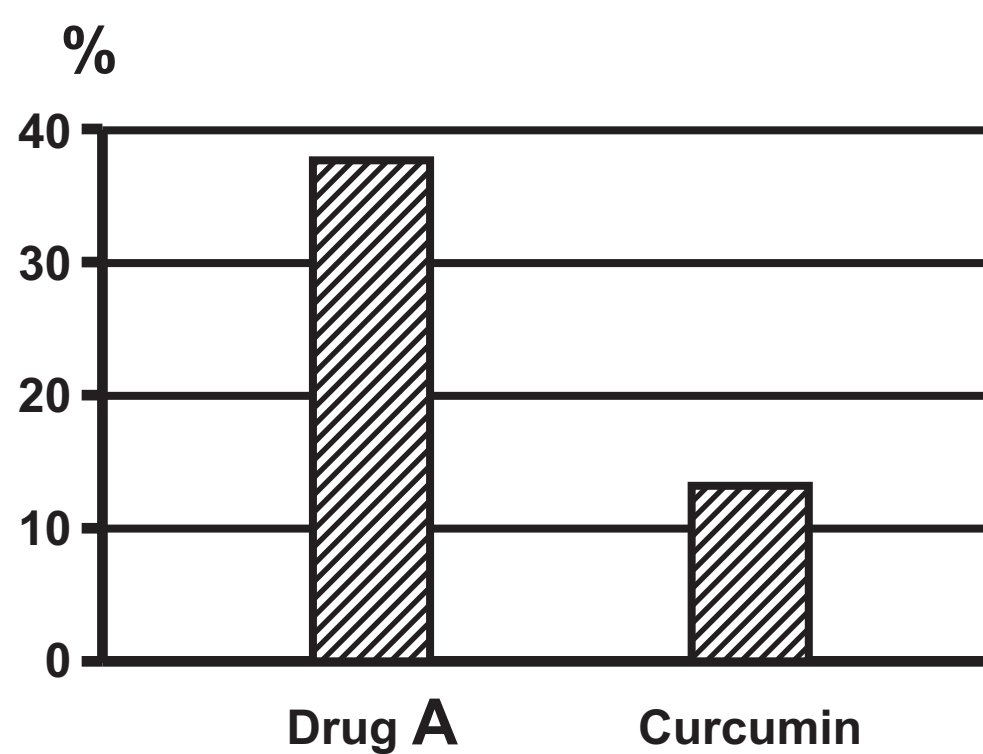


Question 7(b)

Percentage (%) of patients who reported at least 50% improvement in pain levels at day 28

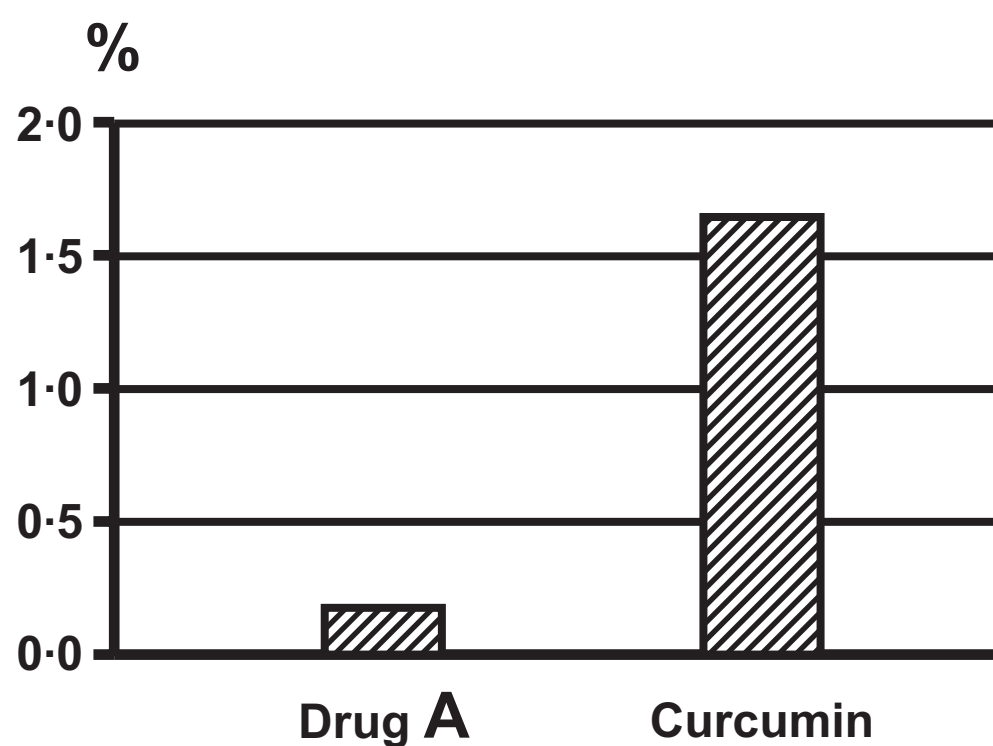


Percentage (%) of patients who reported side effects, including nausea and vomiting

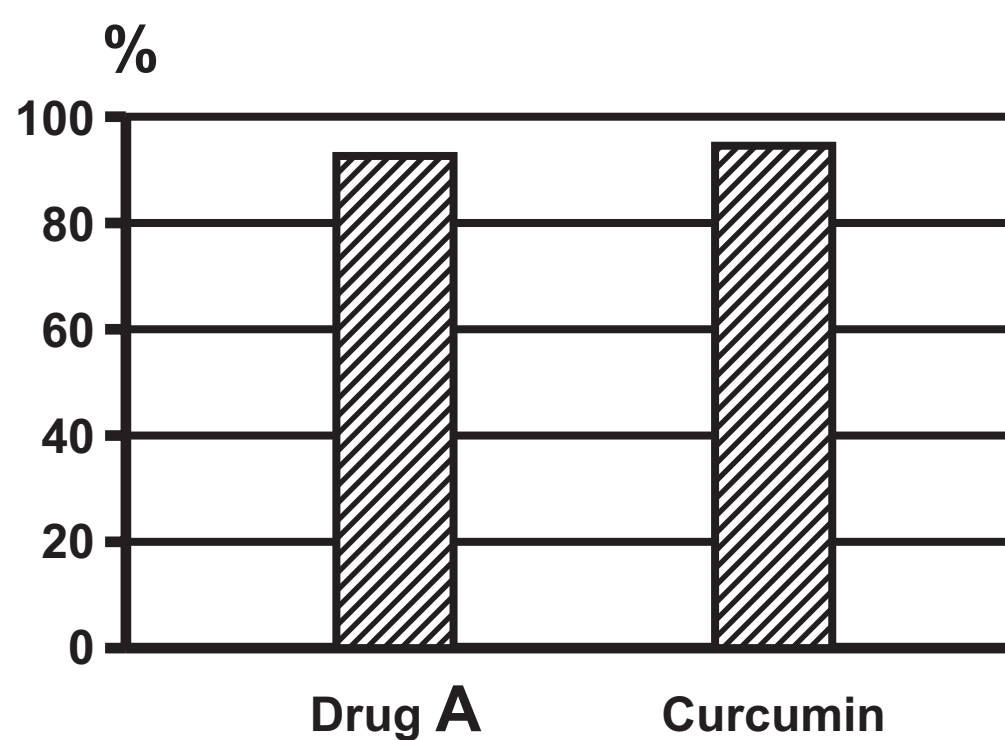


Question 7(b)

Mean percentage (%) weight loss reported in each treatment group



Percentage (%) of patients rated as having excellent or good outcomes by doctors



Question 8



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Turn over

Question 8

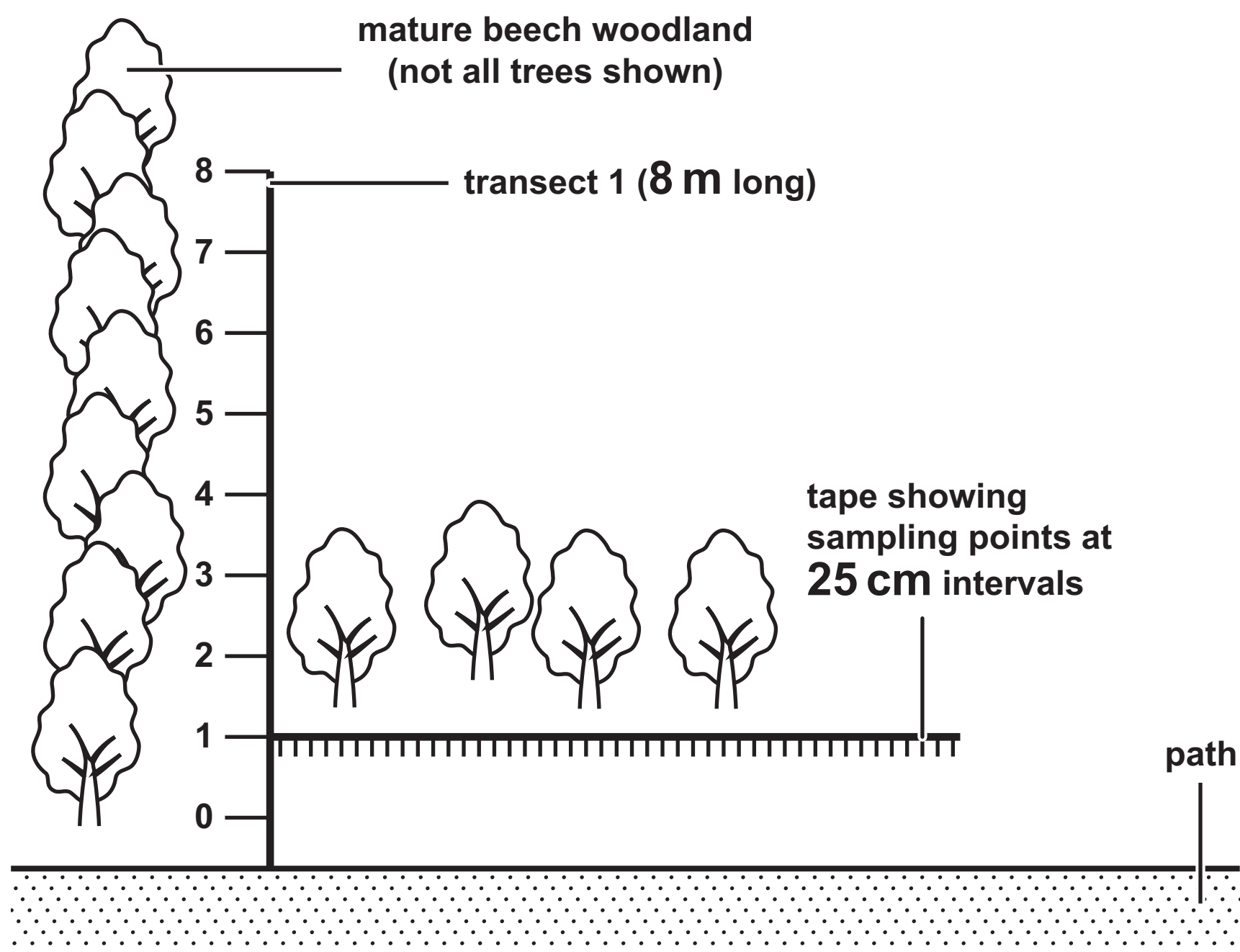


TABLE 1

Distance from path /m	Number of celandine plants recorded			
	Transect 1	Transect 2	Transect 3	Mean
0	18	19	20	19·0
1	19	16	17	17·3
2	17	15	12	14·7
3	15	8	13	12·0
4	9	9	6	8·0
5	3	16	6	8·3
6	5	4	4	4·3
7	2	3	2	2·3
8	1	6	2	3·0

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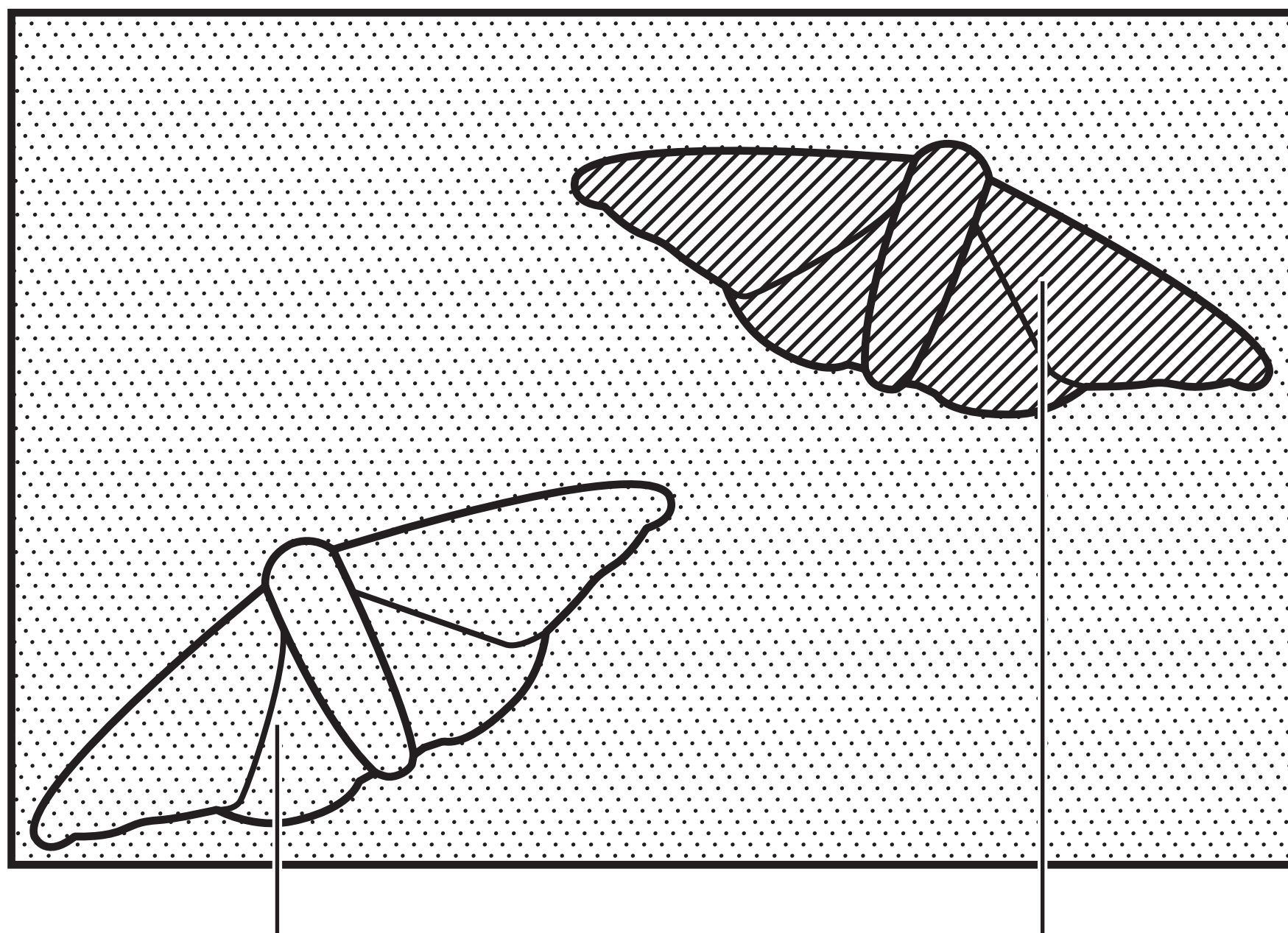
TABLE 2

Distance from path / m	Mean number of celandine plants	Rank distance from path	Rank number of celandine plants	d	d ²
0	19·0	1	9	−8	64
1	17·3	2	8	−6	36
2	14·7	3	7	−4	16
3	12·0	4	6	−2	4
4	8·0	5	4	1	1
5	8·3	6	5	1	1
6	4·3	7	3	4	16
7	2·3	8	1	7	49
8	3·0	9	2	7	49

Number of pairs of values	Level of significance		
	0·10	0·05	0·01
4	1·000	–	–
5	0·900	1·000	–
6	0·829	0·886	1·000
7	0·714	0·786	0·929
8	0·643	0·738	0·881
9	0·600	0·700	0·833
10	0·564	0·648	0·794

Question 9

TREE TRUNK IN RURAL AREA



light form

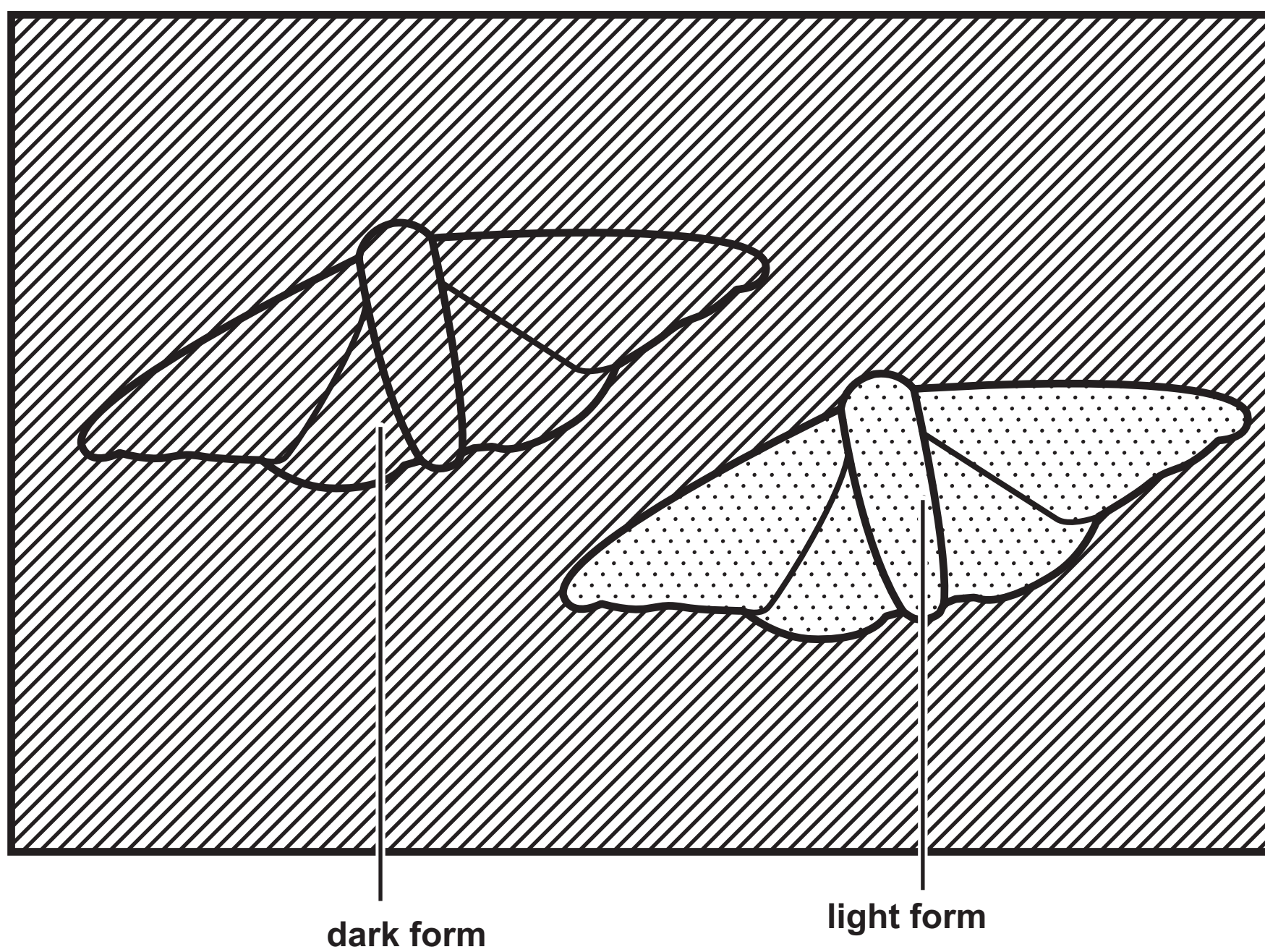
dark form

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Turn over

Question 9 continued

TREE TRUNK IN INDUSTRIAL AREA



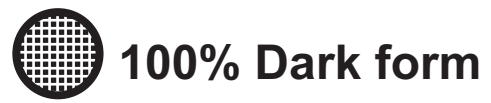
Question 9(b)

Type of peppered moth	Percentage of marked moths released which were recaptured (%)	
	Industrial area	Rural area
Light form	13·1	13·7
Dark form	27·5	4·7

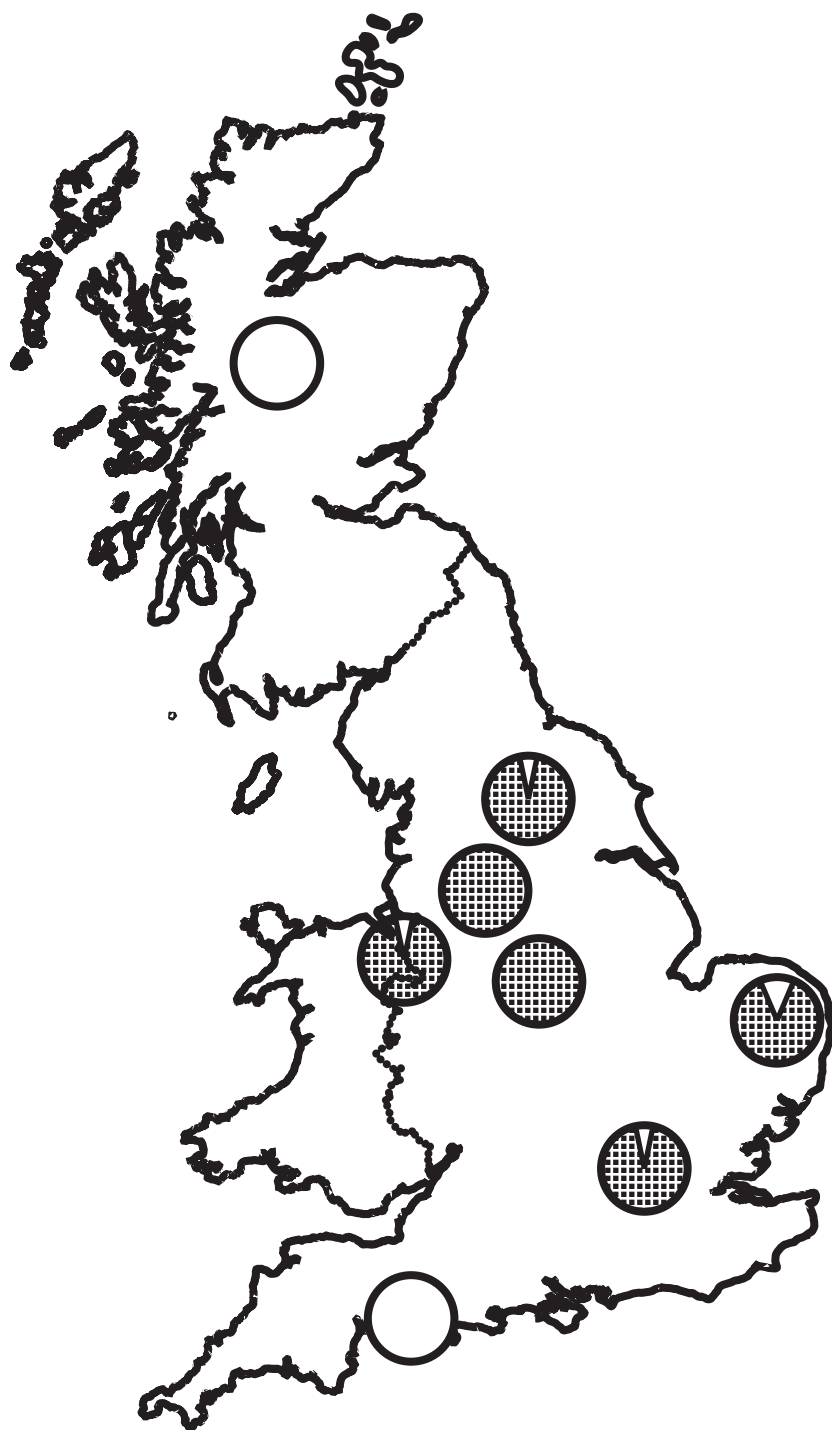
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Question 9(b)

KEY:



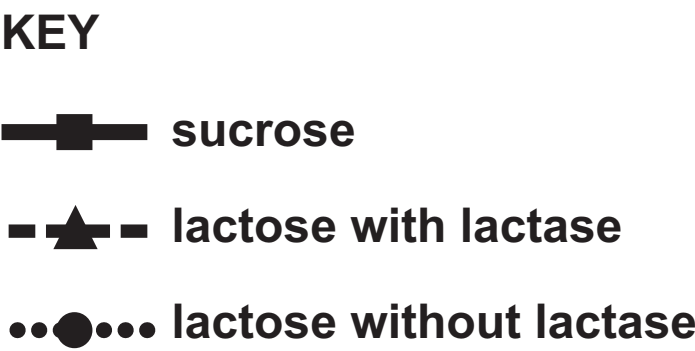
1950s



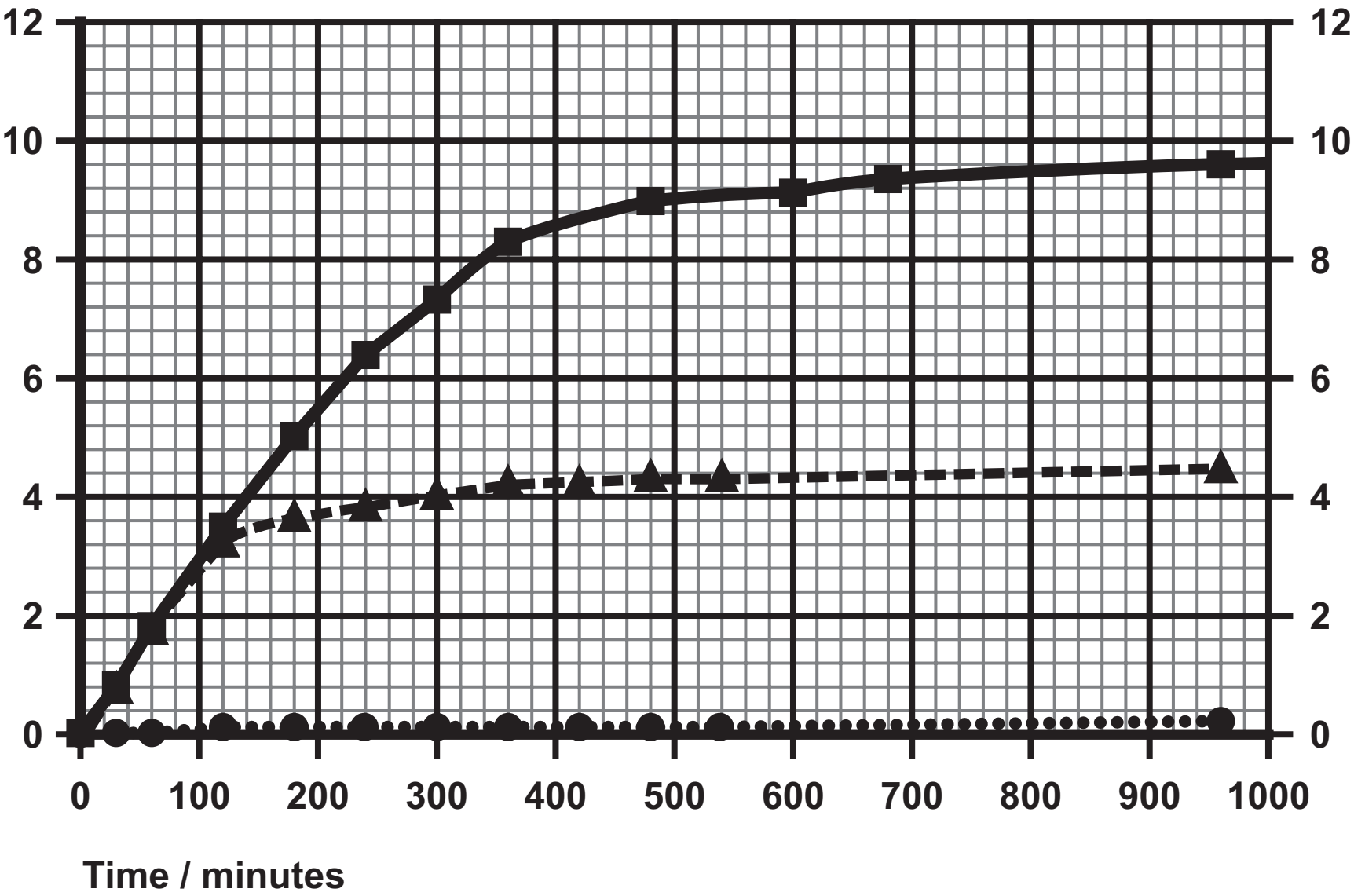
1970s



Question 10(a)

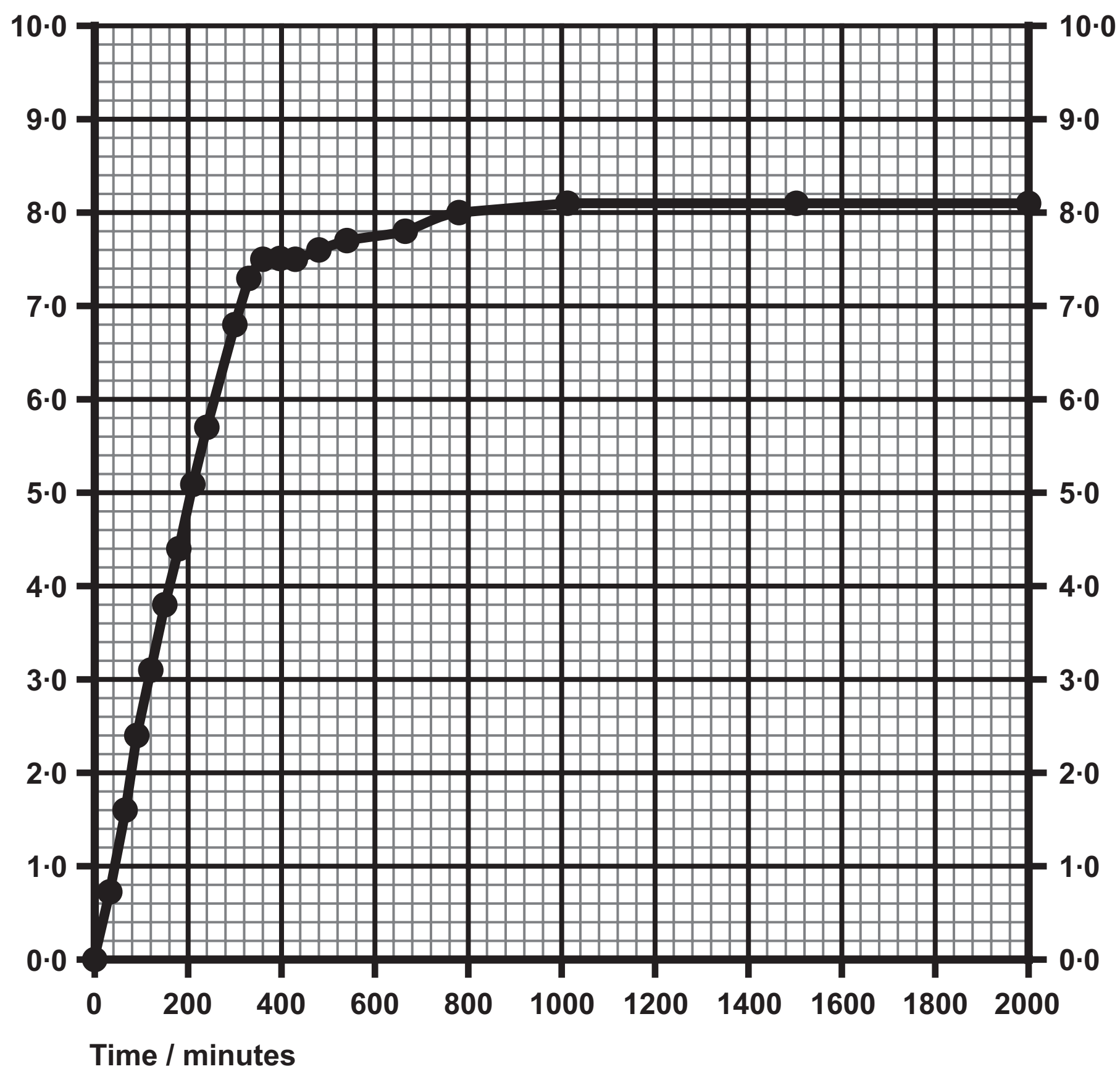


Total volume of carbon
dioxide produced / **cm³**



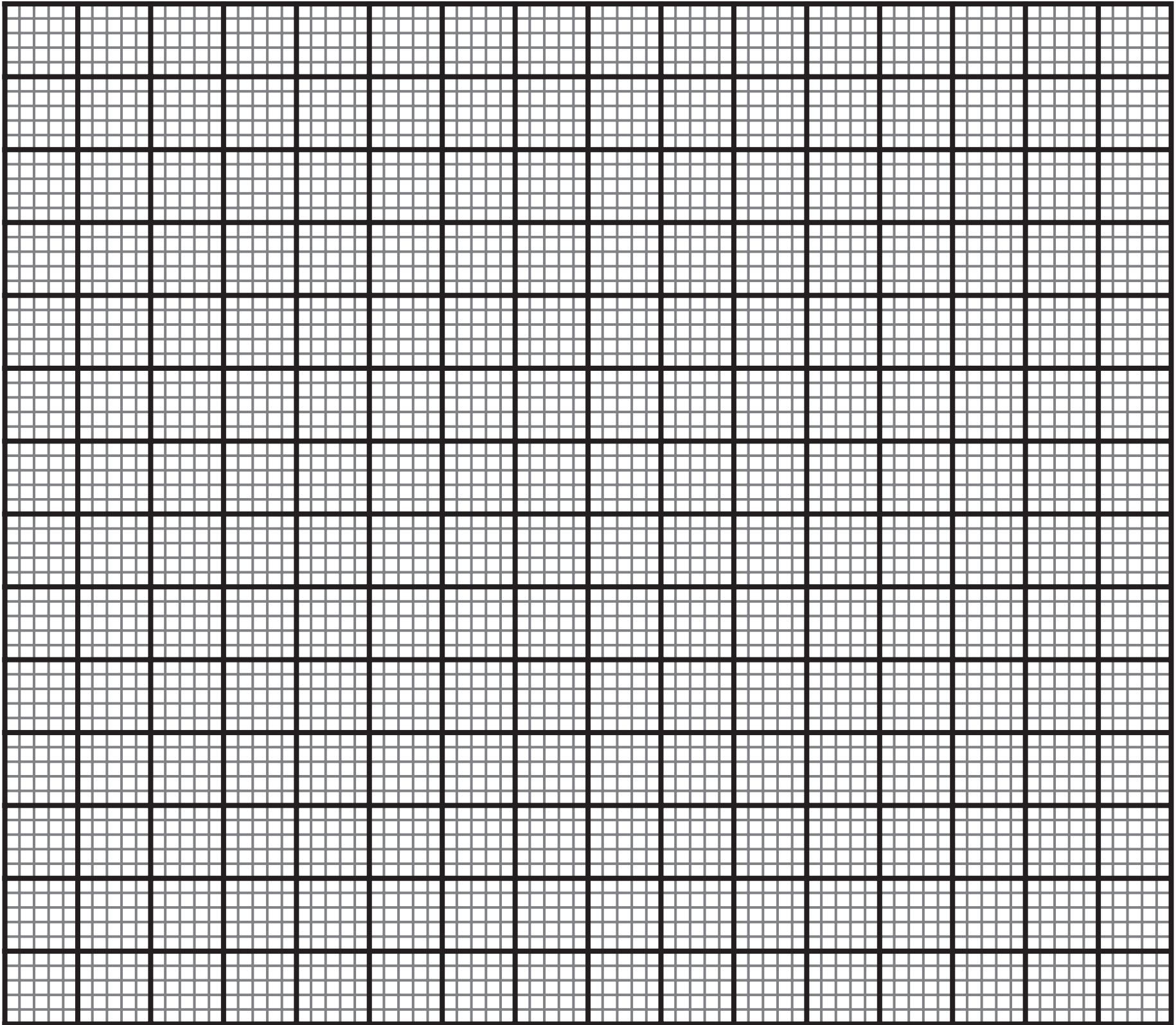
Question 10(c)

Total volume of carbon
dioxide produced / cm^3



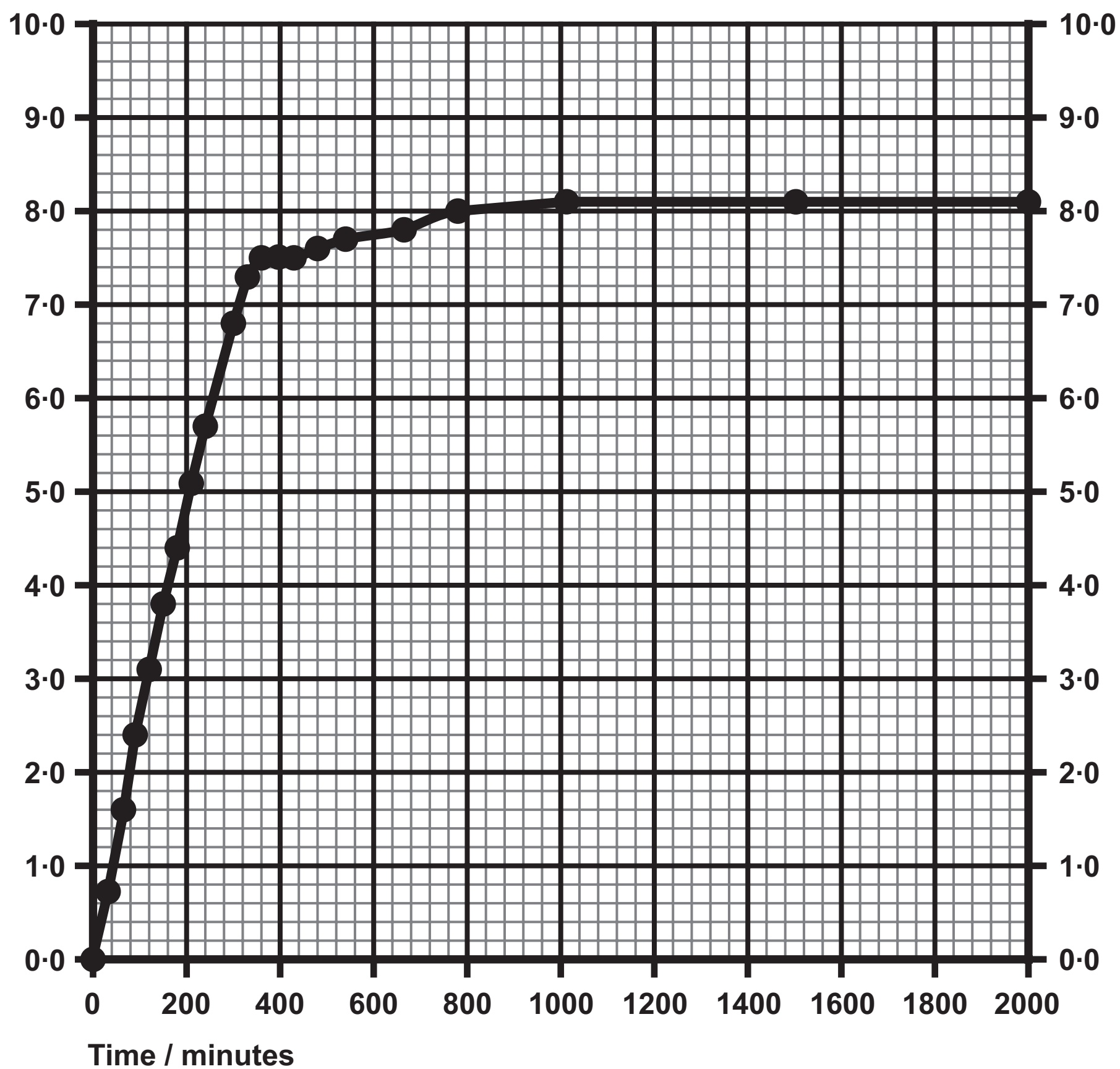
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Mean percentage of plasmolysed cells (%)	0·0	1·3	4·0	31·9	59·6	76·3	92·5	99·4	99·8



Question 10(c)

Total volume of carbon
dioxide produced / cm^3



Source information

Question 3

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Question 4(a)

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Question 4(b)

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Question 9

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