

Question 24 (7 marks)

A researcher conducted a field experiment to determine the effects of planting density on the yield of cauliflowers.

Three planting densities were used:

Treatment A – 20 cm spacing between plants

Treatment B – 50 cm spacing between plants

Treatment C – 80 cm spacing between plants

The researcher prepared 36 trial plots of equal size. Mean yields (grams/cauliflower) for each of the treatments and the position of each plot are shown. The soil texture trend and gradient of the field are also shown.

Gradient								Soil texture	
Top of slope	↓	A	A	A	A	A	A	Sandy loam	Mean yield treatment A $\bar{x} = 1250$ g
Mid-slope	↓	B	B	B	B	B	B	Clay loam	Mean yield treatment B $\bar{x} = 1500$ g
Bottom of slope	↓	C	C	C	C	C	C	Clay	Mean yield treatment C $\bar{x} = 1850$ g

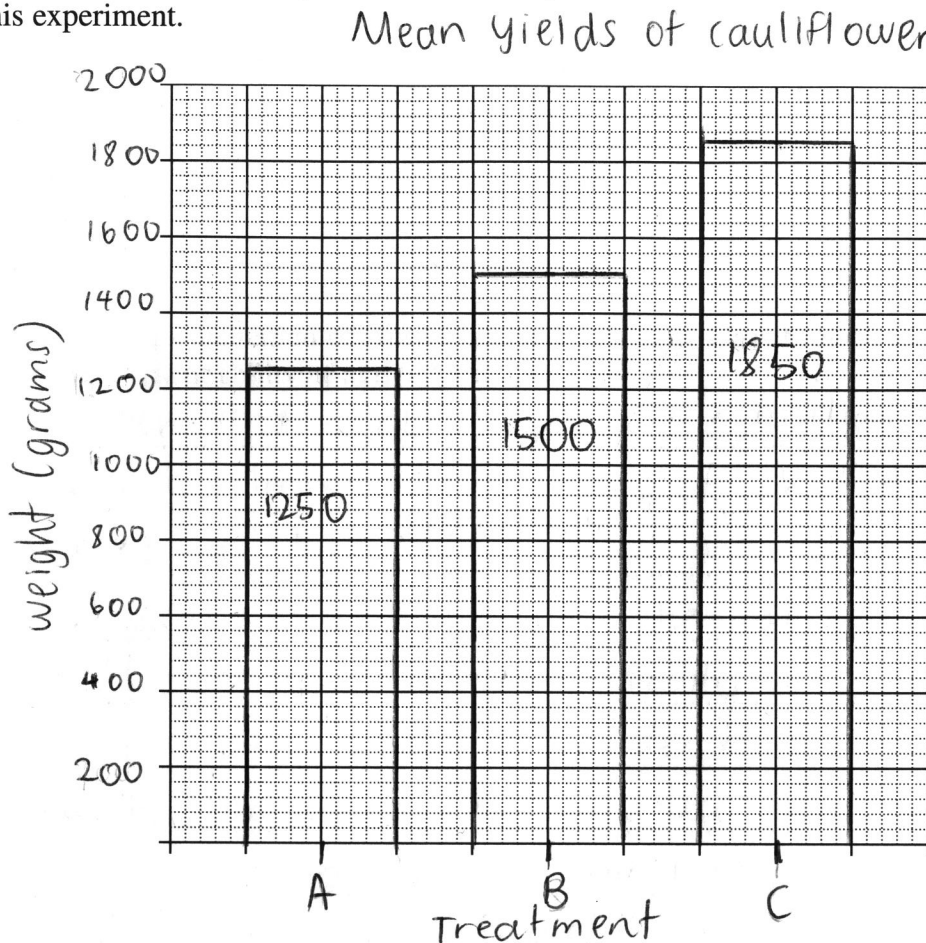
- (a) Which treatment in this experiment is most likely to produce the greatest number of cauliflowers? 1

Treatment A

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Question 24 (continued)

- (b) Construct a graph that represents the mean yields of the THREE treatments in this experiment. 3



- (c) Explain how an alternative experimental design for this experiment may improve the validity of the results. 3

Improvement in standardisation would improve the validity of the results. Performing the experiment again on a flat soil bed with similar soil characters would improve validity, and ensure only the treatment has affected the outcome. Standardising the environmental conditions and the method would also improve its validity.

End of Question 24