1. A continuous curve has equation $y = f(x)$.

A table of values of x and y for $y = f(x)$ is shown below.

x	0.5	1.75	3	4.25	5.5
y	3.479	6.101	7.448	6.823	5.182

Using the trapezium rule with all the values of y in the given table,

(a) find an estimate for

$$\int_{0.5}^{5.5} f(x)\,dx$$

giving your answer to one decimal place.

(3)

(b) Using your answer to part (a) and making your method clear, estimate

$$\int_{0.5}^{5.5} \left(f(x) + 4x\right) dx$$

(2)

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Question 1 continued

(Total for Question 1 is 5 marks)

2. A sequence of numbers $u_1, u_2, u_3, \ldots$ is defined by

$$u_1 = 7$$

$$u_{n+1} = (-1)^n u_n + k$$

where k is a constant.

(a) Show that $u_5 = 7$

(3)

Given that $\sum_{r=1}^{4} u_r = 30$

(b) find the value of k.

(2)

(c) Hence find the value of $\sum_{r=1}^{150} u_r$

(2)

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