1. The sequence $u_1, u_2, u_3, \ldots$ satisfies

$$u_{n+2} = 3u_{n+1} - 2u_n$$

Given that

- $u_1 = 7$
- $u_3 = 4$

(a) find the value of u_2

(2)

(b) find $\displaystyle\sum_{r=1}^{4}\left(u_r + 2r\right)$

(3)

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Question 1 continued

(Total for Question 1 is 5 marks)

2. The table shows corresponding values of x and y for a continuous curve with equation $y = \mathrm{f}(x)$ between $x = -4$ and $x = 5$, where a is a constant.

x	-4	-2.5	-1	0.5	2	3.5	5
y	4.16	2.91	a	1.73	1.37	1.43	2.28

The trapezium rule is used with all the y values in the table to find an approximation for

$$\int_{-4}^{5} \mathrm{f}(x)\,\mathrm{d}x$$

Given that the value of this approximation is 19.3

(a) find the value of the constant a to 3 significant figures.

(3)

(b) Use the given answer of 19.3 to find an approximate value for

$$\int_{-4}^{5} \left(2\mathrm{f}(x) - 3\right)\mathrm{d}x$$

(2)

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