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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Question 2 continued

(Total for Question 2 is 7 marks)

3. $$f(x) = 2x^3 - x^2 + Ax + B$$

where A and B are integers.

Given that when $f(x)$ is divided by $(x + 3)$ the remainder is 55

(a) show that

$$3A - B = -118$$

(2)

Given also that $(2x - 5)$ is a factor of $f(x)$,

(b) find the value of A and the value of B.

(3)

(c) Hence find the quotient when $f(x)$ is divided by $(x - 7)$

(2)

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