



1. Simplify

(a)  $(2\sqrt{5})^2$  (1)

(b)  $\frac{\sqrt{2}}{2\sqrt{5} - 3\sqrt{2}}$  giving your answer in the form  $a + \sqrt{b}$ , where  $a$  and  $b$  are integers. (4)

Lined area for student answers.







4. (i) A sequence  $U_1, U_2, U_3, \dots$  is defined by

$$U_{n+2} = 2U_{n+1} - U_n, \quad n \geq 1$$

$$U_1 = 4 \text{ and } U_2 = 4$$

Find the value of

(a)  $U_3$

(1)

(b)  $\sum_{n=1}^{20} U_n$

(2)

(ii) Another sequence  $V_1, V_2, V_3, \dots$  is defined by

$$V_{n+2} = 2V_{n+1} - V_n, \quad n \geq 1$$

$$V_1 = k \text{ and } V_2 = 2k, \text{ where } k \text{ is a constant}$$

(a) Find  $V_3$  and  $V_4$  in terms of  $k$ .

(2)

Given that  $\sum_{n=1}^5 V_n = 165,$

(b) find the value of  $k$ .

(3)

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