

The electric field strength  $E$  (volts/metre) is measured for various distances  $d$  (angstroms) between the electron and nucleus of a particular atom.

$d$	0.5	0.7	1	1.3	1.6
$E$	26.1	11.5	4.81	2.61	1.64

Show that it is plausible that these values satisfy a relationship of the form

$$E = \frac{a}{d^2} + \frac{b}{d^3}$$

(where  $a$  and  $b$  are unknown constants), by first linearising the equation and then plotting five suitable points (which are derived from the given data). Calculate values for  $a$  and  $b$  by finding the least squares lines for the plotted points.

Use your answer to calculate  $E$  when the distance is 2.0 angstroms. (Carry out all calculations in this problem correct to 3 significant digits.)