The complex number $-1 + \sqrt{7}\mathrm{i}$ is denoted by u. It is given that u is a root of the equation

$$2x^3 + 3x^2 + 14x + k = 0,$$

where k is a real constant.

(a) Find the value of k. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) Find the other two roots of the equation. [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(c) On an Argand diagram, sketch the locus of points representing complex numbers z satisfying the equation $|z - u| = 2$. [2]

(d) Determine the greatest value of $\arg z$ for points on this locus, giving your answer in radians. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....