

Quadratic equation: Homework

In this homework, we are going to solve some quadratic equation problem.

Given a quadratic equation $kx^2 + (k - 6)x + 3k = 0$.

1. Find k such that the quadratic equation has only one root.
2. Suppose it has two distinct roots $\alpha < \beta$, find the following in terms of k :
 - (a) $\alpha + \beta$;
 - (b) $\alpha\beta$;
 - (c) $\alpha^2 + \beta^2$;
 - (d) $\beta - \alpha$;
 - (e) $\beta^2 - \alpha^2$.
3. Form a quadratic equation with roots $(\alpha + \beta)^2$ and $(\beta - \alpha)^2$ in terms of k . Also, using the method of completing the square, find the vertex, the axis of symmetry, and the extreme value of the quadratic equation in terms of k .

功課：一元二次方程的性質

在這份功課中，我們將解決一些一元二次方程的問題。

已知一元二次方程 $kx^2 + (k - 6)x + 3k = 0$.

1. 求 k 的值使得此一元二次方程只有一個根。
2. 設此方程有兩個不同的根 $\alpha < \beta$, 以 k 表下列算式的值:
 - (a) $\alpha + \beta$;
 - (b) $\alpha\beta$;
 - (c) $\alpha^2 + \beta^2$;
 - (d) $\beta - \alpha$;
 - (e) $\beta^2 - \alpha^2$.
3. 以 k 表根為 $(\alpha + \beta)^2$ 及 $(\alpha - \beta)^2$ 的一元二次方程。另外，利用配分法，以 k 表此一元二次方程的頂點、對稱軸與極值。