JU CHING CHU SECONDARY SCHOOL

MATHEMATICS QUIZ
(More About Quadratic Equations)

Nature of the Roots

1. For each of the following equations, find (i) the value of the discriminant and (ii) state the number of real roots that the equation has.
   (a) $3x^2 + 2x + 1 = 0$
   (b) $x(x - 3) = 7 - 3x$
2. The quadratic equation $4x^2 - (k + 3)x + 1 = 0$ has equal roots.
   (a) Find the values of the constant k.
   (b) For each value of k, find the roots.

Sum and Product of the Roots

3. For each of the following equations, write down (i) the sum of roots and (ii) the product of roots.
   (a) $3x^2 - 4x - 1 = 0$
   (b) $5 - 6x^2 = x$
4. If 3 is one root of the equation $3x^2 - 7x + k = 0$, find the other root and the value of the real constant k.
5. If α and β are the roots of the equation $3x^2 - 4x - 9 = 0$, find the values of
   (a) $\alpha + \beta$,
   (b) $\alpha\beta$,
   (c) $\alpha^2 + \beta^2$,
   (d) $(\alpha - \beta)^2$.

Forming Quadratic Equations with given Roots

6. Form the quadratic equation in one variable x with the roots $a+1$, $a-1$.
7. If α and β are the roots of the equation $2x^2 - x + 5 = 0$. Form the equation in x with roots $\alpha + 1$ and $\beta + 1$.
8. Form an equation in x for which the roots are equal but opposite in sign to the roots of $x^2 - 5x - 3 = 0$.

Equations reducible to Quadratic Equations

Find the real roots of each of the following equations.

9. $(\frac{12}{x} - 7)(1 - x) = 12$
10. $\frac{5}{5 - x} + \frac{8}{8 - x} = 3$