S.4 Add Maths Quiz 1

(*Quadratic Equations*)

Time allowed: 30 minutes

Total Mark: 30

Unless otherwise stated in the question, numerical answers must be given in exact value.

1. If the quadratic equation $(mx)^2 + 2mx + x^2 + 2ax + a^2 + 1 = 0$ has equal roots,
   (a) show that $ma = 1$,
   (b) find the double root in terms of m.

(3 + 3 marks)

2. Let $f(x) = 4x^2 - 7x - k$.
   (a) Find the range of values of k for which $f(x) > 2$ for all values of x.
   (b) Using the method of completing the square, show that $f(x)$ attains its minimum value when $x = \frac{7}{8}$ for all values of k.

(3 + 1 marks)

3. Find the values of k so that the roots of the equation $(x-k)^2 - 4(x - 3k - 7) + 8 = 0$ are reciprocals of each other. For the larger value of k, solve the corresponding equation.

(6 marks)

4. Solve the equation $(x-1)^2 + |x-1| - 2 = 0$.

(4 marks)

5. If α^2 and β^2 are the roots of the equation $x^2 - 30x + 9 = 0$, find the equation(s) in x whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

(10 marks)

End of Quiz