1. Express 4^x in terms of y, where $y = 2^x$
   Solve the equation $6(4^x) - 5(2^x) + 1 = 0$, expressing your answers for x in terms of logarithms where appropriate.

2. The quadratic polynomial $x^2 - 10x + 17$ is denoted by $f(x)$. Express $f(x)$ in the Form $(x-a)^2 + b$ stating the values of a & b. Hence find the least possible value that $f(x)$ can take and the corresponding value of x.

3. Solve the simultaneous equations $2x + y = 3$ & $2x^2 - xy = 10$.

4. For what values of k does the equation $2x^2 - kx + 8 = 0$ have a repeated root ?

5. By expressing the function $f(x) = (2x + 3)(x - 4)$ in completed square form, find the range of the function $f(x)$.

6. a) Solve the equation $x^2 - (6\sqrt{3})x + 24 = 0$, giving your answer in terms of surds, simplified as far as possible.

   b) Find all four solutions of the equation $x^4 - (6\sqrt{3})x^2 + 24 = 0$ giving your answers correct to 2 decimal places.

7. Express $9x^2 - 36x + 52$ in the form $(Ax - B)^2 + C$, where A,B & C are Integers. Hence or otherwise, find the set of values taken by $9x^2 - 36x + 52$ for real x.

8. A recycling firm collects aluminium cans from a number of sites. It crushes them and then sells the aluminium back to a manufacturer. The profit from processing t tonnes of cans each week is $p, where $p = 100t - (1/2)t^2 - 200$. By completing the square, find the greatest profit the firm can make each week And how many tonnes of cans it has to collect and crush each week to Achieve this profit.

9. Find the constants a, b and c such that, for all values of x,
   $3x^2 - 5x + 1 = a(x + b)^2 + c$. Hence find the coordinates of the minimum point on the graph of $y = 3x^2 - 5x + 1$.

10. Find the real roots of $(18/x^4) + (1/x^2) = 4$

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