**Teach Yourself PROBLEMS ON ROOTS OF QUADRATICS.**

***1. Suppose the roots of a quadratic are a and b, then the equation is:***

***(x – a)(x – b) = 0***

***x2 – (a + b)x + ab = 0***

***hence for the quadratic x2 + px + q = 0***

***the sum of the roots (a + b) = -p and the product ab = q***

***2. Consider the equation x2 – 7x + 10 = 0***

***If we say one root is c and the other is c + 3***

***then clearly the sum of the roots is 2c + 3 which will equal 7***

***2c + 3 = 7***

***2c = 4***

***c = 2***

***so the roots are 2 and 5.***

*Obviously we could have just factorised the original equation!*

*x2 – 7x + 10 = 0*

*(x – 2)(x – 5) = 0*

*so the roots are 2 and 5.*

*3. Consider the equation x2 – 10x + (k + 3) = 0*

*Suppose that the roots are of the form c and c + 4 and we are asked to find k*

***The sum of the roots is c + c + 4 = 10***

***2c = 10***

***c = 5***

***the roots are 5 and 9***

***using the product of the roots c(c + 4) = k + 3***

***we get 5×9 = k + 3***

***45 = k + 3***

***So that k = 42***

*4. Find the value of k if the roots of 2x2 – 12x + (k = 2) = 0 are c, c + 2*

***(make the coefficient of x2 equal to 1)***

***x2 – 6x + (k + 2) = 0***

***2***

***Sum of roots is 2c + 2 = 6***

***2c = 4***

***c = 2 so roots are 2 and 4***

***product of roots is 8 = k + 2***

***2***

***16 = k + 2***

***k = 14***

*5. One root of x2 + ax + b = 0 is three times the other.*

*Find the relationship between a and b.*

***If one root is c then the other is 3c***

***The sum of the roots is c + 3c = 4c which must equal –a***

***The product of the roots is 3c2 which must equal b***

***We eliminate c: c = -a and b = 3c2***

***4***

***So that b = 3a2***

***16***

*6. One root of x2 + qx + p = 0 is twice the other. Find p in terms of q.*

***If one root is c then the other is 2c***

***The sum of the roots is c + 2c = 3c which must equal –q***

***The product of the roots is 2c2 which must equal p***

***We eliminate c: c = -q and p = 2c2***

***3***

***So that p = 2q2***

***9***