SATPREP

Sum and product of roots of polynomials

Quadratic equation

$ax^2 + bx + c = 0$

Sum of the roots = - b/a ; $\alpha + \beta = \frac{-b}{a}$

Product of the roots = c/a ; $\alpha\beta = \frac{c}{a}$

Cubic equation

$ax^3 + bx^2 + cx + d = 0$

Sum of the roots = - b/a ; $\alpha + \beta + \gamma = \frac{-b}{a}$

Sum of the product of the roots taken two at a time = c/a ; $\alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a}$

Product of the roots = -d/a ; $\alpha\beta\gamma = \frac{-d}{a}$

Biquadratic or a Quartic equation is a polynomial of degree 4

$ax^4 + bx^3 + cx^2 + dx + e = 0$

Sum of the roots = - b/a ; $\alpha + \beta + \gamma + \theta = \frac{-b}{a}$

Sum of the product of the roots taken two at a time = c/a ;

$\alpha\beta + \beta\gamma + \gamma\theta + \theta\alpha + \beta\theta + \gamma\alpha = \frac{c}{a}$

Sum of the product of the roots taken three at a time = -d/a;

$\alpha\beta\gamma + \beta\gamma\theta + \gamma\theta\alpha + \theta\alpha\beta = \frac{-d}{a}$

Product of the roots = e/a; $\alpha\beta\gamma\theta = \frac{e}{a}$

Quintic is a polynomial of degree 5

$Ax^5 + bx^4 + cx^3 + dx^2 + ex+f = 0$

Sum of the roots = - b/a ; $\alpha+\beta+\gamma+\theta+\phi=\frac{-b}{a}$

Sum of the product of the roots taken two at a time = c/a ;

$$\alpha\beta+\beta\gamma+\gamma\theta+\phi\theta+\theta\alpha+\beta\theta+\gamma\alpha+\alpha\phi+\beta\phi+\gamma\phi=\frac{c}{a}$$

Sum of the product of the roots taken three at a time = -d/a;

$$\alpha\beta\gamma+\beta\gamma\theta+\gamma\theta\phi+\theta\phi\alpha+\phi\alpha\beta=\frac{-d}{a}$$

Sum of the product of the roots taken four at a time = e/a;

$$\alpha\beta\gamma\theta+\beta\gamma\theta\phi+\gamma\theta\phi\alpha+\theta\phi\alpha\beta+\phi\alpha\beta\gamma=\frac{e}{a}$$

Product of the roots = e/a; $\alpha\beta\gamma\theta\phi=\frac{-f}{a}$