

Quadratics

$$\rightarrow ax^2 + bx + c = 0$$

$$\rightarrow \text{quadratic formula} = x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$\rightarrow$ Completing Squares

ex. $2x^2 + 20x - 5$

① $2(x^2 + 10x) - 5$

② $\left[\frac{1}{2} \times \text{coeff of } x\right]^2$

③ $2(x^2 + 10x + 25 - 25) - 5$

④ $2(x^2 + 10x + 25) - 50 - 5$

⑤ $2(x + 5)^2 - 55$

final answer = $2(x + 5)^2 - 55$

$\rightarrow$ discriminant = $b^2 - 4ac$

① $b^2 - 4ac > 0$ 2pts

② $b^2 - 4ac < 0$ No intersection

③ $b^2 - 4ac = 0$ 1pt (tangent)

$$\rightarrow ax^2 + bx + c = a(x + p)^2 + q$$

vertex = $(-p, q)$

if a is +ve parabola vertex is minimum $\cup$

if a is -ve parabola vertex is maximum $\cap$

$\rightarrow$ if question says $x^4 + 13x^2 + 36 = 0$

$$x^4 = y^2 \quad \text{and} \quad x^2 = y$$