2. Find the parabola that intersects the x-axis at points $(-1, 0)$ and $(3, 0)$, and passes through point $(2, 6)$, using the following two methods.

(1) Let $y = a(x-\alpha)(x-\beta)$

[Sol] Since the parabola intersects the x-axis at $(-1, 0)$ and $(3, 0)$,
$$y = a(x+1)(x-3)$$
Since the parabola passes through $(2, 6)$,
$$6 = -3a$$
$$a = -2$$
Therefore, $y = -2(x+1)(x-3)$
$$[y = -2x^2 + 4x + 6]$$

---

1) $y = a(x-\alpha)(x-\beta)$ 2) FATORASÃO DA CRUZADINHA

$$ax^2 - (\alpha+\beta)x + \alpha\beta = 0$$

$$\beta = \alpha + \beta$$
$$c = \alpha \cdot \beta$$

$$\begin{array}{c} x \quad -\alpha \\ x \quad -\beta \end{array}$$

$\boxed{a(x-\alpha)(x-\beta)}$ ... ①

$$\begin{array}{cc} & \alpha \quad \beta \\ \text{SE} \quad (-1, 0) \, , \, (3, 0) \rightarrow & X = -1, 3 \end{array}$$

SUBS EM ① :

$$y = a(x-(-1)) \cdot (x-3)$$
$$y = a(x+1)(x-3) \cdots ②$$

COMO A PARÁBOLA PASSA POR $(2, 6)$, SUBS EM ②

$$6 = a(2+1) \cdot (2-3)$$
$$6 = a \cdot 3 \cdot (-1)$$
$$6 = -3a$$
$$\frac{6}{-3} = a$$

$$\boxed{-2 = a}$$

$$\therefore y = -2(x+1)(x-3) \text{ ou}$$
$$y = -2x^2 + 4x + 6$$