

Determina l'equazione della parabola $y = ax^2 + bx + c$ che ha vertice $V(4;1)$ e passa per il punto $A(2; -7)$.

$$[y = -2x^2 + 16x - 31]$$

$$y = ax^2 + bx + c$$

$$V\left(-\frac{b}{2a}, -\frac{\Delta}{4a}\right)$$

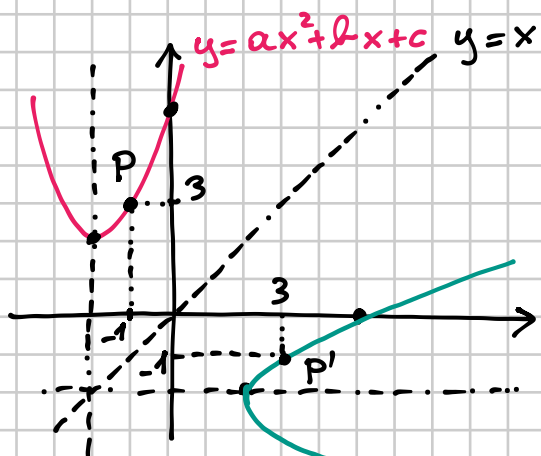
$$\begin{array}{l} V \rightarrow \left\{ \begin{array}{l} -\frac{b}{2a} = 4 \\ 1 = 16a + 4b + c \end{array} \right. \\ A \rightarrow \left\{ \begin{array}{l} -7 = 4a + 2b + c \end{array} \right. \end{array} \quad \left\{ \begin{array}{l} b = -8a \\ 16a - 32a + c = 1 \\ 4a - 16a + c = -7 \end{array} \right. \quad \left\{ \begin{array}{l} b = -8a \\ -16a + c = 1 \\ -12a + c = -7 \end{array} \right.$$

$$\left\{ \begin{array}{l} b = -8a \\ 16a - c = -1 \\ -12a + c = -7 \end{array} \right. \quad \left\{ \begin{array}{l} b = 16 \\ c = -7 + 12a = -7 - 24 = -31 \\ a = -2 \end{array} \right.$$

$$\frac{4a}{4a} = -8$$

$$y = -2x^2 + 16x - 31$$

PARABOLA CON ASSE PARALLELO ALL'ASSE X



$$P(-1, 3) \rightsquigarrow P'(3, -1)$$

La simmetria rispetto alla retta $y = x$ si fa scambiando le x con le y

$$x = ay^2 + by + c$$

EQ. GENERALE DI
UNA PARABOLA CON
ASSE DI SIMMETRIA
// ASSE X

$$x = ay^2 + by + c$$

VERTICE

$$V\left(-\frac{\Delta}{4a}, -\frac{b}{2a}\right)$$

FUOCO

$$F\left(\frac{1-\Delta}{4a}, -\frac{b}{2a}\right)$$

$$\text{DIRETTRICE } x = -\frac{1+\Delta}{4a}$$

ASSE
DI
SIMMETRIA

$$y = -\frac{b}{2a}$$

$$x = ay^2 + by + c$$

$$\begin{array}{l} V\left(-\frac{b}{4a}, -\frac{b^2}{4a}\right) \rightarrow \begin{cases} -\frac{b}{2a} = 2 \\ 4 = 4a + 2b + c \end{cases} \\ A \rightarrow \begin{cases} -1 = 9a + 3b + c \end{cases} \end{array} \quad \begin{cases} b = -4a \\ 4a - 8a + c = 4 \\ 9a - 12a + c = -1 \end{cases}$$

$$\begin{cases} b = -4a \\ -4a + c = 4 \\ -3a + c = -1 \end{cases} \quad \begin{cases} b = -4a \\ c = 4a + 4 \\ -3a + 4a + 4 = -1 \end{cases} \quad \begin{cases} b = 20 \\ c = -16 \\ a = -5 \end{cases}$$

$$x = -5y^2 + 20y - 16$$