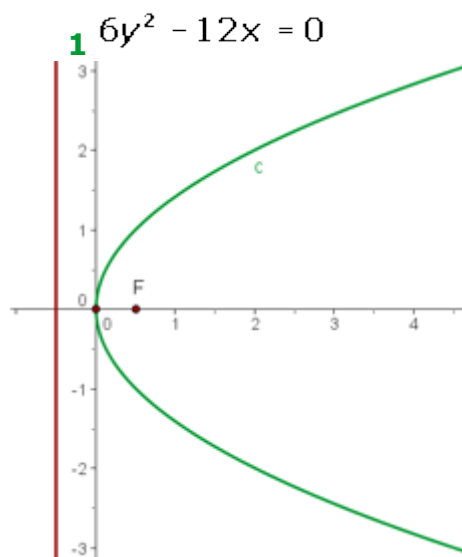


## Soluciones de la parábola

### Ejercicio 1 resuelto

Determinar, en forma reducida, las ecuaciones de las siguientes parábolas, indicando el valor del parámetro, las coordenadas del foco y la ecuación de la directriz.

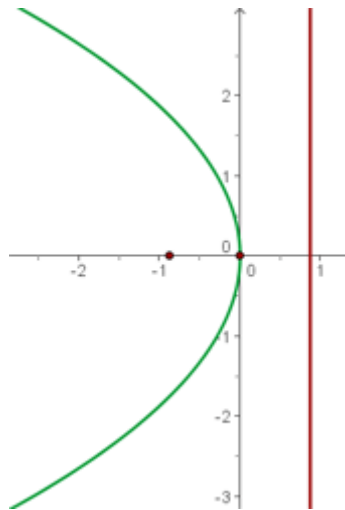


$$6y^2 = 12x \quad y^2 = 2x$$

$$2p = 2 \quad p = 1$$

$$F\left(\frac{1}{2}, 0\right) \quad x = -\frac{1}{2}$$

2  $2y^2 = -7x$

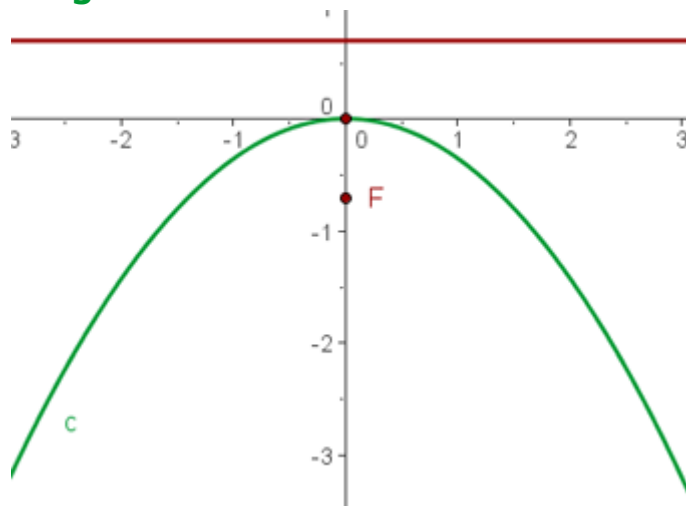


$$2y^2 = -7x \quad y^2 = -\frac{7}{2}x$$

$$2p = \frac{7}{2} \quad p = \frac{7}{4}$$

$$F\left(-\frac{7}{8}, 0\right) \quad x = \frac{7}{8}$$

$$3 \quad 15x^2 = -42y$$



$$15x^2 = -42y \quad x^2 = -\frac{14}{5}y$$

$$2p = \frac{14}{5}$$

$$p = \frac{7}{5}$$

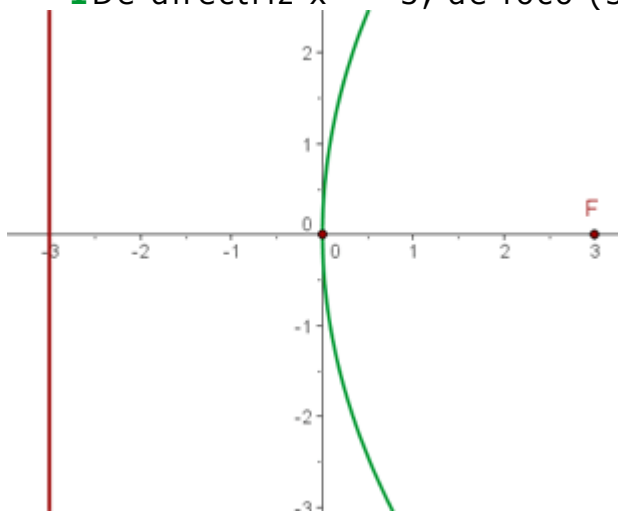
$$F\left(0, -\frac{7}{10}\right)$$

$$x = \frac{7}{10}$$

## Ejercicio 2 resuelto

Determina las ecuaciones de las parábolas que tienen:

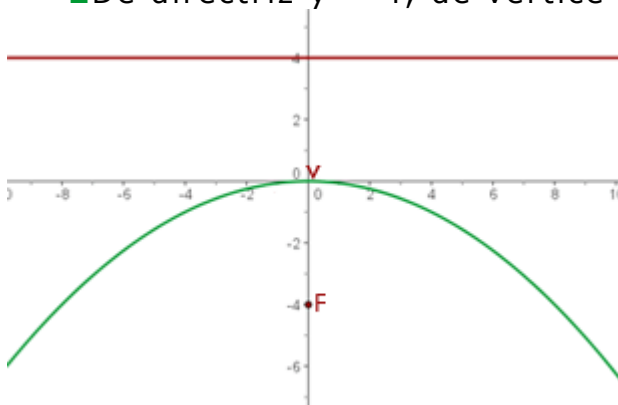
**1** De directriz  $x = -3$ , de foco  $(3, 0)$ .



$$p = d(F, r) = 6$$

$$y^2 = 12x$$

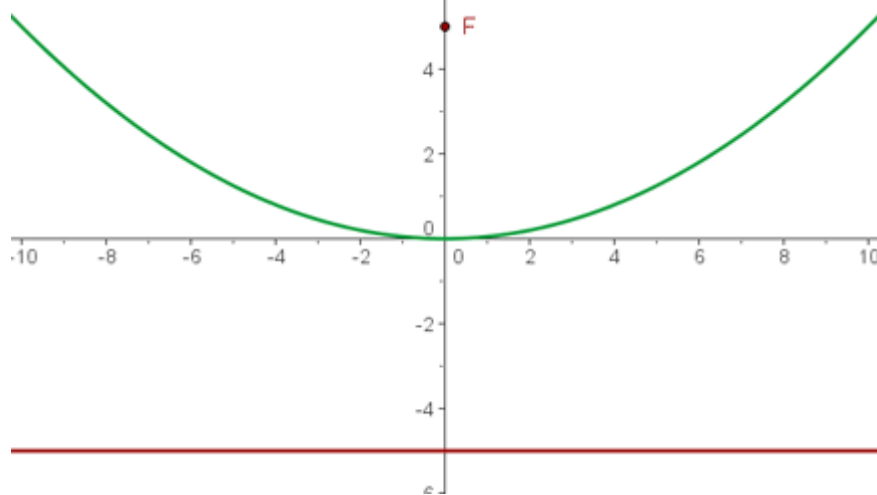
**2** De directriz  $y = 4$ , de vértice  $(0, 0)$ .



$$\frac{p}{2} = 4$$

$$x^2 = -16y$$

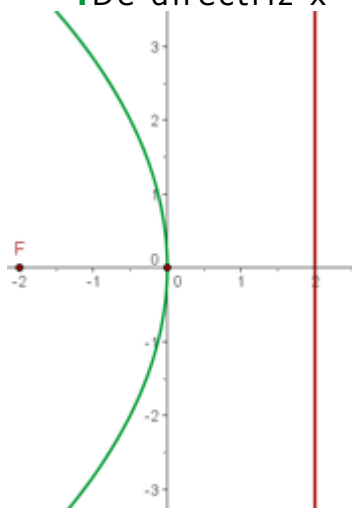
**3** De directriz  $y = -5$ , de foco  $(0, 5)$ .



$$\frac{p}{2} = 5$$

$$x^2 = 20y$$

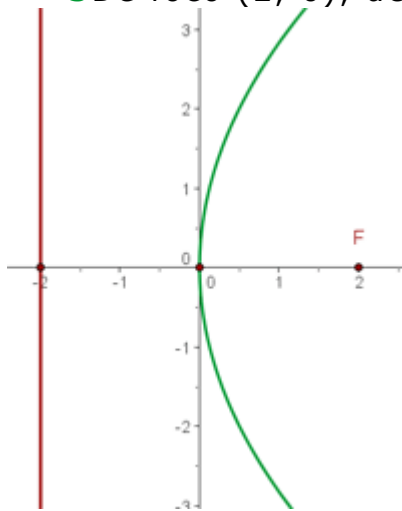
**4** De directriz  $x = 2$ , de foco  $(-2, 0)$ .



$$p = 4$$

$$y^2 = -8x$$

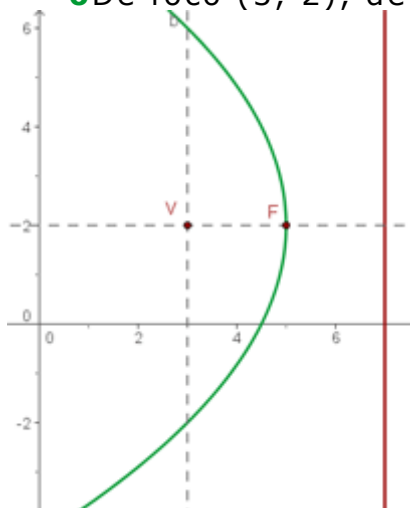
5 De foco (2, 0), de vértice (0, 0).



$$p = 4$$

$$y^2 = 8x$$

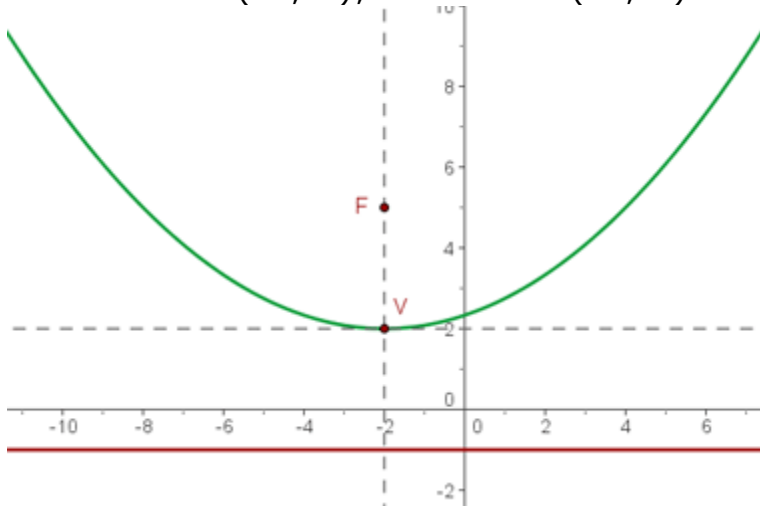
6 De foco (3, 2), de vértice (5, 2).



$$\frac{p}{2} = 2$$

$$(y - 2)^2 = -8(x - 5)$$

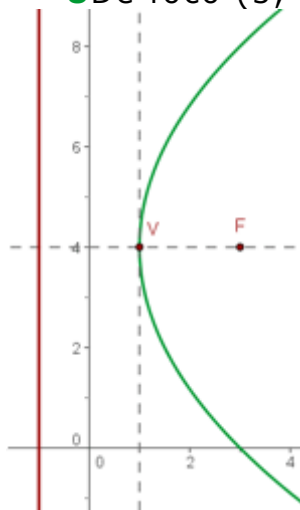
**7** De foco  $(-2, 5)$ , de vértice  $(-2, 2)$ .



$$\frac{p}{2} = 3$$

$$(x + 2)^2 = 12(y - 2)$$

**8** De foco  $(3, 4)$ , de vértice  $(1, 4)$ .



$$\frac{p}{2} = 2$$

$$(y - 4)^2 = 8(x - 1)$$

### Ejercicio 4 resuelto

Hallar la ecuación de la parábola de eje vertical y que pasa por los puntos: A(6, 1), B(-2, 3), C(16, 6).

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

$$\begin{cases} 1 = a \cdot 36 + b \cdot 6 + c \\ 3 = a \cdot 4 + b \cdot (-2) + c \\ 6 = a \cdot 256 + b \cdot 16 + c \end{cases}$$

$$a = \frac{1}{24} \quad b = -\frac{10}{24} \quad c = 2$$

$$y = \frac{1}{24}x^2 - \frac{10}{24}x + 2$$


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### Ejercicio 5 resuelto

Determina la ecuación de la parábola que tiene por directriz la recta:  $y = 0$  y por foco el punto (2, 4).

$$d(P, F) = d(P, d)$$

$$\sqrt{(x-2)^2 + (y-4)^2} = \frac{y}{\sqrt{0^2 + 1^2}}$$

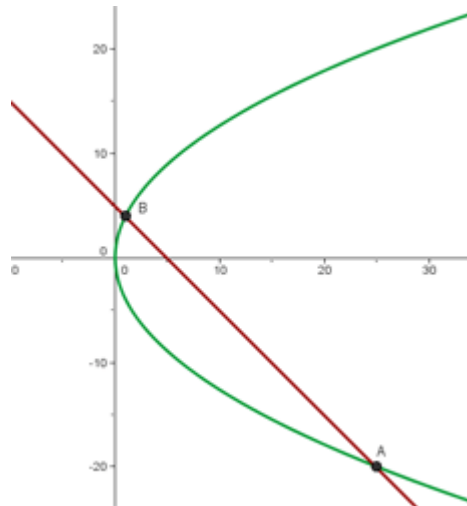
$$y^2 = (x-2)^2 + y^2 - 8y + 16$$

$$(x-2)^2 = 8(y-2)$$


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### Ejercicio 6 resuelto

Calcular la posición relativa de la recta  $r \equiv x + y - 5 = 0$  respecto a la parábola  $y^2 = 16x$ .



$$\begin{cases} y^2 = 16x \\ y = 5 - x \end{cases} \quad (5 - x)^2 = 16x$$

$$x^2 - 26x + 25 = 0$$

$$x_1 = 25 \quad x_2 = 1$$

$$A(25, -20)$$

$$B(1, 4)$$

*Secantes*

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