

## SOLUCIÓN A LOS EJERCICIOS DEL CAPÍTULO X

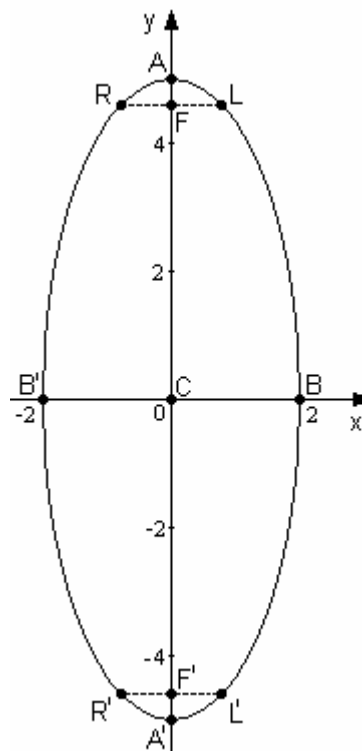
### 10.3.1. ELIPSE CON CENTRO EN EL ORIGEN Y EJE FOCAL SOBRE ALGUNO DE LOS EJES COORDENADOS

1)  $\frac{y^2}{25} + \frac{x^2}{4} = 1;$

$a = 5; b = 2; c = \sqrt{21}; F(0, \sqrt{21}); F'(0, -\sqrt{21}); A(0, 5)$

$A'(0, -5); B(2, 0); B'(-2, 0); LR = \frac{8}{5}; L\left(\frac{4}{5}, \sqrt{21}\right)$

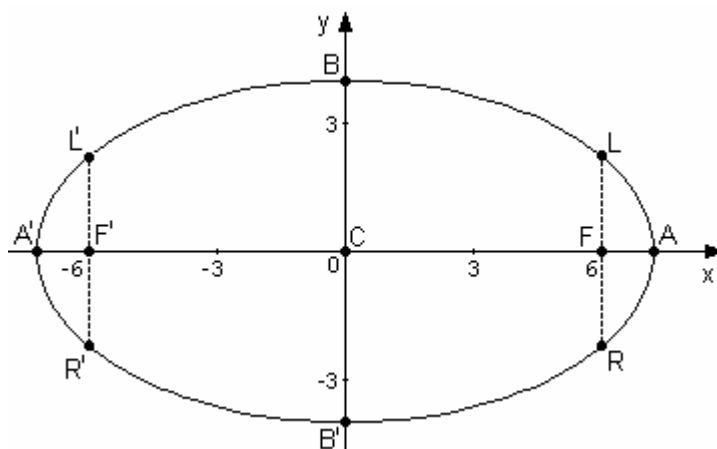
$R\left(-\frac{4}{5}, \sqrt{21}\right); L'\left(\frac{4}{5}, -\sqrt{21}\right); R'\left(-\frac{4}{5}, -\sqrt{21}\right); e = \frac{\sqrt{21}}{5}$



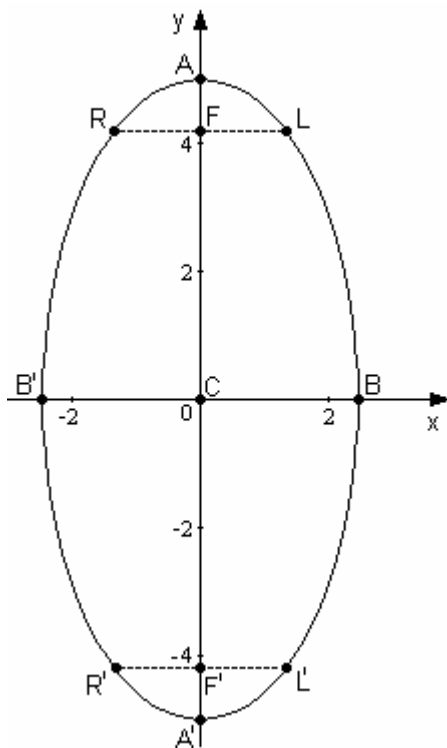
2)  $\frac{x^2}{52} + \frac{y^2}{16} = 1;$

$a = \sqrt{52}; b = 4; c = 6; F'(-6, 0); F(6, 0); B(0, 4); B'(0, -4); LR = \frac{16}{\sqrt{13}}; L\left(6, \frac{8}{\sqrt{13}}\right); R\left(6, -\frac{8}{\sqrt{13}}\right)$

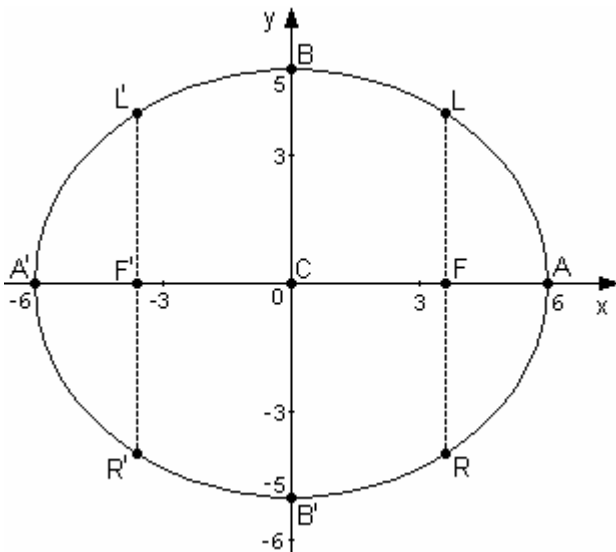
$L'\left(-6, \frac{8}{\sqrt{13}}\right); R'\left(-6, -\frac{8}{\sqrt{13}}\right); e = \frac{3}{\sqrt{13}}; A(2\sqrt{13}, 0); A'(-2\sqrt{13}, 0).$



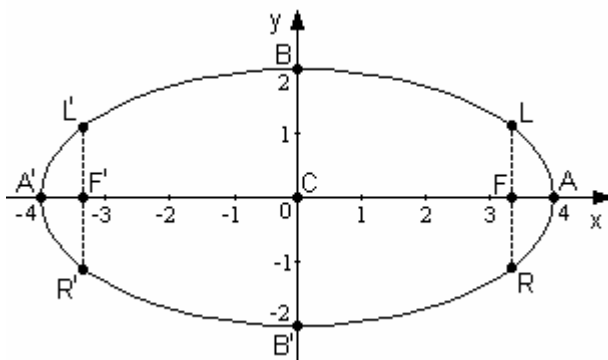
- 3)  $\frac{y^2}{25} + \frac{x^2}{6} = 1$ ;  $a = 5$ ;  $b = \sqrt{6}$ ;  $c = \sqrt{19}$ ;  $F(0, \sqrt{19})$ ;  $F'(0, -\sqrt{19})$ ;  $A(0, 5)$ ;  $A'(0, -5)$ ;  $B(\sqrt{6}, 0)$   
 $B'(-\sqrt{6}, 0)$ ;  $LR = \frac{12}{5}$ ;  $L(\frac{6}{5}, \sqrt{19})$ ;  $R(-\frac{6}{5}, \sqrt{19})$ ;  $L'(\frac{6}{5}, -\sqrt{19})$ ;  $R'(-\frac{6}{5}, -\sqrt{19})$ ;  $e = \frac{\sqrt{19}}{5}$ .



- 4)  $\frac{x^2}{36} + \frac{y^2}{25} = 1$ ;  $a = 6$ ;  $b = 5$ ;  $c = \sqrt{11}$ ;  $F(\sqrt{11}, 0)$ ;  $F'(-\sqrt{11}, 0)$ ;  $A(6, 0)$ ;  $A'(-6, 0)$ ;  $B(0, 5)$   
 $B'(0, -5)$ ;  $LR = \frac{25}{3}$ ;  $L(\sqrt{11}, \frac{25}{6})$ ;  $R(\sqrt{11}, -\frac{25}{6})$ ;  $L'(-\sqrt{11}, \frac{25}{6})$ ;  $R'(-\sqrt{11}, -\frac{25}{6})$ ;  $e = \frac{\sqrt{11}}{6}$ .

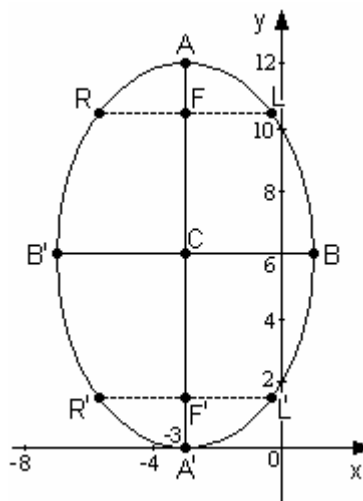


- 5)  $\frac{x^2}{16} + \frac{y^2}{4} = 1$ ;  $a = 4$ ;  $b = 2$ ;  $c = 2\sqrt{3}$ ;  $F(2\sqrt{3}, 0)$ ;  $F'(-2\sqrt{3}, 0)$ ;  $A(4, 0)$ ;  $A'(-4, 0)$ ;  $B(0, 2)$ ;  $B'(0, -2)$ ;  $LR = 2$ ;  $L(2\sqrt{3}, 1)$ ;  $R(2\sqrt{3}, -1)$ ;  $L'(-2\sqrt{3}, 1)$ ;  $R'(-2\sqrt{3}, -1)$ ;  $e = \frac{\sqrt{3}}{2}$ .

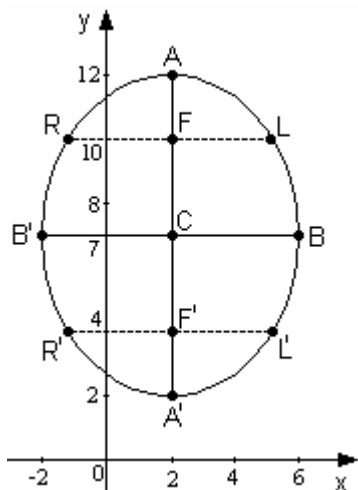


### 10.3.2. ELIPSE CON CENTRO FUERA DEL ORIGEN Y EJE FOCAL PARALELO A ALGUNO DE LOS EJES COORDENADOS

- 1)  $\frac{(y-6)^2}{36} + \frac{(x+3)^2}{16} = 1$ ;  $a = 6$ ;  $b = 4$ ;  $c = 2\sqrt{5}$ ;  $C(-3, 6)$   
 $A(-3, 12)$ ;  $A'(-3, 0)$ ;  $B(1, 6)$ ;  $B'(-7, 6)$ ;  $F(-3, 6 + 2\sqrt{5})$   
 $F'(-3, 6 - 2\sqrt{5})$ ;  $L(-\frac{1}{3}, 6 + 2\sqrt{5})$ ;  $R(-\frac{17}{3}, 6 + 2\sqrt{5})$   
 $L'(-\frac{1}{3}, 6 - 2\sqrt{5})$ ;  $R'(-\frac{17}{3}, 6 - 2\sqrt{5})$ ;  $e = \frac{\sqrt{5}}{3} \approx 0.75$   
 $LR = \frac{16}{3}$ ; Ec. eje mayor:  $x = -3$   
 Ec. eje menor:  $y = 6$

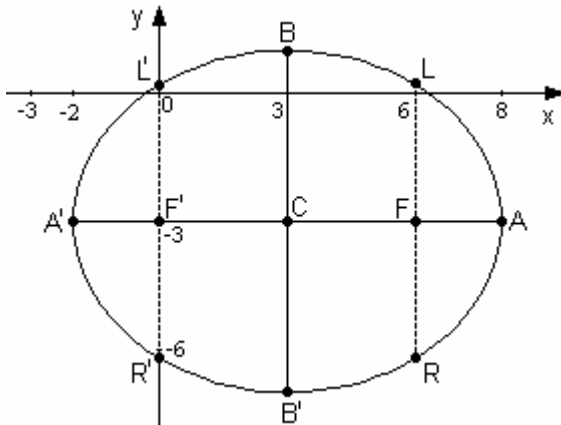


2)



- $F'(2, 4)$ ;  $F(2, 10)$ ;  $A(2, 12)$ ;  $a = 5$ ;  $b = 4$ ;  $c = 3$ ;  $C(2, 7)$   
 $A'(2, 2)$ ;  $B(6, 7)$ ;  $B'(-2, 7)$ ;  $L(\frac{26}{5}, 10)$ ;  $R(-\frac{6}{5}, 10)$ ;  $L'(\frac{26}{5}, 4)$   
 $R'(-\frac{6}{5}, 4)$ ;  $e = \frac{3}{5} = 0.6$ ;  $LR = \frac{32}{5}$ ; Ec. eje mayor:  $x = 2$   
 Ec. eje menor:  $y = 7$ ; Ec. elipse:  $\frac{(y-7)^2}{25} + \frac{(x-2)^2}{16} = 1$

- 3)  $A'(-2,-3)$ ;  $A(8,-3)$ ;  $LR = \frac{32}{5}$ ;  $a = 5$ ;  $b = 4$ ;  $c = 3$ ;  $C(3,-3)$ ;  $B(3,1)$ ;  $B'(3,-7)$ ;  $F(6,-3)$



$$F'(0,-3); L\left(6, \frac{1}{5}\right); R\left(6, -\frac{31}{5}\right); L'\left(0, \frac{1}{5}\right)$$

$$R'\left(0, -\frac{31}{5}\right); e = \frac{3}{5} = 0.6; LR = \frac{32}{5}$$

Ec. eje mayor:  $y = -3$

Ec. eje menor:  $x = 3$

$$\text{Ec. elipse: } \frac{(x-3)^2}{25} + \frac{(y+3)^2}{16} = 1$$

- 4)  $C(1,-4)$ ;  $F(1,6)$ ;  $B'(-2,-4)$ ;  $a = \sqrt{109}$ ;  $b = 3$ ;  $c = 10$ ;  $A(1, -4 + \sqrt{109})$ ;  $A'(1, -4 - \sqrt{109})$

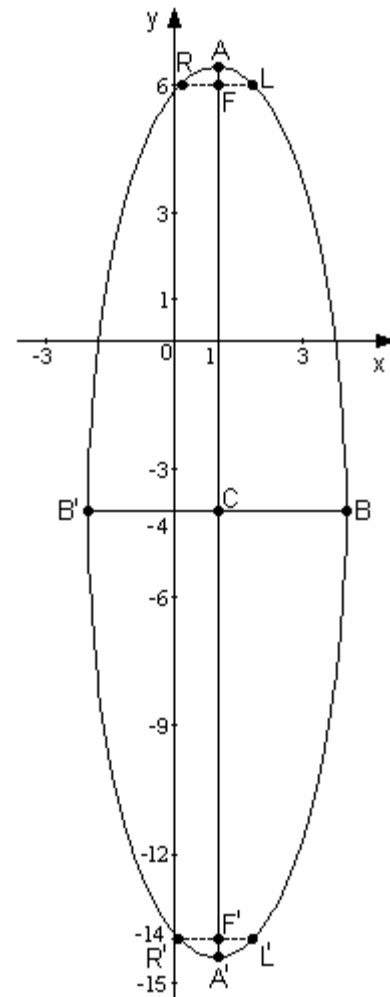
$$B(4,-4); F'(1,-14); L\left(1 + \frac{9}{\sqrt{109}}, 6\right); R\left(1 - \frac{9}{\sqrt{109}}, 6\right)$$

$$L'\left(1 + \frac{9}{\sqrt{109}}, -14\right); R'\left(1 - \frac{9}{\sqrt{109}}, -14\right); e = \frac{10}{\sqrt{109}} \approx 0.96$$

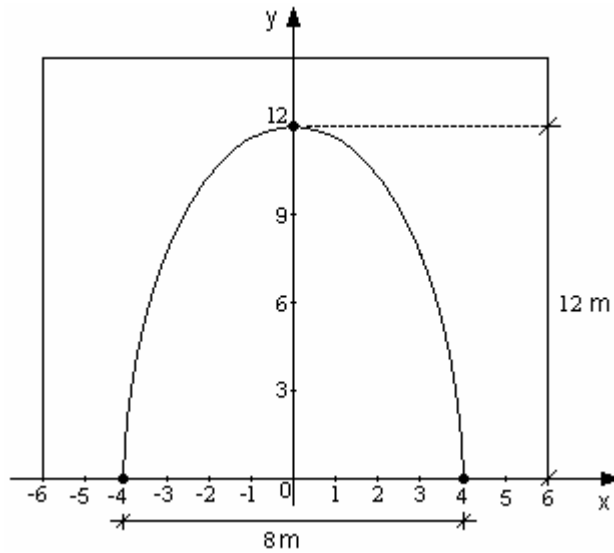
$$LR = \frac{18}{\sqrt{109}}; \text{Ec. eje mayor: } x = 1$$

Ec. eje menor:  $y = -4$

$$\text{Ec. elipse: } \frac{(y+4)^2}{109} + \frac{(x-1)^2}{9} = 1$$

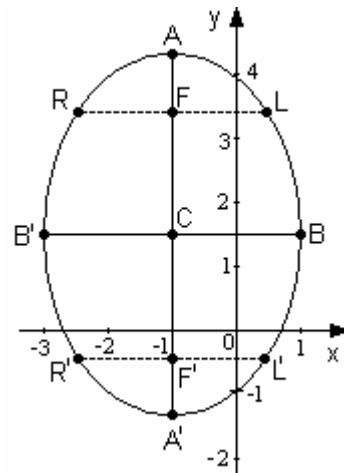


5)  $\frac{y^2}{144} + \frac{x^2}{16} = 1$

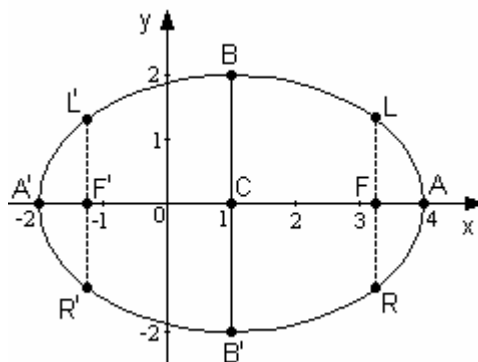


**10.4. FORMA GENERAL DE LA ECUACIÓN DE LA ELIPSE CON EJE FOCAL PARALELO A ALGUNO DE LOS EJES COORDENADOS**

1)  $8x^2 + 4y^2 + 16x - 12y - 15 = 0$ ;  $\frac{(x+1)^2}{4} + \frac{\left(y-\frac{3}{2}\right)^2}{8} = 1$   
 $C\left(-1, \frac{3}{2}\right)$ ;  $a = 2\sqrt{2}$ ;  $b = 2$ ;  $c = 2$ ;  $e = \frac{1}{\sqrt{2}} \approx 0.71$ ;  $LR = 2\sqrt{2}$

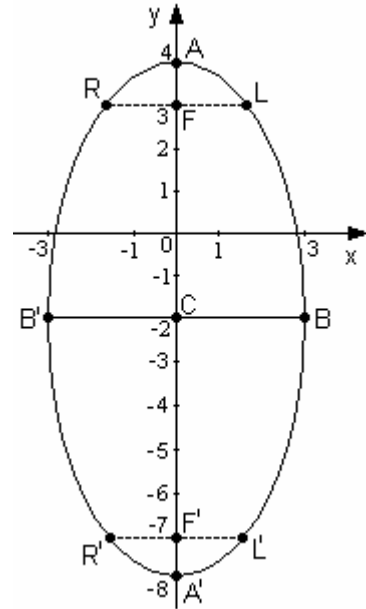


2)  $4x^2 + 9y^2 - 8x - 32 = 0$ ;  $\frac{(x-1)^2}{9} + \frac{y^2}{4} = 1$ ;  $C(1,0)$ ;  $a = 3$ ;  $b = 2$ ;  $c = \sqrt{5}$ ;  $e = \frac{\sqrt{5}}{3} \approx 0.75$ ;  
 $LR = \frac{8}{3}$



3)  $36x^2 + 9y^2 + 36y - 288 = 0$ ;  $\frac{x^2}{9} + \frac{(y+2)^2}{36} = 1$ ;  $C(0, -2)$

$a = 6$ ;  $b = 3$ ;  $c = 3\sqrt{3}$ ;  $e = \frac{\sqrt{3}}{2} \approx 0.87$ ;  $LR = 3$

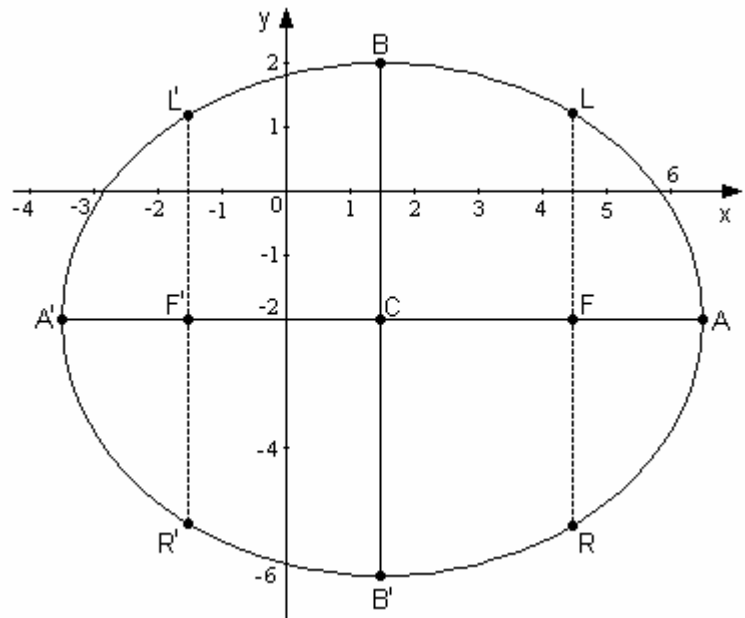


4)  $16x^2 + 25y^2 - 48x + 100y - 264 = 0$ ;

$\frac{\left(x - \frac{3}{2}\right)^2}{25} + \frac{(y+2)^2}{16} = 1$ ;  $C\left(\frac{3}{2}, -2\right)$

$a = 5$ ;  $b = 4$ ;  $c = 3$ ;  $e = \frac{3}{5} = 0.6$

$LR = \frac{32}{5}$



5)  $4x^2 + 16y^2 - 64 = 0$ ;  $\frac{x^2}{16} + \frac{y^2}{4} = 1$ ;  $C(0, 0)$ ;  $a = 4$ ;  $b = 2$ ;  $c = 2\sqrt{3}$ ;  $e = \frac{\sqrt{3}}{2} \approx 0.9$ ;  $LR = 2$

