

$$21. r=1; x=\frac{x_1+x_2}{2}; y=\frac{y_1+y_2}{2}$$

22. Los puntos de trisección son:

$$A\left(\frac{x_1+2x_2}{3}, \frac{y_1+2y_2}{3}\right)$$

$$B\left(\frac{2x_1+x_2}{3}, \frac{2y_1+y_2}{3}\right)$$

### EJERCICIO 7

$$1. Pm\left(\frac{5}{2}, 2\right); P_i: \left(\frac{8}{3}, 3\right) \text{ y } \left(\frac{7}{3}, 1\right)$$

$$2. Pm\left(\frac{3}{2}, \frac{11}{2}\right); P_i: (1, 5) \text{ y } (2, 6)$$

$$3. Pm(4, 7); P_i: \left(\frac{7}{3}, \frac{17}{3}\right) \text{ y } \left(\frac{17}{3}, \frac{25}{3}\right)$$

$$4. Pm\left(8, -\frac{11}{2}\right); P_i: (7, -6) \text{ y } (9, -5)$$

$$5. Pm\left(\frac{5}{12}, \frac{3}{2}\right); P_i: \left(\frac{4}{9}, \frac{4}{3}\right) \text{ y } \left(\frac{7}{18}, \frac{5}{3}\right)$$

$$6. Pm\left(\frac{11}{24}, -\frac{1}{2}\right); P_i: \left(\frac{7}{18}, 0\right) \text{ y } \left(\frac{19}{36}, -1\right)$$

$$7. P_2(-5, -5)$$

$$8. (-1, 1), (7, 9) \text{ y } (-3, 5)$$

### EJERCICIO 8

$$1. 3u^2 \quad 4. 10u^2 \quad 7. 31u^2 \quad 10. 50,5u^2$$

$$2. 15u^2 \quad 5. 6u^2 \quad 8. 17u^2$$

$$3. 28,5u^2 \quad 6. a^2u^2 \quad 9. 19u^2$$

## CAPÍTULO 3

### EJERCICIO 9

$$1. \frac{2}{5}$$

$$7. \text{ No existe}$$

$$13. 30^\circ$$

$$2. -\frac{7}{5}$$

$$8. -\frac{17}{5}$$

$$14. 35^\circ 15'$$

$$3. -\frac{1}{8}$$

$$9. -\frac{5}{72}$$

$$15. 90^\circ$$

$$4. \frac{4}{3}$$

$$10. \frac{b}{a}$$

$$16. 0^\circ \text{ o } 180^\circ$$

$$17. \text{ Son colineales}$$

$$18. \text{ Son colineales}$$

$$19. \text{ Son colineales}$$

$$20. \text{ No son colineales}$$

$$5. -\frac{2}{3}$$

$$12. 135^\circ$$

$$6. 0$$

$$21. \text{ Son colineales} \quad 24. \text{ Son colineales}$$

$$22. \text{ No son colineales} \quad 25. x = \frac{2}{3}$$

$$23. \text{ Son colineales} \quad 26. x = 4$$

$$27. y = -3 + \sqrt{3}$$

$$28. y = -6$$

### EJERCICIO 10

$$1. \text{ Son perpendiculares}$$

$$2. \text{ Los lados opuestos son paralelos y de igual pendiente}$$

$$m_{BC} = m_{AD} = \frac{2}{5} \text{ y } m_{CD} = m_{AB} = 3$$

$$3. \text{ Las rectas son paralelas}$$

$$m_{AB} = m_{CD} = -\frac{5}{3}$$

$$4. \text{ En un triángulo rectángulo los catetos son perpendiculares.}$$

$$m_{AB} \cdot m_{AC} = \frac{1}{2} \cdot (-2) = -1$$

$$5. \text{ En un cuadrado los lados opuestos son paralelos y los lados adyacentes son perpendiculares.}$$

$$m_{AB} = m_{CD} = 4, m_{BC} = m_{AD} = -\frac{1}{4} \text{ y } m_{AC} \cdot m_{BD} = -1$$

$$6. x = 5$$

$$7. m_{AB} = m_{CD} = -2; m_{BC} = m_{AD} = \frac{2}{7}$$

### EJERCICIO 11

$$1. \alpha = 57^\circ 5' 41''$$

$$2. 26^\circ 33' 54'', 116^\circ 33' 54''$$

$$36^\circ 52' 11''$$

$$3. 63^\circ 26' 5'', 63^\circ 26' 5'' \text{ y}$$

$$53^\circ 7' 48''$$

$$4. \text{ Un ángulo de } 90^\circ$$

$$\text{los restantes de } 45^\circ$$

$$5. 63^\circ 26' 5'' \text{ y } 26^\circ 33' 54''$$

$$6. \alpha = 131^\circ 49' 12''$$

$$7. 130^\circ 14' 10''; 49^\circ 45' 50''$$

$$8. 117^\circ 16' 36''$$

$$9. m_1 = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$10. x = 8$$

$$11. m_1 = -\frac{1}{7}, m_2 = 7$$

$$12. -2 + \sqrt{3}; 2 + \sqrt{3}$$

## EJERCICIO 13

- $y - x = 2$
- $xy = 1$
- $x - 2y = 0$
- $x^2 + y^2 = 25$
- $7x - 3y + 4 = 0$
- $x^2 + y^2 - 8x + 6y = 0$
- $x^2 + 10y + 25 = 0$
- $2x + y + 5 = 0$
- $x^2 + y^2 + 6x + 4y - 51 = 0$
- $x^2 + y^2 - 6x - 6y + 9 = 0$
- $21x^2 - 12xy + 16y^2 + 60x + 60y - 600 = 0$
- $9x^2 + 25y^2 - 225 = 0$
- $28y^2 - 36x^2 - 63 = 0$ ;  $36x^2 - 28y^2 + 63 = 0$
- $16x^2 + 7y^2 - 112 = 0$
- $7x^2 - 9y^2 - 28x + 90y - 260 = 0$

## CAPÍTULO 5

## EJERCICIO 14

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| 1. $2x + 5y - 14 = 0$               | 19. $2x + y - 4 = 0$             |
| 2. $2x - y + 3 = 0$                 | 20. $6x + 5y - 82 = 0$           |
| 3. $2y - 1 = 0$                     | 21. $2x - 3y + 8 = 0$            |
| 4. $2x + 2y + 1 = 0$                | 22. $4x - 7y + 10 = 0$           |
| 5. $3x - 5y + 11 = 0$               | $7x - 5y - 26 = 0$               |
| 6. $4x - 3y + 6 = 0$                | $3x + 2y + 22 = 0$               |
| 7. $x - 3 = 0$                      | 23. $4x - 6y - 5 = 0$            |
| 8. $8x - 4y - 7 = 0$                | 24. $10x - 3y - 4 = 0$           |
| 9. $3x + 2y - 2 = 0$                | 25. $2x - 3y - 7 = 0$            |
| 10. $3x + 5y - 12 = 0$              | 26. $2x + 11y + 5 = 0$           |
| 11. $3x + 2y - 5 = 0$               | $5x - 16y - 31 = 0$              |
| 12. $\sqrt{3}x + y - 3\sqrt{3} = 0$ | 27. $(8, 6), (-2, -8), (-6, -2)$ |
| 13. $x + y - 4 = 0$                 | 28. $(-3, 0), (3, 2), (4, -2)$   |
| 14. $x - 3 = 0$                     | 29. $(-3, 2), (-1, -2)$          |
| 15. $x + 4 = 0$                     | $(7, 0), (5, 4)$                 |
| 16. $3x - 2y - 12 = 0$              | 30. $120x - y = 0$               |
| 17. $x + 4y + 2 = 0$                | 31. $3t - 2v + 4 = 0$            |
| 18. $2x + y = 0$                    | 32. $x + 40y - 600 = 0$          |
| $3x - 4y + 11 = 0$                  | 33. $120x - y + 1200 = 0$        |
| $5x + 2y - 25 = 0$                  | 34. $9T_C - 5T_F + 160 = 0$      |
| $y = 0$                             |                                  |

## EJERCICIO 15

- $y = -x + 4$ ;  $\frac{x}{4} + \frac{y}{4} = 1$
- $y = \frac{2}{5}x + 1$ ;  $\frac{x}{-5/2} + \frac{y}{1} = 1$
- $y = \frac{1}{3}x + \frac{8}{3}$ ;  $\frac{x}{-8} + \frac{y}{8/3} = 1$

4.  $y = 2x$

5.  $y = -\frac{1}{8}x + \frac{1}{2}$ ;  $\frac{x}{4} + \frac{y}{1/2} = 1$

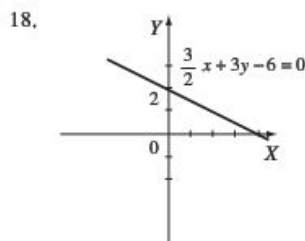
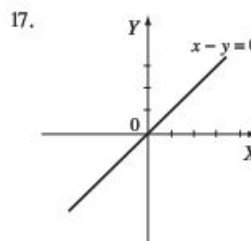
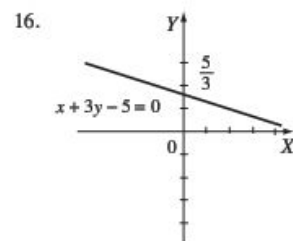
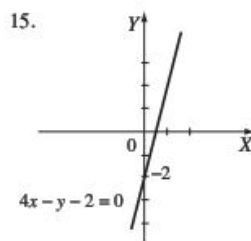
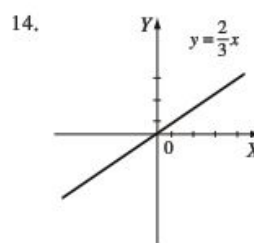
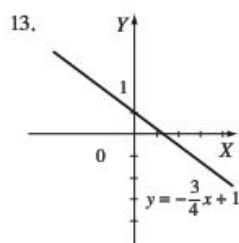
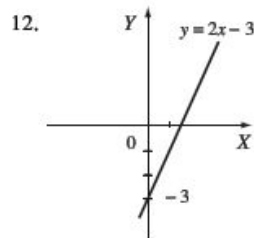
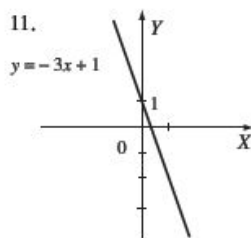
6.  $y = \frac{3}{4}x - 3$ ;  $\frac{x}{4} + \frac{y}{-3} = 1$

7.  $y = -\frac{3}{5}x + 2$ ;  $\frac{x}{10/3} + \frac{y}{2} = 1$

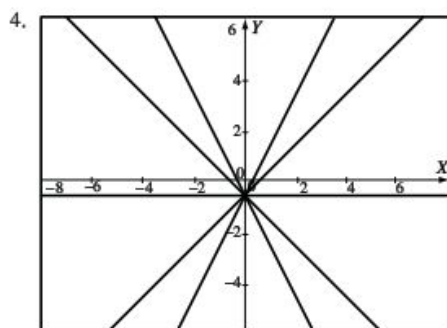
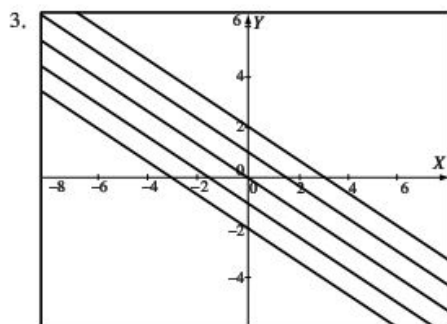
8.  $y = -\frac{1}{6}x - \frac{5}{3}$ ;  $\frac{x}{-10} + \frac{y}{-5/3} = 1$

9.  $y = \frac{6}{5}x + 12$ ;  $\frac{x}{-10} + \frac{y}{12} = 1$

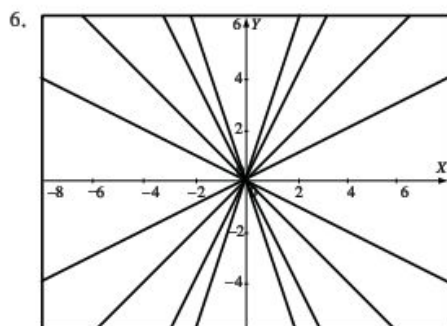
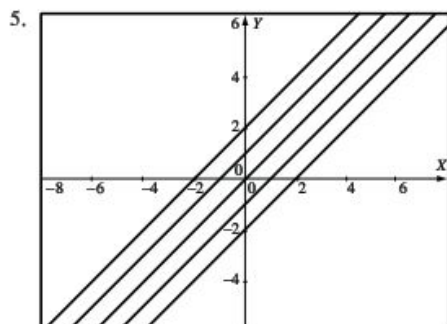
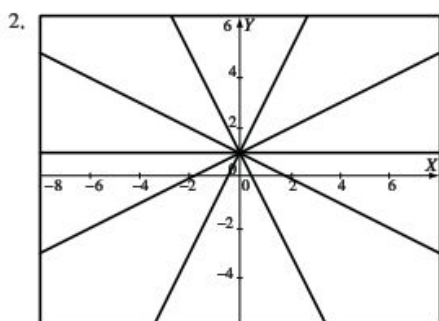
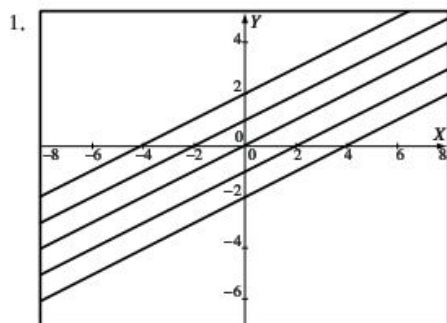
10.  $y = -x \operatorname{ctg} w + p \operatorname{csc} w$ ;  $\frac{x}{p \sec w} + \frac{y}{p \csc w} = 1$

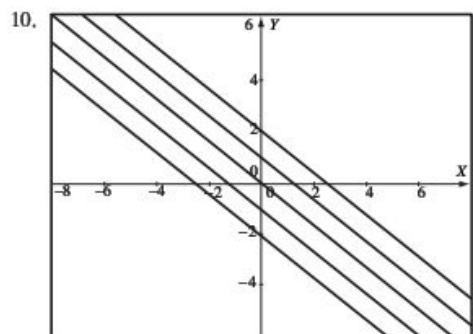
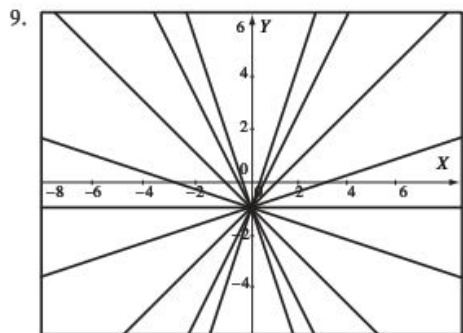
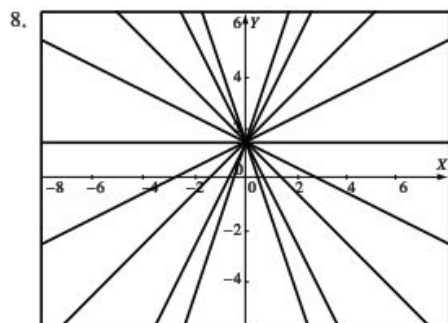
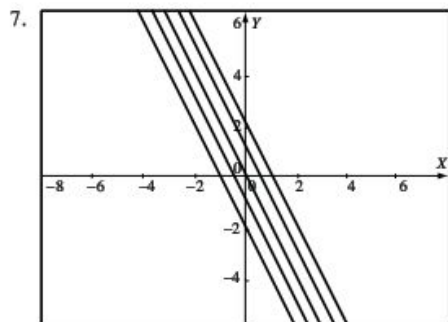


19.  $x + y + 5 = 0$   
 20.  $y = 2x + 4$   
 21.  $y = -3x + 11$   
 22.  $y = -\frac{1}{6}x + \frac{13}{6}$   
 23.  $y = 5x + 5$   
 24.  $5x - 3y + 20 = 0$   
 25.  $4x + y - 15 = 0$   
 26.  $x - y + 1 = 0$   
 27.  $6x + 4y + 5 = 0$   
 28.  $3x - 2y - 6 = 0$   
 29.  $161^\circ 33' 54''$   
 30.  $36^\circ 1' 38''$   
 $102^\circ 20' 20''$   
 $41^\circ 38'$   
 31.  $(20, 13)$   
 32. a)  $y = 50x + 30\,000$   
 b) \$70 000.00  
 33. a)  $4m/s^2$   
 b)  $31m/s$
34. a)  $C = 30x + 6\,000$   
 b) \$1 000.00  
 c) no  
 d) 120 platos
35.  $\frac{x}{5} + \frac{y}{-5} = 1$   
 36.  $\frac{x}{8} + \frac{y}{-4} = 1$   
 37.  $\frac{x}{-\frac{4}{3}} + \frac{y}{-\frac{4}{5}} = 1$   
 38.  $\frac{x}{-\frac{7}{4}} + \frac{y}{\frac{7}{2}} = 1$   
 39.  $\frac{x}{\frac{6}{5}} + \frac{y}{-\frac{3}{2}} = 1$



### EJERCICIO 16




**EJERCICIO 17**

1.  $\frac{2x}{\sqrt{13}} + \frac{3y}{\sqrt{13}} - \frac{5}{\sqrt{13}} = 0$

2.  $-\frac{x}{\sqrt{2}} + \frac{y}{\sqrt{2}} - \frac{5}{\sqrt{2}} = 0$

3.  $\frac{5x}{\sqrt{34}} + \frac{3y}{\sqrt{34}} = 0$

4.  $\frac{-x}{\sqrt{10}} + \frac{3y}{\sqrt{10}} - \frac{7}{\sqrt{10}} = 0$

5.  $-\frac{12x}{13} - \frac{5y}{13} - 1 = 0$

6.  $\frac{\sqrt{5}x}{3} + \frac{2y}{3} - \frac{1}{3} = 0$

7.  $\sqrt{3}x + y - 8 = 0$

8.  $x + y - 2 = 0$

9.  $x + \sqrt{3}y - 6 = 0$

10.  $x - \sqrt{3}y + 2 = 0$

11.  $x + \sqrt{3} = 0$

12.  $\sqrt{3}x - y + 10 = 0$

13.  $x + y + 6 = 0$

14.  $x - \sqrt{3}y - 8\sqrt{3} = 0$

15.  $\frac{x}{2} - \frac{\sqrt{3}y}{2} - 2 = 0$

16.  $\frac{2x}{\sqrt{29}} + \frac{5y}{\sqrt{29}} - \frac{12}{\sqrt{29}} = 0$

17.  $-\frac{3x}{\sqrt{10}} - \frac{y}{\sqrt{10}} - \frac{7}{\sqrt{10}} = 0$

18.  $\theta = 60^\circ, \theta' = 120^\circ$

19.  $3x - 4y - 12 = 0$

$3x + 4y + 12 = 0$

**EJERCICIO 18**

1.  $\frac{23\sqrt{53}}{53}$

2.  $\frac{9}{5}$

3.  $5\sqrt{2}$

4.  $\frac{49}{13}$

5.  $\frac{7\sqrt{2}}{2}$

6. 1

7.  $\frac{32\sqrt{17}}{17}$

8. 10

9.  $\frac{9\sqrt{10}}{5}$

10.  $5u^2$

11.  $r = \frac{7}{5}$

12.  $K_1 = 2$   
 $K_2 = \frac{1}{2}$

13.  $\frac{2\sqrt{13}}{13}$

14.  $-\frac{6}{5}$

15.  $\frac{14}{5}$

16.  $\frac{11\sqrt{29}}{29}$

17.  $-\frac{7}{10}$

18.  $-\frac{27\sqrt{2}}{8}$

19.  $3x - 4y - 10 = 0$

$3x - 4y + 20 = 0$

20.  $y = -\sqrt{17} + \frac{7}{4}$

$y = \sqrt{17} + \frac{7}{4}$

21.  $\frac{7\sqrt{5}}{5}$

22.  $\frac{11\sqrt{5}}{15}$

23.  $x - y - 3 - 3\sqrt{2} = 0$

$x - y - 3 + 3\sqrt{2} = 0$

24.  $2x - y - 1 = 0$

$2x + y - 7 = 0$

**EJERCICIO 19**

- $2x - y + 3 = 0$
- $4x - 6y + 13 = 0$
- $x + 3y - 9 = 0$
- $y + 6 = 0$
- $2x - 6y - 11 = 0; 6x + 2y - 1 = 0$
- $99x - 27y + 50 = 0; 21x + 77y - 80 = 0$
- $y - 2 = 0; 7x - y - 5 = 0; x + y - 3 = 0; (1, 2)$
- $2x + y - 6 = 0; x - 6y - 10 = 0; 3x - 5y - 16 = 0;$   
 $\left(\frac{46}{13}, -\frac{14}{13}\right)$
- $2x + y - 3 = 0; 3x - 5y + 16 = 0; x - 6y + 19 = 0;$   
 $\left(-\frac{1}{13}, \frac{41}{13}\right)$
- $11x + 4y - 27 = 0; 7x - y - 16 = 0; 4x + 5y - 11 = 0;$   
 $\left(\frac{7}{3}, \frac{1}{3}\right)$
- $(5\sqrt{5} - \sqrt{34})x + (3\sqrt{5} + 2\sqrt{34})y - (4\sqrt{5} + 7\sqrt{34}) = 0$   
 $(\sqrt{37} + 6\sqrt{5})x + (\sqrt{5} - 2\sqrt{37})y + (7\sqrt{37} - 23\sqrt{5}) = 0$   
 $(5\sqrt{37} + 6\sqrt{34})x + (3\sqrt{37} + \sqrt{34})y - (4\sqrt{37} + 23\sqrt{34}) = 0$   
 $(1.5965, 2.2438)$
- $55x + 47y - 144 = 0$

**CAPÍTULO 6****EJERCICIO 20**

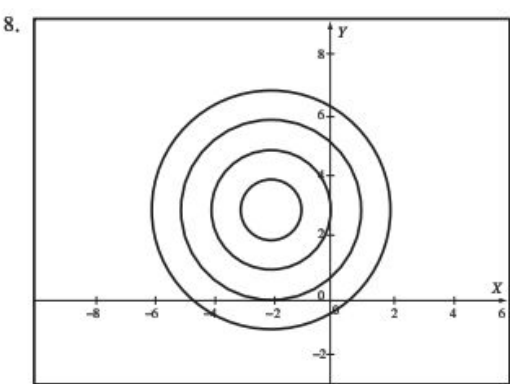
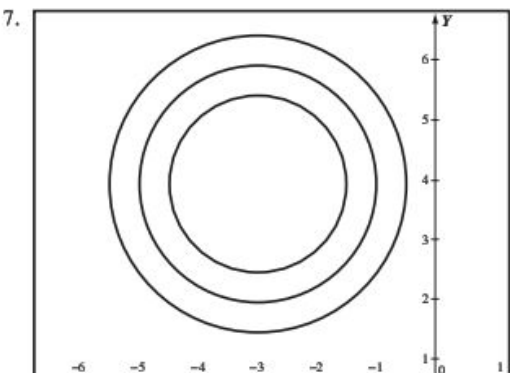
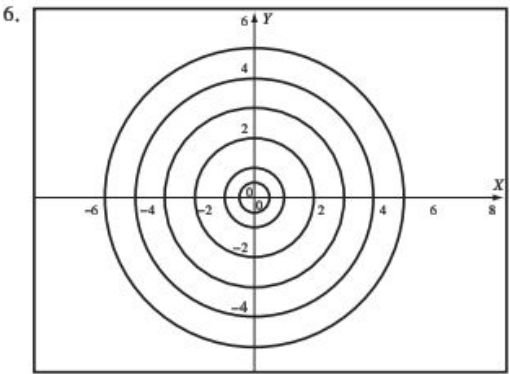
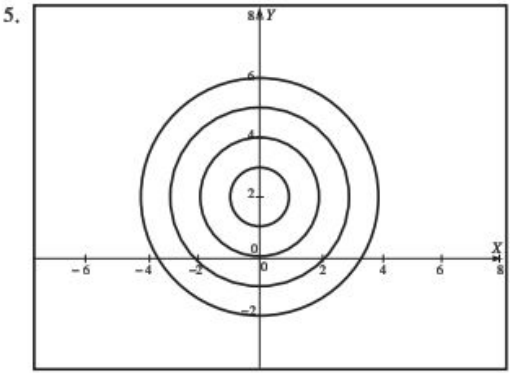
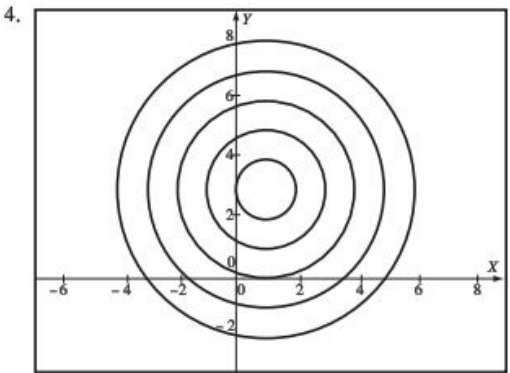
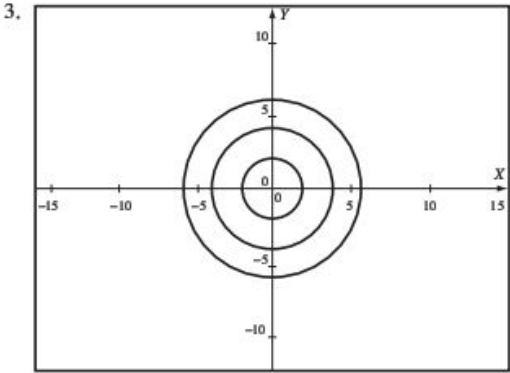
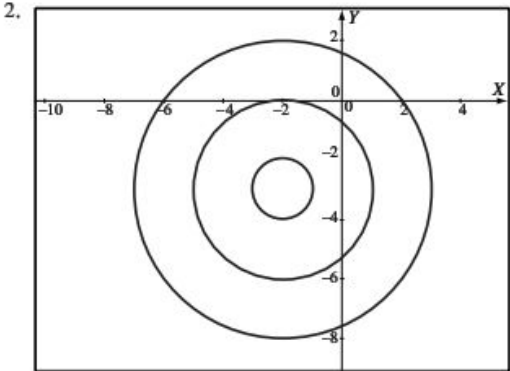
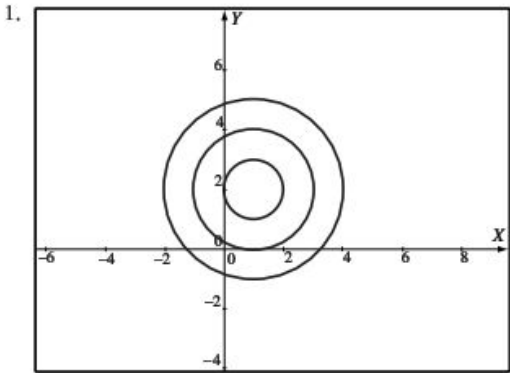
- $x^2 + y^2 - 16 = 0$
- $4x^2 + 4y^2 - 3 = 0$
- $x^2 + y^2 - 2x + 6y + 6 = 0$
- $3x^2 + 3y^2 + 3x + 4y = 0$
- $x^2 + y^2 - 13 = 0$
- $x^2 + y^2 - 2x - 6y - 31 = 0$
- $x^2 + y^2 - 2x + 6y - 35 = 0$
- $x^2 + y^2 + 2x + 10y + 25 = 0$
- $x^2 + y^2 - 10x + 4y = 0$
- $x^2 + y^2 + 8x - 4y + 4 = 0$
- $x^2 + y^2 - 10x + 10y + 25 = 0$
- $3x^2 + 3y^2 + 13x - 65 = 0$
- $4x^2 + 4y^2 + 41y + 66 = 0$
- $x^2 + y^2 + 4y = 0$

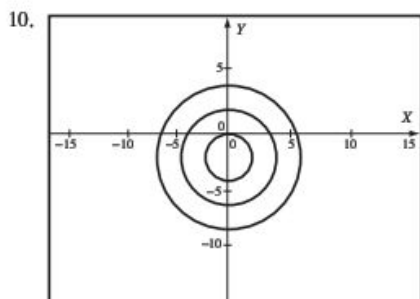
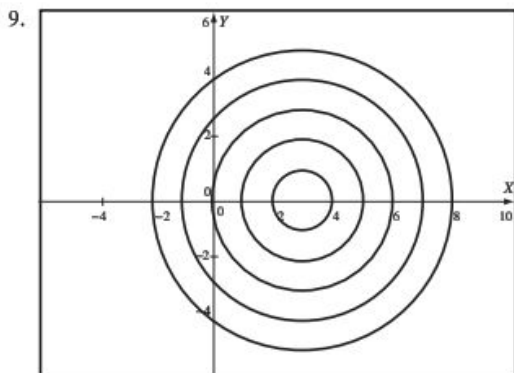
- $x^2 + y^2 - 8x + 6y + 21 = 0$
- $x^2 + y^2 - 2x - 4y - 11 = 0$
- $x^2 + y^2 + 6x + 8y - 144 = 0$
- $x^2 + y^2 - 2x - 4y - 59 = 0$
- $2x^2 + 2y^2 + 15x - 11y - 51 = 0$
- $17x^2 + 17y^2 - 88x + 58y - 544 = 0$
- $9x^2 + 9y^2 - 43x + 9y - 140 = 0$
- $x^2 + y^2 - 4x + 4y - 2 = 0$
- $x^2 + y^2 - 2x - 4y - 4 = 0$
- $3x^2 + 3y^2 + 8x + 10y - 43 = 0$
- $3x^2 + 3y^2 - x + 7y - 10 = 0$
- $x^2 + y^2 - 6x + 4y - 5 = 0$
- $x^2 + y^2 + 4x - 2y - 29 = 0$

**EJERCICIO 21**

- $C(-1, -1), r = 2$
- $C(3, -4), r = \sqrt{5}$
- Punto,  $C(-3, -1), r = 0$
- Imaginaria con  $C(2, -1)$  y  $r = \sqrt{-9}$
- $C(-7, 4), r = 5$
- $C(0, 4), r = 3$
- $C(-2, 0), r = 1$
- $C\left(-\frac{5}{2}, \frac{3}{2}\right), r = \sqrt{7}$
- $C\left(\frac{1}{2}, -\frac{3}{2}\right), r = \frac{1}{2}$
- $C\left(\frac{1}{5}, 3\right), r = \frac{4}{5}$
- $C\left(\frac{3}{4}, -\frac{1}{6}\right), r = \frac{5}{12}$
- $C\left(-\frac{2}{3}, \frac{1}{2}\right), r = 3$
- $x - 3y + 8 = 0$   
 $79x + 3y - 568 = 0$
- $x^2 + y^2 - 8x - 4y + 10 = 0$
- $x^2 + y^2 - 8x - 8y + 19 = 0$   
 $x^2 + y^2 + 4y - 9 = 0$
- $x^2 + y^2 + 10x - 4 = 0$
- $k = 5, k = -\frac{19}{17}$
- $(-5, 3)$  y  $(1, 9)$
- $(2, 2)$
- No existe intersección
- $(3, 5)$  y  $(4, 4)$
- $(4, -1)$  y  $(6, -3)$

EJERCICIO 22





11.  $(x-1)^2 + (y-1)^2 = p^2$     13.  $(x+2)^2 + (y-3)^2 = p^2$   
 12.  $(x+1)^2 + (y+3)^2 = p^2$     14.  $(x-1)^2 + (y-0)^2 = p^2$

## CAPÍTULO 7

### EJERCICIO 23

- |                           |                                |
|---------------------------|--------------------------------|
| 1. $(2, 2)$               | 10. $y'^2 - 12x' = 0$          |
| 2. $(9, 1)$               | 11. $9x'^2 + 16y'^2 - 144 = 0$ |
| 3. $(-1, 4)$              | 12. $4x'^2 + 5y'^2 - 20 = 0$   |
| 4. $(-10, -4)$            | 13. $9x'^2 + 4y'^2 - 72 = 0$   |
| 5. $(-8, 7)$              | 14. $x'^2 - 2y'^2 - 2 = 0$     |
| 6. $y'^2 - 8x' = 0$       | 15. $4x'^2 - 9y'^2 - 36 = 0$   |
| 7. $x'^2 - 4y' = 0$       | 16. $y' = x'^3$                |
| 8. $x'^2 + y'^2 - 9 = 0$  | 17. $y'^2 = x'^3 - 1$          |
| 9. $x'^2 + y'^2 - 25 = 0$ |                                |

### EJERCICIO 24

- |                          |                                |
|--------------------------|--------------------------------|
| 1. $x'^2 - 8y' = 0$      | 5. $9x'^2 + 4y'^2 - 36 = 0$    |
| 2. $y'^2 - 16x' = 0$     | 6. $16x'^2 + 16y'^2 - 9 = 0$   |
| 3. $x'^2 + y'^2 - 8 = 0$ | 7. $25x'^2 - 16y'^2 + 400 = 0$ |
| 4. $x'^2 + y'^2 - 4 = 0$ | 8. $y'^3 - x' = 0$             |

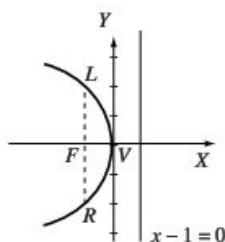
## CAPÍTULO 8

### EJERCICIO 25

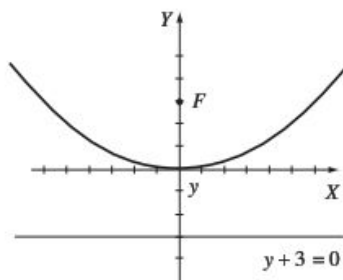
- $y^2 + 8x = 0$
- $x^2 + 4y = 0$
- $y^2 - 12x + 2y + 1 = 0$
- $x^2 - 16y = 0$
- $x^2 - 4x + 4y - 16 = 0$
- $y^2 + 12x - 4y + 52 = 0$
- $x^2 - 2xy + y^2 + 8x - 4y + 2 = 0$
- $9x^2 - 12xy + 4y^2 - 48x + 32y + 64 = 0$

### EJERCICIO 26

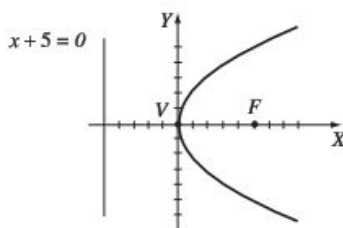
- Foco:  $F(-1, 0)$ , Directriz:  $x - 1 = 0$ ,  $LR = 4$ , Eje:  $y = 0$



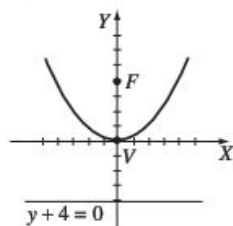
- Foco:  $F(0, 3)$ , Directriz:  $y + 3 = 0$ ,  $LR = 12$ , Eje:  $x = 0$



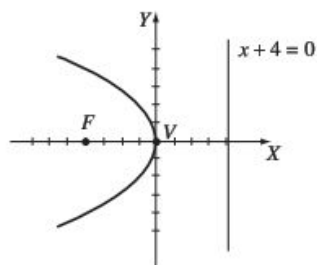
- Foco:  $F(5, 0)$ , Directriz:  $x + 5 = 0$ ,  $LR = 20$ , Eje:  $y = 0$



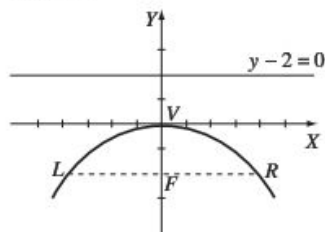
4. Foco:  $F(0, 4)$ , Directriz:  $y + 4 = 0$ ,  $LR = 16$ ,  
Eje:  $x = 0$



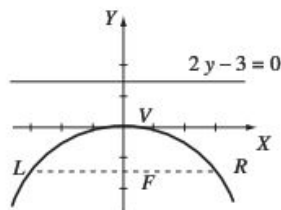
5. Foco:  $F(-4, 0)$ , Directriz:  $x - 4 = 0$ ,  $LR = 16$ ,  
Eje:  $y = 0$



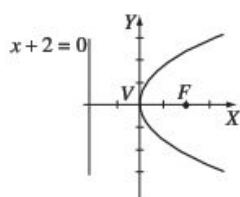
6. Foco:  $F(0, -2)$ , Directriz:  $y - 2 = 0$ ,  $LR = 8$ ,  
Eje:  $x = 0$



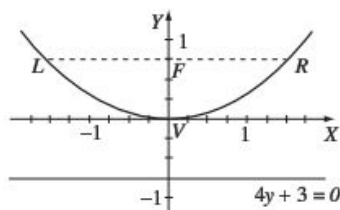
7. Foco:  $F(0, -\frac{3}{2})$ , Directriz:  $2y - 3 = 0$ ,  $LR = 6$ ,  
Eje:  $x = 0$



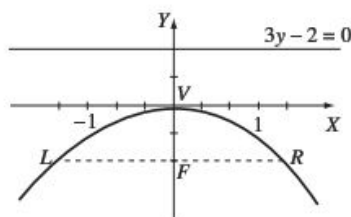
8. Foco:  $F(2, 0)$ , Directriz:  $x + 2 = 0$ ,  $LR = 8$ ,  
Eje:  $y = 0$



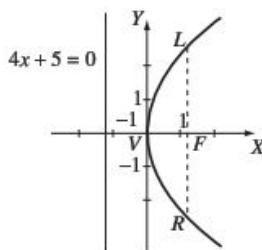
9. Foco:  $F(0, \frac{3}{4})$ , Directriz:  $4y + 3 = 0$ ,  $LR = 3$ ,  
Eje:  $x = 0$



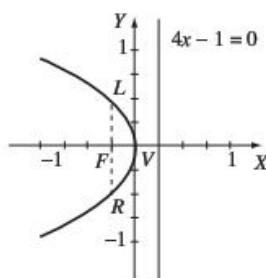
10. Foco:  $F(0, -\frac{2}{3})$ , Directriz:  $3y - 2 = 0$ ,  $LR = \frac{8}{3}$ ,  
Eje:  $x = 0$



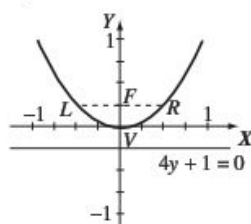
11. Foco:  $F(\frac{5}{4}, 0)$ , Directriz:  $4x + 5 = 0$ ,  $LR = 5$ ,  
Eje:  $y = 0$



12. Foco:  $F(-\frac{1}{4}, 0)$ , Directriz:  $4x - 1 = 0$ ,  $LR = 1$ ,  
Eje:  $y = 0$



13. Foco:  $F\left(0, \frac{1}{4}\right)$ , Directriz:  $4y + 1 = 0$ ,  $LR = 1$   
Eje:  $x = 0$



- |                      |                                  |
|----------------------|----------------------------------|
| 14. $y^2 + 20x = 0$  | 25. $x^2 - y = 0$                |
| 15. $x^2 - 24y = 0$  | 26. $y^2 + 18x = 0$              |
| 16. $y^2 - 8x = 0$   | 27. $x^2 + 4y = 0$               |
| 17. $x^2 + 4y = 0$   | 28. $3y^2 - 16x = 0$             |
| 18. $y^2 + 2x = 0$   | 29. $3x^2 + 16y = 0$             |
| 19. $3x^2 + 28y = 0$ | 30. $3\sqrt{13}$ unidades        |
| 20. $x^2 - 8y = 0$   | 31. $5\sqrt{2}$ unidades         |
| 21. $y^2 + 24x = 0$  | 32. $2x^2 - y = 0, y^2 - 4x = 0$ |
| 22. $x^2 + 10y = 0$  | 33. $y^2 + 3x = 0, y^2 - 3x = 0$ |
| 23. $y^2 + 6x = 0$   | 34. $y^2 - 12x = 0$              |
| 24. $3y^2 - 16x = 0$ | 35. $x^2 - 8y = 0$               |

### EJERCICIO 27

V: Vértice, F: Foco, LR: Lado recto, D: Directriz

- $V(1, 5)$ ,  $F(4, 5)$ ,  $LR = 12$ ,  $D: x + 2 = 0$ , Eje:  $y = 5$
- $V(6, -2)$ ,  $F(6, -6)$ ,  $LR = 16$ ,  $D: y - 2 = 0$ , Eje:  $x = 6$
- $V(-2, -4)$ ,  $F(-7, -4)$ ,  $LR = 20$ ,  $D: x - 3 = 0$ , Eje:  $y = -4$
- $V(-1, 5)$ ,  $F(-1, 4)$ ,  $LR = 4$ ,  $D: y - 6 = 0$ , Eje:  $x = -1$
- $V(-2, 0)$ ,  $F(0, 0)$ ,  $LR = 8$ ,  $D: x + 4 = 0$ , Eje:  $y = 0$
- $V(0, 2)$ ,  $F(0, 8)$ ,  $LR = 24$ ,  $D: y + 4 = 0$ , Eje:  $x = 0$
- $V(-4, 2)$ ,  $F\left(-4, \frac{7}{2}\right)$ ,  $LR = 6$ ,  $D: 2y - 1 = 0$ , Eje:  $x = -4$
- $V\left(\frac{4}{5}, -3\right)$ ,  $F\left(\frac{41}{20}, -3\right)$ ,  $LR = 5$ ,  $D: 20x + 9 = 0$ , Eje:  $y = -3$
- $V\left(\frac{3}{2}, 2\right)$ ,  $F\left(\frac{3}{2}, 3\right)$ ,  $LR = 4$ ,  $D: y - 1 = 0$ ,  $x = \frac{3}{2}$
- $V\left(2, -\frac{1}{4}\right)$ ,  $F\left(\frac{19}{8}, -\frac{1}{4}\right)$ ,  $LR = \frac{3}{2}$ ,  $D: x = \frac{13}{8}$ , Eje:  $y = -\frac{1}{4}$
- $V\left(\frac{1}{2}, -\frac{3}{2}\right)$ ,  $F\left(\frac{1}{2}, -\frac{1}{2}\right)$ ,  $LR = 4$ ,  $D: 2y + 5 = 0$ , Eje:  $x = \frac{1}{2}$
- $V(3, -1)$ ,  $F\left(\frac{10}{3}, -1\right)$ ,  $LR = \frac{4}{3}$ ,  $D: 3x - 8 = 0$ , Eje:  $y = -1$
- $V\left(0, \frac{1}{4}\right)$ ,  $F\left(0, \frac{3}{4}\right)$ ,  $LR = 2$ ,  $D: 4y + 1 = 0$ , Eje:  $x = 0$

14.  $V(1, 0)$ ,  $F\left(\frac{21}{16}, 0\right)$ ,  $LR = \frac{5}{4}$ ,  $D: 16x - 11 = 0$ , Eje:  $y = 0$

- $y^2 + 20x - 8y - 24 = 0$
- $x^2 - 6x + 16y + 25 = 0$
- $y^2 - 8x - 4y + 28 = 0$
- $x^2 + 10x - 12y + 49 = 0$
- $y^2 - 2x + 8y + 20 = 0$
- $3x^2 + 18x - 28y - 29 = 0$
- $y^2 + 24x - 12y - 60 = 0$
- $x^2 - 8x - 16y + 32 = 0$
- $y^2 + 8y - 20x + 36 = 0$
- $x^2 + 28y - 28 = 0$
- $y^2 + 14x - 4y + 25 = 0$
- $x^2 - 14x - 10y + 54 = 0$
- $x^2 - 2x - 8y - 23 = 0$
- $x^2 + 6x - 24y + 129 = 0$   
 $x^2 + 6x + 24y - 111 = 0$
- $y^2 + 24x - 4y - 116 = 0$
- $x^2 - 6x + 24y - 87 = 0$
- $(4, 8), (7, -4)$

### EJERCICIO 28

- |                           |                            |
|---------------------------|----------------------------|
| 1. $y^2 - x + 2y + 1 = 0$ | 5. $x^2 - 4x - y + 3 = 0$  |
| 2. $y^2 - 4x = 0$         | 6. $x^2 - y + 1 = 0$       |
| 3. $3y^2 - x + 7 = 0$     | 7. $2x^2 + 3x - y + 1 = 0$ |
| 4. $y^2 - x - 4 = 0$      | 8. $x^2 + 6x - 2y + 5 = 0$ |

### EJERCICIO 29

- |                       |                        |
|-----------------------|------------------------|
| 1. $8m$               | 6. $x - 4y + 24 = 0$   |
| 2. $62,5 \text{ cm}$  | 7. $2x - y - 9 = 0$    |
| 3. $18,75 \text{ cm}$ | 8. $x - 2y + 2 = 0$    |
| 4. $27,71 \text{ cm}$ | 9. $x - 3y - 3 = 0$    |
| 5. $x - y - 2 = 0$    | 10. $2x - 3y - 16 = 0$ |

## CAPÍTULO 9

### EJERCICIO 30

- $5x^2 + 9y^2 - 180 = 0$
- $5x^2 + 9y^2 - 45 = 0$
- $49x^2 + 24y^2 - 1176 = 0$
- $25x^2 + 16y^2 + 100x - 128y - 44 = 0$
- $9x^2 + 25y^2 - 18x + 100y - 791 = 0$