

EXAMEN DEL CAPÍTULO ■ PÁGINA 714

1. (a) Lineal (b) $(-2, 3)$ 2. (a) No lineal
 (b) $(1, -2), (\frac{5}{3}, 0)$
 3. $(-0.55, -0.78), (0.43, -0.29), (2.12, 0.56)$
 4. Viento 60 km/h, avión 300 km/h
 5. (a) Forma escalonada por renglones (b) Forma escalonada por renglones reducida (c) Ninguna 6. (a) $(\frac{5}{2}, \frac{5}{2}, 0)$ (b) No hay solución

7. $(-\frac{3}{5} + \frac{2}{5}t, \frac{1}{5} + \frac{1}{5}t, t)$

8. Café \$1.50, jugo \$1.75, rosquilla \$0.75

9. (a) Dimensiones incompatibles

(b) Dimensiones incompatibles

(c) $\begin{bmatrix} 6 & 10 \\ 3 & -2 \\ -3 & 9 \end{bmatrix}$ (d) $\begin{bmatrix} 36 & 58 \\ 0 & -3 \\ 18 & 28 \end{bmatrix}$ (e) $\begin{bmatrix} 2 & -\frac{3}{2} \\ -1 & 1 \end{bmatrix}$

(f) B no es cuadrada (g) B no es cuadrada (h) -3

10. (a) $\begin{bmatrix} 4 & -3 \\ 3 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 30 \end{bmatrix}$ (b) (70, 90)

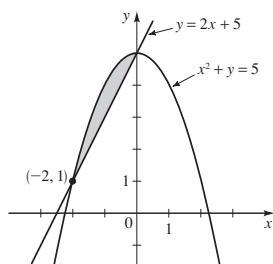
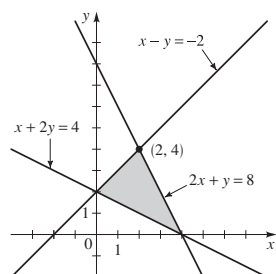
11. $|A| = 0, |B| = 2, B^{-1} = \begin{bmatrix} 1 & -2 & 0 \\ 0 & \frac{1}{2} & 0 \\ 3 & -6 & 1 \end{bmatrix}$

12. (5, -5, -4)

13. (a) $\frac{1}{x-1} + \frac{1}{(x-1)^2} - \frac{1}{x+2}$ (b) $-\frac{1}{x} + \frac{x+2}{x^2+3}$

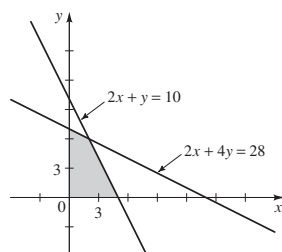
14. (a)

(b)


ENFOQUE SOBRE MODELADO ■ PÁGINA 720

1. 198, 195

3.

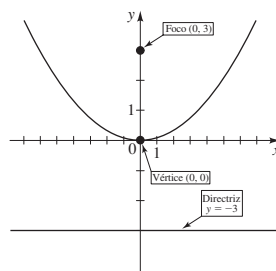

 máximo 161
 mínimo 135

5. 3 mesas, 34 sillas 7. 30 cajas de toronjas, 30 cajas de naranjas
 9. 15 Pasadena a Santa Mónica, 3 Pasadena a El Toro, 0 Long Beach a Santa Mónica, 16 Long Beach a El Toro
 11. 90 estándar, 40 de lujo 13. \$7500 en bonos municipales, \$2500 en certificados bancarios, \$2000 en bonos de alto riesgo
 15. 4 juegos, 32 educativos, 0 utilería

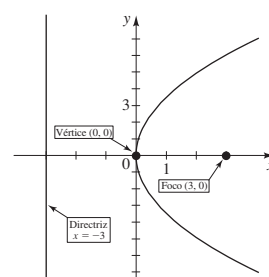
CAPÍTULO 11
SECCIÓN 11.1 ■ PÁGINA 730

1. foco, directriz 2. $F(0, p), y = -p, F(0, 3), y = -3$
 3. $F(p, 0), x = -p, F(3, 0), x = -3$

4. (a)



(b)

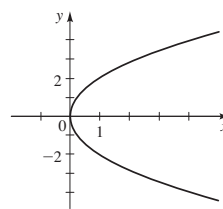
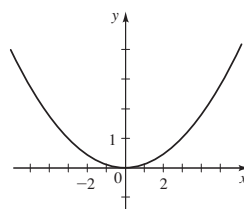


5. III 7. II 9. VI

Orden de respuestas: foco; directriz; diámetro focal

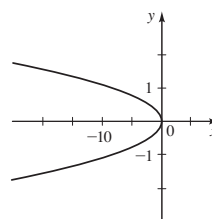
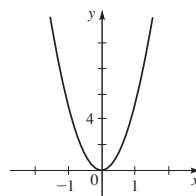
11. $F(0, \frac{9}{4}); y = -\frac{9}{4}; 9$

13. $F(1, 0); x = -1; 4$



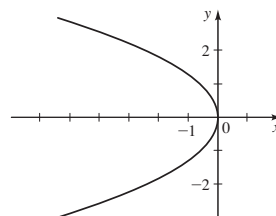
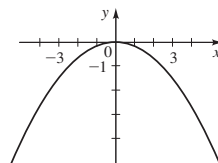
15. $F(0, \frac{1}{20}); y = -\frac{1}{20}; \frac{1}{5}$

17. $F(-\frac{1}{32}, 0); x = \frac{1}{32}; \frac{1}{8}$

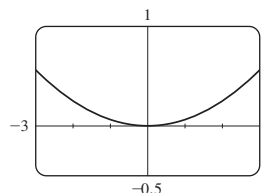


19. $F(0, -\frac{3}{2}); y = \frac{3}{2}; 6$

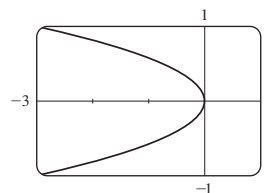
21. $F(-\frac{5}{12}, 0); x = \frac{5}{12}; \frac{5}{3}$



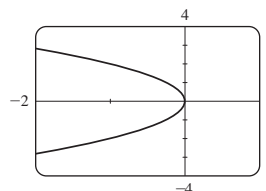
23.



25.

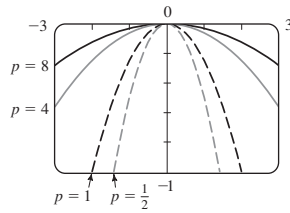


27.



29. $x^2 = 8y$ 31. $y^2 = -32x$ 33. $y^2 = -8x$ 35. $x^2 = 40y$
 37. $y^2 = 4x$ 39. $x^2 = 20y$ 41. $x^2 = 8y$ 43. $y^2 = -16x$
 45. $y^2 = -3x$ 47. $x = y^2$ 49. $x^2 = -4\sqrt{2}y$
 51. (a) $x^2 = -4py$, $p = \frac{1}{2}, 1, 4$, y 8

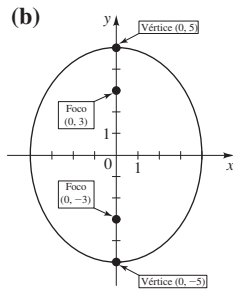
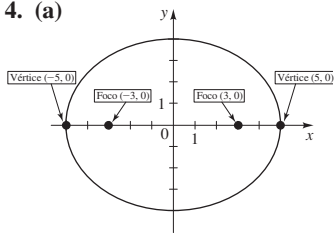
(b) Cuanto más cercana está la directriz del vértice, la parábola es más pronunciada.



53. (a) $y^2 = 12x$ (b) $8\sqrt{15} \approx 31$ cm 55. $x^2 = 600y$

SECCIÓN 11.2 ■ PÁGINA 738

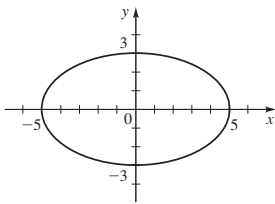
1. suma; focos
 2. $(a, 0), (-a, 0)$; $c = \sqrt{a^2 - b^2}$; $(5, 0), (-5, 0), (3, 0), (-3, 0)$
 3. $(0, a), (0, -a)$; $c = \sqrt{a^2 - b^2}$; $(0, 5), (0, -5), (0, 3), (0, -3)$
 4. (a)



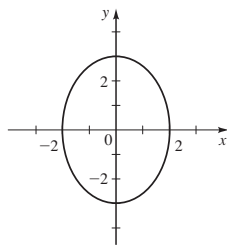
5. II 7. I

Orden de respuestas: vértices; focos; excentricidad; eje mayor y eje menor

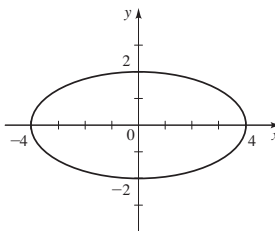
9. $V(\pm 5, 0)$; $F(\pm 4, 0)$;
 $\frac{4}{5}$; 10, 6



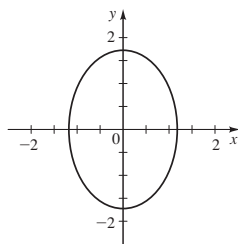
11. $V(0, \pm 3)$; $F(0, \pm\sqrt{5})$;
 $\sqrt{5}/3$; 6, 4



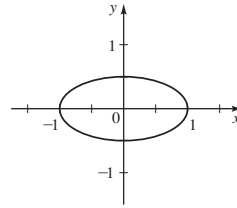
13. $V(\pm 4, 0)$; $F(\pm 2\sqrt{3}, 0)$;
 $\sqrt{3}/2$; 8, 4



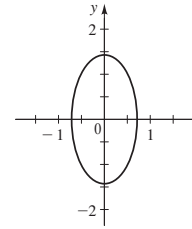
15. $V(0, \pm\sqrt{3})$; $F(0, \pm\sqrt{3}/2)$;
 $1/\sqrt{2}$; $2\sqrt{3}$, $\sqrt{6}$



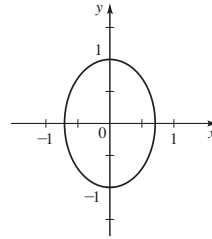
17. $V(\pm 1, 0)$; $F(\pm\sqrt{3}/2, 0)$;
 $\sqrt{3}/2$; 2, 1



19. $V(0, \pm\sqrt{2})$; $F(0, \pm\sqrt{3}/2)$;
 $\sqrt{3}/2$; $2\sqrt{2}$, $\sqrt{2}$

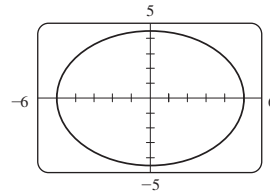


21. $V(0, \pm 1)$; $F(0, \pm 1/\sqrt{2})$;
 $1/\sqrt{2}$; 2, $\sqrt{2}$

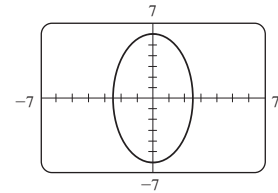


23. $\frac{x^2}{25} + \frac{y^2}{16} = 1$ 25. $\frac{x^2}{4} + \frac{y^2}{8} = 1$ 27. $\frac{x^2}{256} + \frac{y^2}{48} = 1$

29.



31.

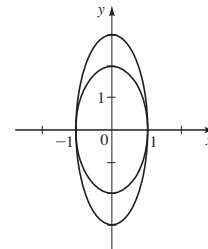
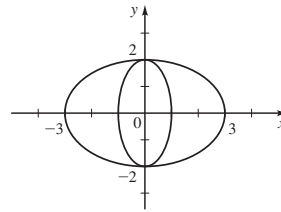


33. $\frac{x^2}{25} + \frac{y^2}{9} = 1$ 35. $x^2 + \frac{y^2}{4} = 1$ 37. $\frac{x^2}{9} + \frac{y^2}{13} = 1$

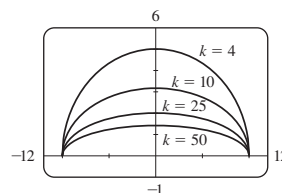
39. $\frac{x^2}{100} + \frac{y^2}{91} = 1$ 41. $\frac{x^2}{25} + \frac{y^2}{5} = 1$ 43. $\frac{64x^2}{225} + \frac{64y^2}{81} = 1$

45. $(0, \pm 2)$

47. $(\pm 1, 0)$



49. (a)



(b) Ejes mayores y vértices comunes; la excentricidad aumenta cuando k aumenta.

$$51. \frac{x^2}{2.2500 \times 10^{16}} + \frac{y^2}{2.2491 \times 10^{16}} = 1$$

$$53. \frac{x^2}{1,455,642} + \frac{y^2}{1,451,610} = 1$$

$$55. 5\sqrt{39}/2 \approx 15.6 \text{ in.}$$

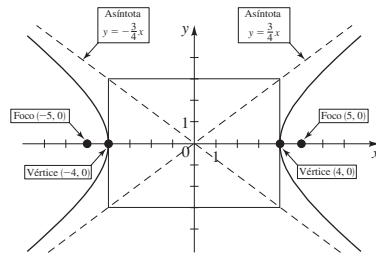
SECCIÓN 11.3 ■ PÁGINA 747

1. diferencia; focos

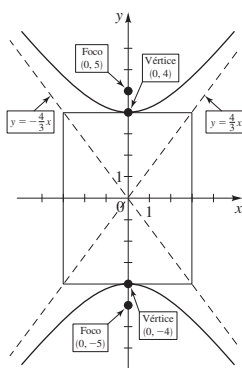
$$2. (-a, 0), (a, 0); \sqrt{a^2 + b^2}; (-4, 0), (4, 0), (-5, 0), (5, 0)$$

$$3. (0, -a), (0, a); \sqrt{a^2 + b^2}; (0, -4), (0, 4), (0, -5), (0, 5)$$

4. (a)



(b)

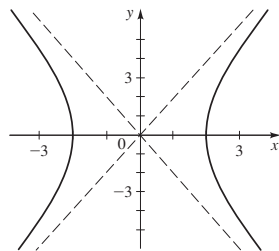


5. III 7. II

Orden de respuestas: vértices; focos; asíntotas

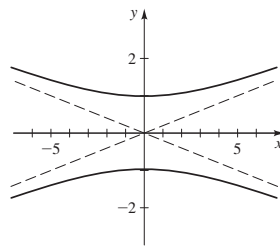
$$9. V(\pm 2, 0); F(\pm 2\sqrt{5}, 0);$$

$$y = \pm 2x$$



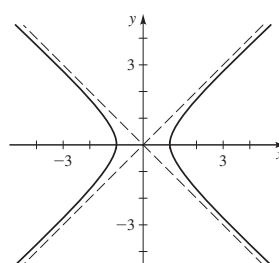
$$11. V(0, \pm 1); F(0, \pm \sqrt{26});$$

$$y = \pm \frac{1}{5}x$$



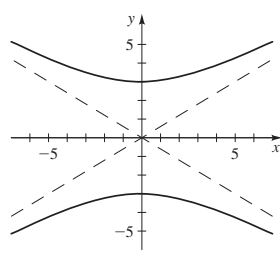
$$13. V(\pm 1, 0); F(\pm \sqrt{2}, 0);$$

$$y = \pm x$$



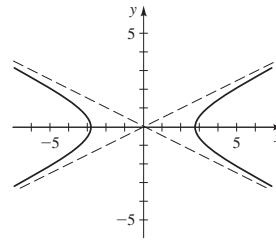
$$15. V(0, \pm 3); F(0, \pm \sqrt{34});$$

$$y = \pm \frac{3}{5}x$$



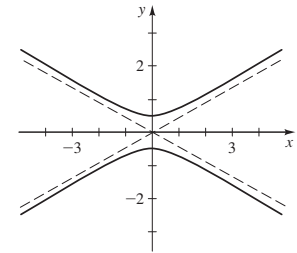
$$17. V(\pm 2\sqrt{2}, 0); F(\pm \sqrt{10}, 0);$$

$$y = \pm \frac{1}{2}x$$



$$19. V(0, \pm \frac{1}{2}); F(0, \pm \sqrt{5}/2);$$

$$y = \pm \frac{1}{2}x$$

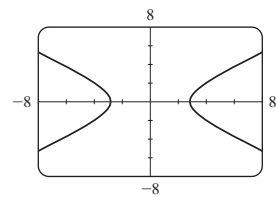


$$21. \frac{x^2}{4} - \frac{y^2}{12} = 1$$

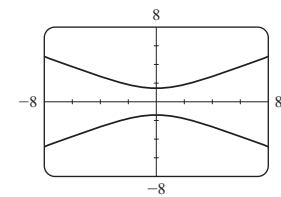
$$23. \frac{y^2}{16} - \frac{x^2}{16} = 1$$

$$25. \frac{x^2}{9} - \frac{4y^2}{9} = 1$$

27.



29.



$$31. \frac{x^2}{9} - \frac{y^2}{16} = 1$$

$$33. y^2 - \frac{x^2}{3} = 1$$

$$35. x^2 - \frac{y^2}{25} = 1$$

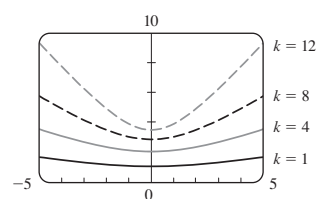
$$37. \frac{5y^2}{64} - \frac{5x^2}{256} = 1$$

$$39. \frac{x^2}{16} - \frac{y^2}{16} = 1$$

$$41. \frac{x^2}{9} - \frac{y^2}{16} = 1$$

$$43. (b) x^2 - y^2 = c^2/2$$

47. (b)

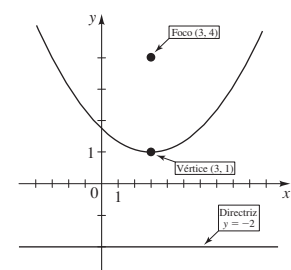
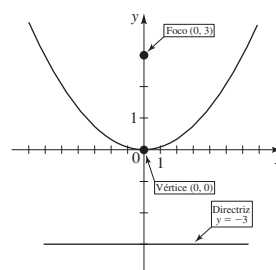

 Cuando k aumenta, las asíntotas se hacen más pronunciadas.

$$49. x^2 - y^2 = 2.3 \times 10^{19}$$

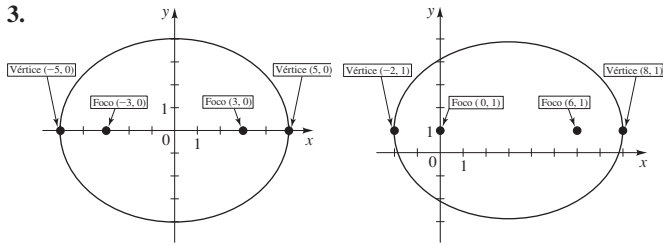
SECCIÓN 11.4 ■ PÁGINA 755

1. (a)) derecha; izquierda (b) hacia arriba; hacia abajo

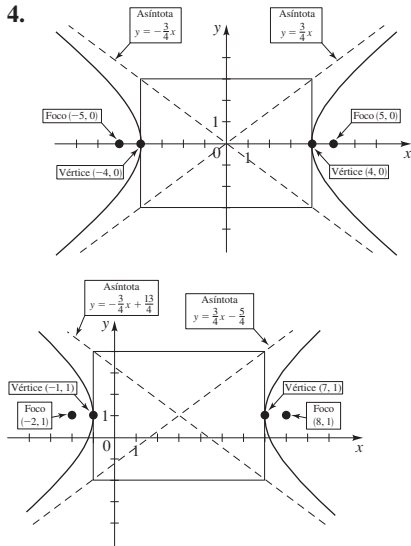
2.



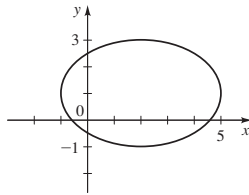
3.



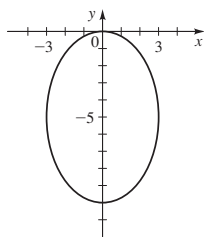
4.



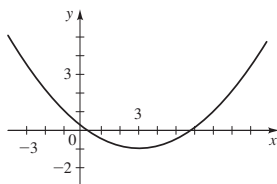
5. Centro $C(2, 1)$;
focos $F(2 \pm \sqrt{5}, 1)$;
vértices $V_1(-1, 1)$, $V_2(5, 1)$;
eje mayor 6, eje menor 4



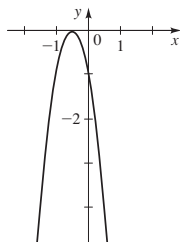
7. Centro $C(0, -5)$;
focos $F_1(0, -1)$, $F_2(0, -9)$;
vértices $V_1(0, 0)$, $V_2(0, -10)$;
eje mayor 10, eje menor 6



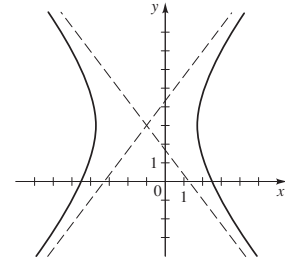
9. Vértice $V(3, -1)$;
foco $F(3, 1)$;
directriz $y = -3$



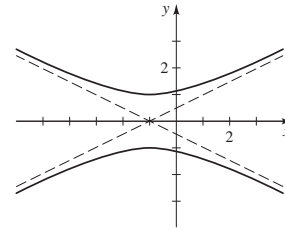
11. Vértice $V(-\frac{1}{2}, 0)$;
foco $F(-\frac{1}{2}, -\frac{1}{16})$;
directriz $y = \frac{1}{16}$



13. Centro $C(-1, 3)$;
focos $F_1(-6, 3)$, $F_2(4, 3)$;
vértices $V_1(-4, 3)$, $V_2(2, 3)$;
asíntotas
 $y = \pm \frac{4}{3}(x + 1) + 3$



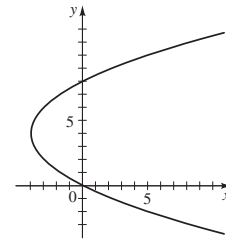
15. Centro $C(-1, 0)$;
focos $F(-1, \pm \sqrt{5})$;
vértices $V(-1, \pm 1)$;
asíntotas $y = \pm \frac{1}{2}(x + 1)$



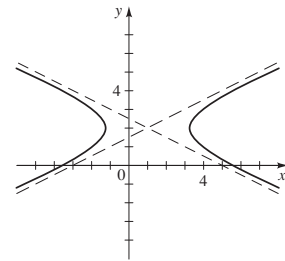
17. $x^2 = -\frac{1}{4}(y - 4)$ 19. $\frac{(x - 5)^2}{25} + \frac{y^2}{16} = 1$

21. $(y - 1)^2 - x^2 = 1$

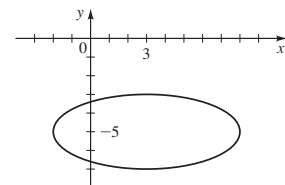
23. Parábola;
 $V(-4, 4)$;
 $F(-3, 4)$;
 $x = -5$



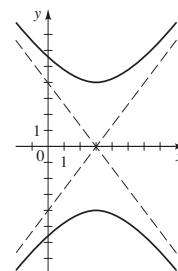
25. Hipérbola;
 $C(1, 2)$; $F_1(-\frac{3}{2}, 2)$, $F_2(\frac{7}{2}, 2)$;
 $V(1 \pm \sqrt{5}, 2)$; asíntotas
 $y = \pm \frac{1}{2}(x - 1) + 2$



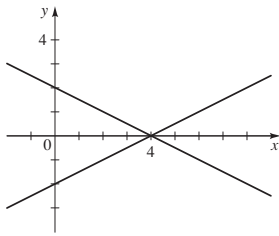
27. Elipse; $C(3, -5)$;
 $F(3 \pm \sqrt{21}, -5)$;
 $V_1(-2, -5)$, $V_2(8, -5)$;
eje mayor 10,
eje menor 4



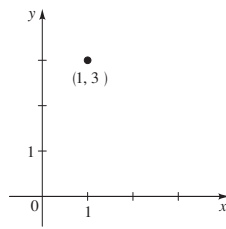
29. Hipérbola; $C(3, 0)$;
 $F(3, \pm 5)$; $V(3, \pm 4)$;
asíntotas $y = \pm \frac{4}{3}(x - 3)$



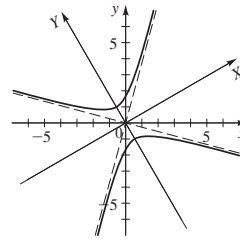
- 31. Cónica degenerada**
(par de rectas),
 $y = \pm \frac{1}{2}(x - 4)$



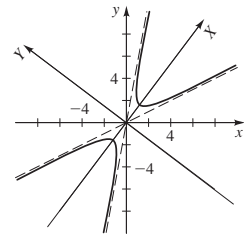
- 33. Punto (1, 3)**



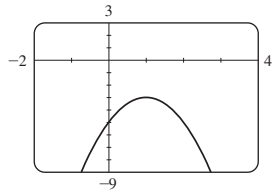
- 17. (a) Hipérbola**
(b) $Y^2 - X^2 = 1$
(c) $\phi = 30^\circ$



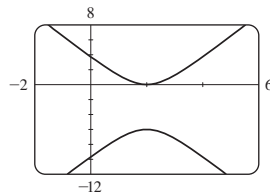
- 19. (a) Hipérbola**
(b) $\frac{X^2}{4} - Y^2 = 1$
(c) $\phi \approx 53^\circ$



35.

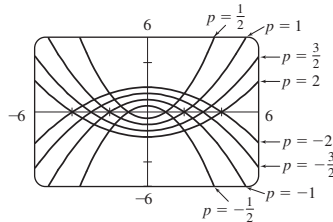


37.



- 39. (a) $F < 17$ (b) $F = 17$ (c) $F > 17$**

41. (a)

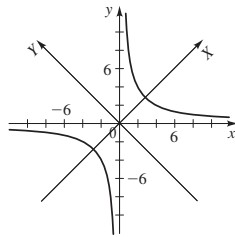


- (c) Las parábolas se hacen más angostas.

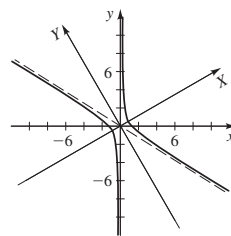
43. $\frac{(x + 150)^2}{18,062,500} + \frac{y^2}{18,040,000} = 1$

SECCIÓN 11.5 ■ PÁGINA 764

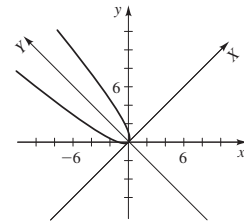
- 1.** $x = X \cos \phi - Y \sin \phi$, $y = X \sin \phi + Y \cos \phi$,
 $X = x \cos \phi + y \sin \phi$, $Y = -x \sin \phi + y \cos \phi$
2. (a) sección cónica **(b)** $(A - C)/B$
(c) $B^2 - 4AC$, parábola, elipse, hipérbola **3.** $(\sqrt{2}, 0)$
5. $(0, -2\sqrt{3})$ **7.** $(1.6383, 1.1472)$
9. $X^2 + \sqrt{3}XY + 2 = 0$
11. $7Y^2 - 48XY - 7X^2 - 40X - 30Y = 0$
13. $X^2 - Y^2 = 2$
15. (a) Hipérbola **(b)** $X^2 - Y^2 = 16$
(c) $\phi = 45^\circ$



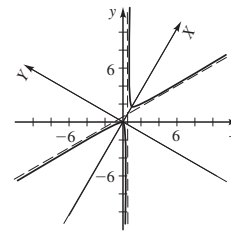
- 21. (a) Hipérbola**
(b) $3X^2 - Y^2 = 2\sqrt{3}$
(c) $\phi = 30^\circ$



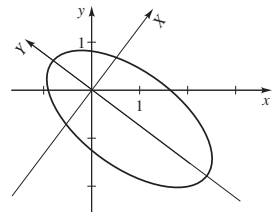
- 23. (a) Parábola**
(b) $Y = \sqrt{2}X^2$
(c) $\phi = 45^\circ$



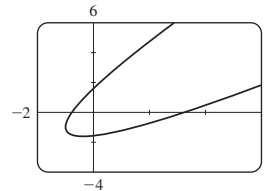
- 25. (a) Hipérbola**
(b) $(X - 1)^2 - 3Y^2 = 1$
(c) $\phi = 60^\circ$



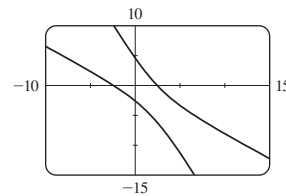
- 27. (a) Elipse**
(b) $X^2 + \frac{(Y + 1)^2}{4} = 1$
(c) $\phi \approx 53^\circ$



- 29. (a) Parábola**
(b)



- 31. (a) Hipérbola**
(b)



33. (a) $(X - 5)^2 - Y^2 = 1$

(b) XY-coordenadas:

$C(5, 0); V_1(6, 0), V_2(4, 0); F(5 \pm \sqrt{2}, 0);$

xy-coordenadas:

$C(4, 3); V_1(\frac{24}{5}, \frac{18}{5}), V_2(\frac{16}{5}, \frac{12}{5}); F_1(4 + \frac{4}{5}\sqrt{2}, 3 + \frac{3}{5}\sqrt{2}),$

$F_2(4 - \frac{4}{5}\sqrt{2}, 3 - \frac{3}{5}\sqrt{2})$

(c) $Y = \pm(X - 5); 7x - y - 25 = 0, x + 7y - 25 = 0$

35. $X = x \cos \phi + y \sin \phi; Y = -x \sin \phi + y \cos \phi$

SECCIÓN 11.6 ■ PÁGINA 770

1. foco, directriz; $\frac{\text{distancia de } P \text{ a } F}{\text{distancia de } P \text{ a } \ell}$, sección cónica; parábola, elipse, hipérbola, excentricidad

2. $\frac{ed}{1 \pm e \cos \theta}, \frac{ed}{1 \pm e \sin \theta}$

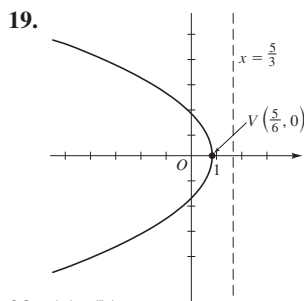
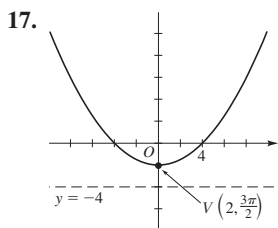
3. $r = 6/(3 + 2 \cos \theta)$

5. $r = 2/(1 + \sin \theta)$

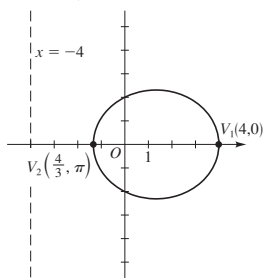
7. $r = 20/(1 + 4 \cos \theta)$

9. $r = 10/(1 + \sin \theta)$

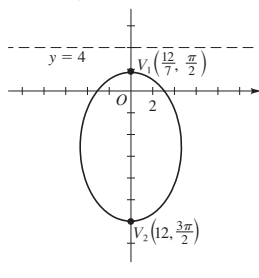
11. II 13. VI 15. IV



21. (a), (b)



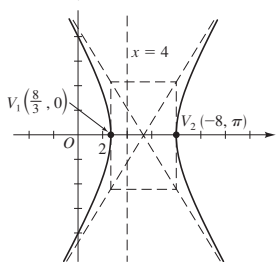
23. (a), (b)



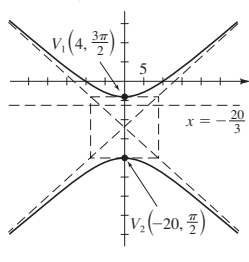
(c) $C(\frac{4}{3}, 0)$, eje mayor: $\frac{16}{3}$, eje menor: $\frac{8\sqrt{3}}{3}$

(c) $C(\frac{36}{7}, \frac{3\pi}{2})$, eje mayor: $\frac{96}{7}$, eje menor: $\frac{24\sqrt{7}}{7}$

25. (a), (b)



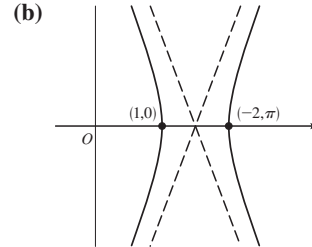
27. (a), (b)



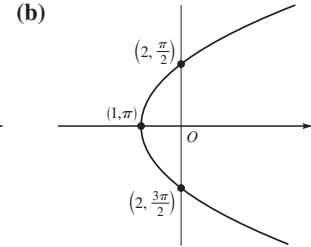
(c) $(\frac{16}{3}, 0)$

(c) $(12, \frac{3\pi}{2})$

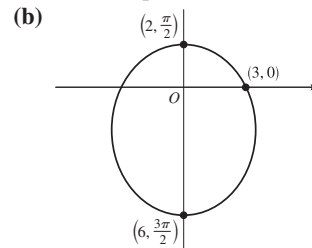
29. (a) 3, hipérbola



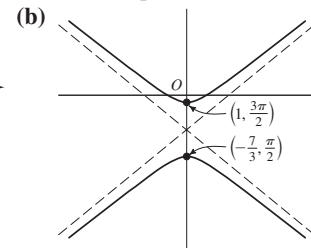
31. (a) 1, parábola



33. (a) $\frac{1}{2}$, elipse



35. (a) $\frac{5}{2}$, hipérbola

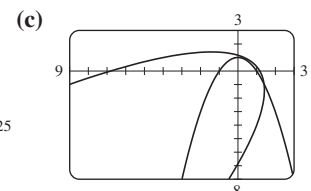
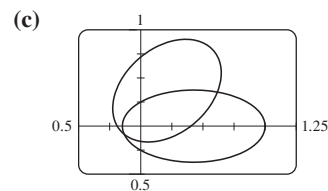


37. (a) excentricidad $\frac{3}{4}$, directriz $x = -\frac{1}{3}$

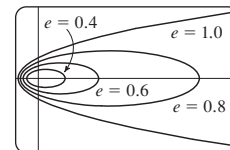
(b) $r = \frac{1}{4 - 3 \cos(\theta - \frac{\pi}{3})}$

39. (a) excentricidad 1, directriz $y = 2$

(b) $r = \frac{2}{1 + \sin(\theta + \frac{\pi}{4})}$



41. La elipse es casi circular cuando e es cercana a 0 y se hace más alargada cuando $e \rightarrow 1^-$. En $e = 1$, la curva se hace una parábola.



43. (b) $r = (1.49 \times 10^8)/(1 - 0.017 \cos \theta)$

45. 0.25

REPASO DEL CAPÍTULO 11 ■ PÁGINA 773

1. $V(0, 0); F(1, 0); x = -1$

3. $V(0, 0); F(0, -2); y = 2$

