THOMAS CÁLCULO

UNA VARIABLE

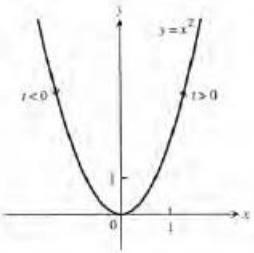
Decimosegunda edición

PEARSON

CAPÍTULO 11

Sección 11.1, pp. 616–618

1.



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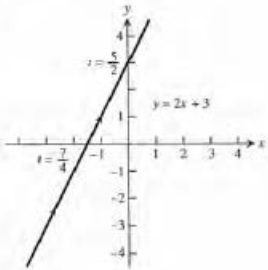

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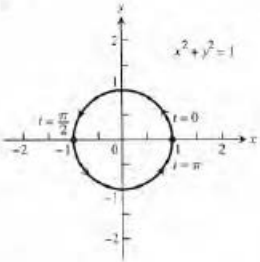

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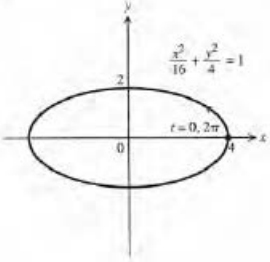

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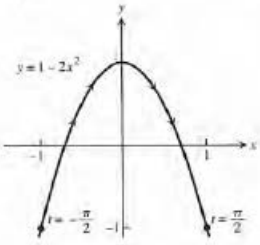

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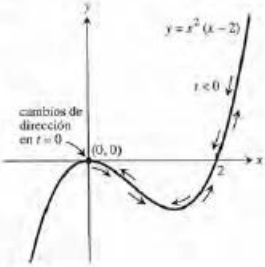

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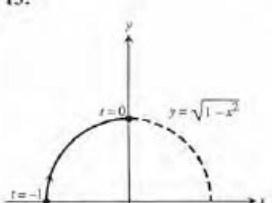

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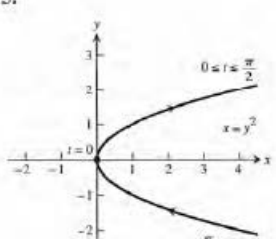

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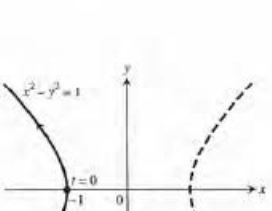


19. **(a)** $x = a\cos t, \quad y = -a \operatorname{sen} t, \quad 0 \le t \le 2\pi$

(b) $x = a\cos t, \quad y = a \operatorname{sen} t, \quad 0 \le t \le 2\pi$

(c) $x = a\cos t, \quad y = -a \operatorname{sen} t, \quad 0 \le t \le 4\pi$

(d) $x = a\cos t, \quad y = a \operatorname{sen} t, \quad 0 \le t \le 4\pi$

21. Posible respuesta: $x = -1 + 5t, \quad y = -3 + 4t, \quad 0 \le t \le 1$

23. Posible respuesta: $x = t^2 + 1, \quad y = t, \quad t \le 0$

25. Posible respuesta: $x = 2 - 3t, \quad y = 3 - 4t, \quad t \ge 0$

27. Posible respuesta: $x = 2\cos t, \quad y = 2\,|\operatorname{sen} t|, \quad 0 \le t \le 4\pi$

29. Posible respuesta: $x = \dfrac{-at}{\sqrt{1+t^2}}, \quad y = \dfrac{a}{\sqrt{1+t^2}},$

$-\infty < t < \infty$

31. Posible respuesta: $x = \dfrac{4}{1 + 2\tan\theta}, \quad y = \dfrac{4\tan\theta}{1 + 2\tan\theta},$

$0 \le \theta < \pi/2$ y $x = 0, y = 2$ si $\theta = \pi/2$

33. Posible respuesta: $x = 2 - \cos t, \quad y = \operatorname{sen} t, \quad 0 \le t \le 2\pi$

35. $x = 2\cot t, \quad y = 2\operatorname{sen}^2 t, \quad 0 < t < \pi$

37. $x = a\operatorname{sen}^2 t \tan t, \quad y = a\ \operatorname{sen}^2 t, \quad 0 \le t < \pi/2$ **39.** $(1, 1)$

Sección 11.6, pp. 645–648

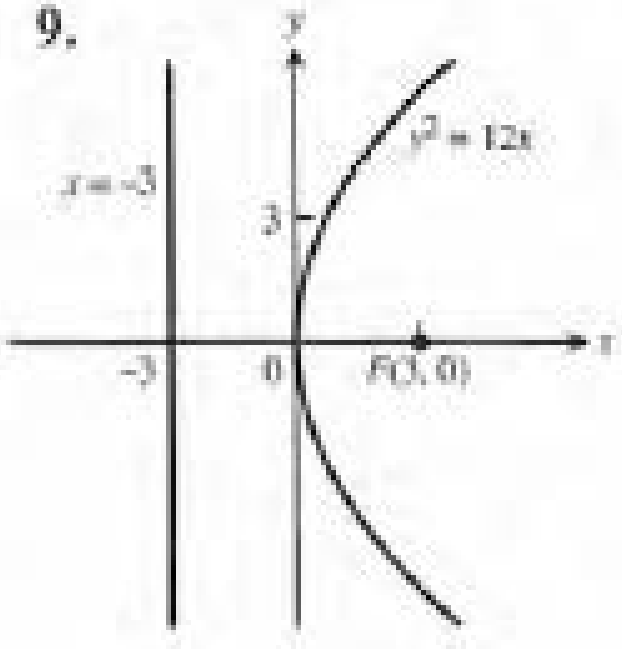
1. $y^2 = 8x$, $F(2, 0)$, directriz: $x = -2$

3. $x^2 = -6y$, $F(0, -3/2)$, directriz: $y = 3/2$

5. $\dfrac{x^2}{4} - \dfrac{y^2}{9} = 1$, $F\left(\pm\sqrt{13}, 0\right)$, $V(\pm 2, 0)$, asíntotas: $y = \pm\dfrac{3}{2}x$

7. $\dfrac{x^2}{2} + y^2 = 1$, $F(\pm 1, 0)$, $V\left(\pm\sqrt{2}, 0\right)$

9.



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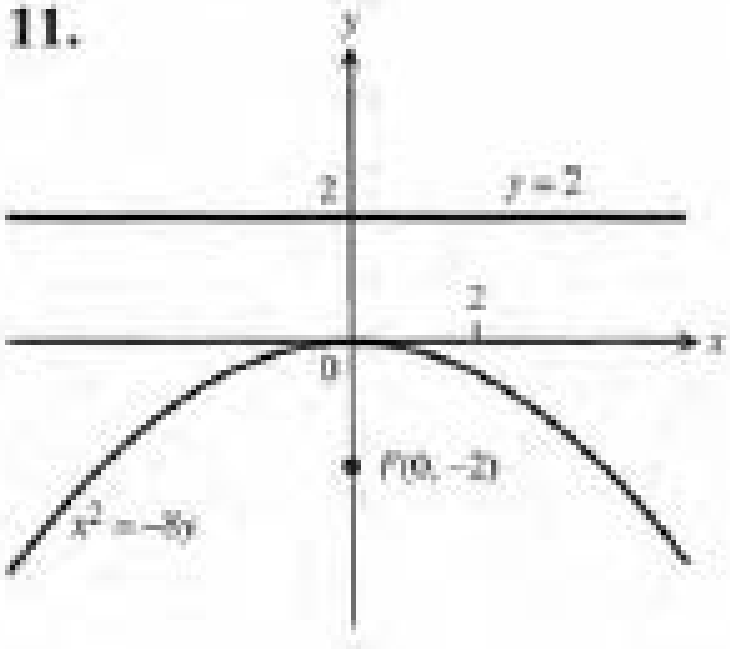

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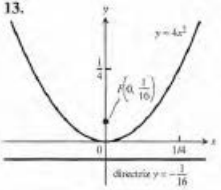

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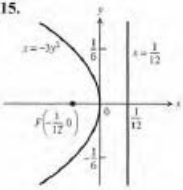

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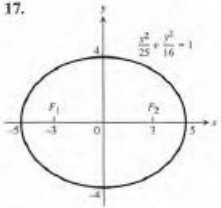

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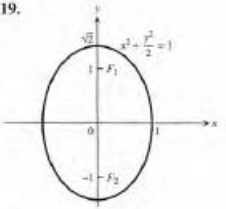

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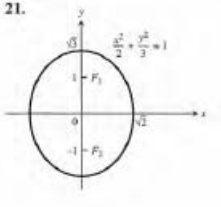

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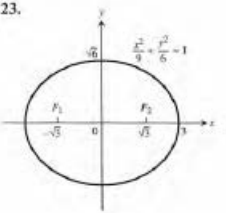
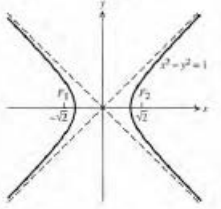
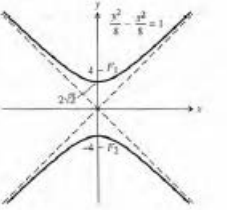


25. $\dfrac{x^2}{4} + \dfrac{y^2}{2} = 1$

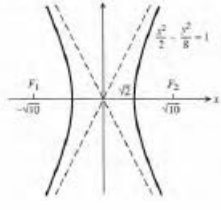
27. Asíntotas: $y = \pm x$



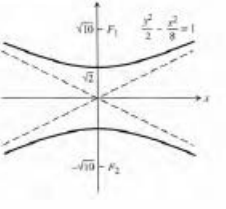
29. Asíntotas: $y = \pm x$



31. Asíntotas: $y = \pm 2x$



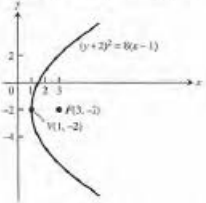
33. Asíntotas: $y = \pm x/2$



35. $y^2 - x^2 = 1$ 37. $\frac{x^2}{9} - \frac{y^2}{16} = 1$

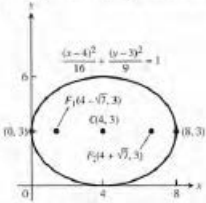
39. **(a)** Vértice: $(1, -2)$; foco: $(3, -2)$; directriz: $x = -1$

(b)



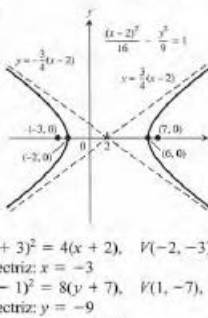
41. **(a)** Foco: $\left(4 \pm \sqrt{7}, 3\right)$; vértices: $(8, 3)$ y $(0, 3)$; centro: $(4, 3)$

(b)



43. **(a)** Centro: $(2, 0)$; foco: $(7, 0)$ y $(-3, 0)$; vértices: $(6, 0)$ y $(-2, 0)$; asíntotas: $y = \pm\frac{3}{4}(x - 2)$

(b)



45. $(y + 3)^2 = 4(x + 2)$, $V(-2, -3)$, $F(-1, -3)$, directriz: $x = -3$

47. $(x - 1)^2 = 8(y + 7)$, $V(1, -7)$, $F(1, -5)$, directriz: $y = -9$

49. $\frac{(x + 2)^2}{6} + \frac{(y + 1)^2}{9} = 1$, $F\left(-2, \pm\sqrt{3} - 1\right)$, $V(-2, \pm 3 - 1)$, $C(-2, -1)$

51. $\frac{(x - 2)^2}{3} + \frac{(y - 3)^2}{2} = 1$, $F(3, 3)$ y $F(1, 3)$, $V\left(\pm\sqrt{3} + 2, 3\right)$, $C(2, 3)$

53. $\frac{(x - 2)^2}{4} - \frac{(y - 2)^2}{5} = 1$, $C(2, 2)$, $F(5, 2)$ y $F(-1, 2)$, $V(4, 2)$ y $V(0, 2)$; asíntotas: $(y - 2) = \pm\frac{\sqrt{5}}{2}(x - 2)$

55. $(y + 1)^2 - (x + 1)^2 = 1$, $C(-1, -1)$, $F\left(-1, \sqrt{2} - 1\right)$ y $F\left(-1, -\sqrt{2} - 1\right)$, $V(-1, 0)$ y $V(-1, -2)$; asíntotas $(y + 1) = \pm(x + 1)$

57. $C(-2, 0)$, $a = 4$ 59. $V(-1, 1)$, $F(-1, 0)$

61. Elipse: $\dfrac{(x+2)^2}{5} + y^2 = 1$, $C(-2, 0)$, $F(0, 0)$ y $F(-4, 0)$, $V\left(\sqrt{5} - 2, 0\right)$ y $V\left(-\sqrt{5} - 2, 0\right)$

63. Elipse: $\dfrac{(x-1)^2}{2} + (y-1)^2 = 1$, $C(1, 1)$, $F(2, 1)$ y $F(0, 1)$, $V\left(\sqrt{2} + 1, 1\right)$ y $V\left(-\sqrt{2} + 1, 1\right)$

65. Hipérbola: $(x-1)^2 - (y-2)^2 = 1$, $C(1, 2)$, $F\left(1 + \sqrt{2}, 2\right)$ y $F\left(1 - \sqrt{2}, 2\right)$, $V(2, 2)$ y $V(0, 2)$; asíntotas: $(y-2) = \pm(x-1)$

67. Hipérbola: $\dfrac{(y-3)^2}{6} - \dfrac{x^2}{3} = 1$, $C(0, 3)$, $F(0, 6)$ y $F(0, 0)$, $V\left(0, \sqrt{6} + 3\right)$ y $V\left(0, -\sqrt{6} + 3\right)$; asíntotas: $y = \sqrt{2}x + 3$ o $y = -\sqrt{2}x + 3$

69. **(b)** 1 : 1 73. Longitud $= 2\sqrt{2}$, ancho $= \sqrt{2}$, área $= 4$

75. 24π

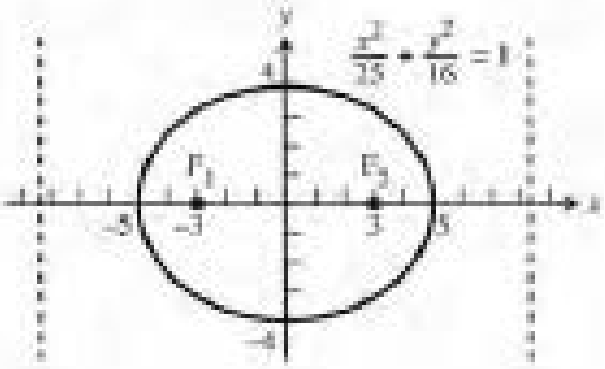
77. $x = 0, y = 0$: $y = -2x$; $x = 0, y = 2$: $y = 2x + 2$; $x = 4, y = 0$: $y = 2x - 8$

79. $\bar{x} = 0$, $\bar{y} = \dfrac{16}{3\pi}$

Sección 11.7, pp. 653–654

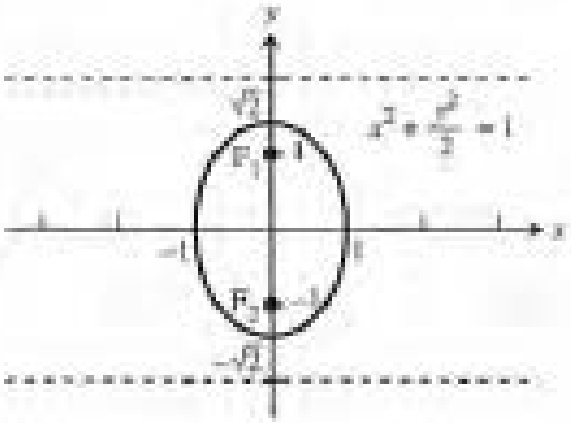
1. $e = \frac{3}{5}$, $F(\pm 3, 0)$;

las directrices son $x = \pm\frac{25}{3}$.



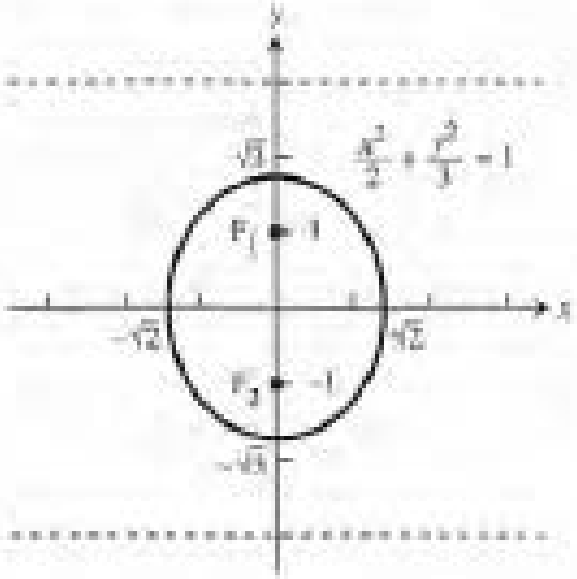
3. $e = \frac{1}{\sqrt{2}}$; $F(0, \pm 1)$;

las directrices son $y = \pm 2$.



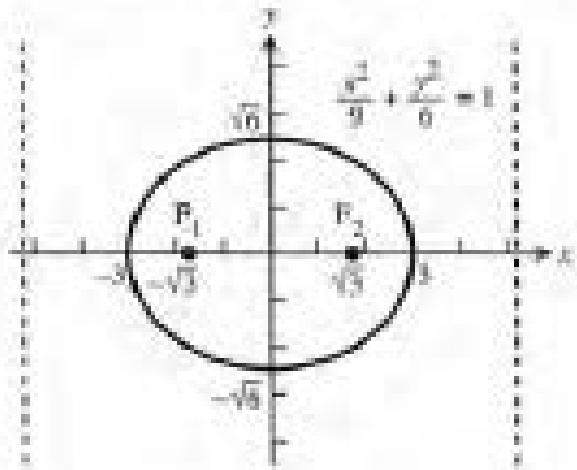
5. $e = \frac{1}{\sqrt{3}}$; $F(0, \pm 1)$;

las directrices son $y = \pm 3$.



7. $e = \frac{\sqrt{3}}{3}$; $F(\pm\sqrt{3}, 0)$;

las directrices son $x = \pm 3\sqrt{3}$.



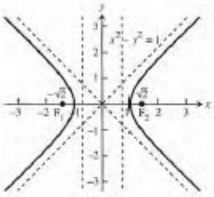
9. $\frac{x^2}{27} + \frac{y^2}{36} = 1$

11. $\frac{x^2}{4851} + \frac{y^2}{4900} = 1$

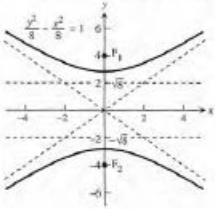
13. $\frac{x^2}{9} + \frac{y^2}{4} = 1$

15. $\frac{x^2}{64} + \frac{y^2}{48} = 1$

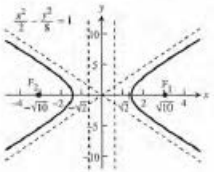
17. $e = \sqrt{2}$; $F(\pm\sqrt{2}, 0)$; las directrices son $x = \pm\frac{1}{\sqrt{2}}$.



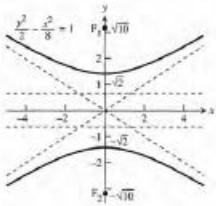
19. $e = \sqrt{2}$; $F(0, \pm 4)$; las directrices son $y = \pm 2$.



21. $e = \sqrt{5}$; $F(\pm\sqrt{10}, 0)$; las directrices son $x = \pm\frac{2}{\sqrt{10}}$.



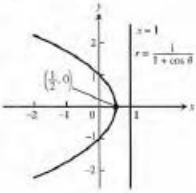
23. $e = \sqrt{5}$; $F(0, \pm\sqrt{10})$; las directrices son $y = \pm\frac{2}{\sqrt{10}}$.



25. $y^2 - \frac{x^2}{8} = 1$ **27.** $x^2 - \frac{y^2}{8} = 1$ **29.** $r = \frac{2}{1 + \cos\theta}$

31. $r = \frac{30}{1 - 5\,\text{sen}\,\theta}$ **33.** $r = \frac{1}{2 + \cos\theta}$ **35.** $r = \frac{10}{5 - \text{sen}\,\theta}$

37.



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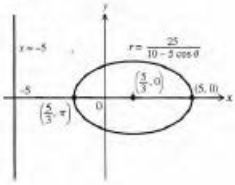

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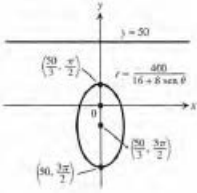

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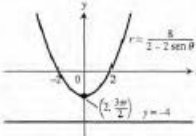
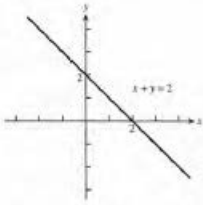
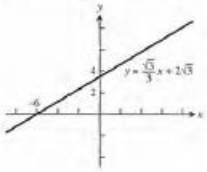


45. $y = 2 - x$

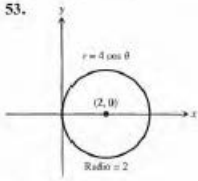


47. $y = \frac{\sqrt{3}}{3}x + 2\sqrt{3}$

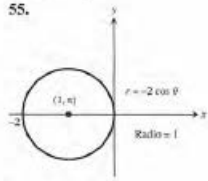


49. $r\cos\left(\theta - \frac{\pi}{4}\right) = 3$ **51.** $r\cos\left(\theta + \frac{\pi}{2}\right) = 5$

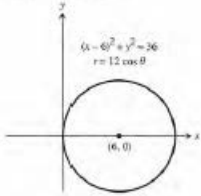
53.



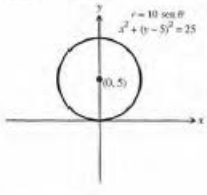
55.



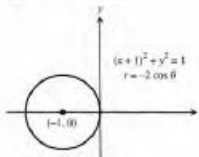
57. $r = 12\cos\theta$



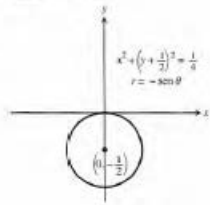
59. $r = 10\,\text{sen}\,\theta$



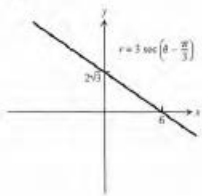
61. $r = -2\cos\theta$



63. $r = -\text{sen}\,\theta$



65.



67.