(b) $\partial w/\partial x = -4xy^2/(x^2-y^2)^2$;
$\partial w/\partial y = 4yx^2/(x^2-y^2)^2$.

(c) $\partial w/\partial x = ye^{xy}\log(x^2+y^2)$
$+ 2xe^{xy}/(x^2+y^2)$;
$\partial w/\partial y = xe^{xy}\log(x^2+y^2)$
$+ 2ye^{xy}/(x^2+y^2)$.

(d) $\partial w/\partial x = 1/y$; $\partial w/\partial y = -x/y^2$.

(e) $\partial w/\partial x = -y^2e^{xy}\operatorname{sen} ye^{xy}\operatorname{sen} x +$
$\cos ye^{xy}\cos x$;
$\partial w/\partial y = (xye^{xy}+e^{xy})(-\operatorname{sen} ye^{xy}\operatorname{sen} x)$.

5. $z = 6x + 3y - 11$.

7. $z = x - y + 1$.

9. (a) $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$.

(b) $\begin{bmatrix}e^y & xe^y & -\operatorname{sen} y\\ 1 & 0 & \\ 1 & e^y & \end{bmatrix}$.

(c) $\begin{bmatrix}1 & 1 & e^z\\ 2xy & x^2 & 0\end{bmatrix}$.

(d) $\begin{bmatrix}(y+xy^2)e^{xy} & (x+x^2y)e^{xy}\\ \operatorname{sen} y & x\cos y\\ 5y^2 & 10xy\end{bmatrix}$.

11. $z = 2(x-4) + 4(y-3) + 10$.

13. En $z = 1$.

15. Ambos son xye^{xy}.

17. $(2, 6, -36)$.

19. (a) $\nabla f = (e^{-x^2-y^2-z^2}(-2x^2+1)$,
$-2xye^{-x^2-y^2-z^2}, -2xze^{-x^2-y^2-z^2})$.

(b) $\nabla f = (x^2+y^2+z^2)^{-2}(yz(y^2+z^2-x^2)$,
$xz(x^2+z^2-y^2), xy(x^2+y^2-z^2))$.

(c) $\nabla f = (z^2e^x\cos y, -z^2e^x\operatorname{sen} y, 2ze^x\cos y)$.

21. $2x + 6y - z = 5$.

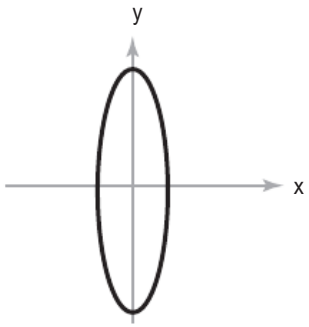
23. $\mathbf{l}(t) = (1, 3, 20) + t(-1, 2, 8)$.

25. $-2\mathbf{k}$.

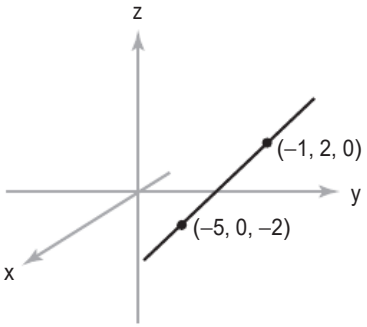
27. Son constantes. Demostrar que la derivada es la matriz cero.

Sección 2.4

1. Esta curva es la elipse $(y^2/16) + x^2 = 1$:



3. Esta curva es la recta que pasa por $(-1, 2, 0)$ con dirección $(2, 1, 1)$:



5. (a) $\mathbf{c}(t) = (2\cos(t),\ 2\operatorname{sen}(t)),\ t \in [0, 2\pi]$.

(b) $\mathbf{c}(t) = (2\operatorname{sen}(t),\ 2\cos(t)),\ t \in [0, 2\pi]$.

(c) $\mathbf{c}(t) = (2\cos(t)+4,\ 2\operatorname{sen}(t)+7),\ t \in [0, 2\pi]$.

7. $6\mathbf{i} + 6t\mathbf{j} + 3t^2\mathbf{k}$.

9. $(-2\cos t\operatorname{sen} t, 3 - 3t^2, 1)$.

11. $\mathbf{c}'(t) = (e^t, -\operatorname{sen} t)$.

13. $\mathbf{c}'(t) = (t\cos t + \operatorname{sen} t, 4)$.

15. Horizontal cuando $t = (R/v)n\pi$, siendo n un entero; la rapidez es cero si n es par; la rapidez es $2v$ si n es impar.

17. $(\operatorname{sen} 3, \cos 3, 2) + (3\cos 3, -3\operatorname{sen} 3, 5)(t-1)$.

19. $(8, 8, 0)$.

21. $(8, 0, 1)$.

23. (a) $\sqrt{1+64\pi^2}$.

(b) Sí, cuando $t = 0$.

(c) $\mathbf{l}(t) = (1, 0, 16\pi^2) + t(0, 1, 8\pi)$.

(d) $(1, -2\pi, 0)$.

25. (a) $(f \circ \mathbf{c})(t) = (t^6 - t^4, 2t^5, 4t^2)$.

(b) $\mathbf{l}(t) = (0, 2, 4) + t(2, 10, 8)$.