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4.3 En los problemas 1-4, emplee la definición 4.3.1 para calcular  $\partial z / \partial x$  y  $\partial z / \partial y$  con respecto a la función dada.

1.  $z = 7x + 8y^2$

$$\frac{\partial(7x+8y^2)}{\partial x} = 7 \cdot 1 + 0 = 7, \quad \frac{\partial(7x+8y^2)}{\partial y} = 0 + 2 \cdot 8y^1 = 16y,$$

2.  $z = xy$

$$\frac{\partial(xy)}{\partial x} = 1 \cdot y = y, \quad \frac{\partial(xy)}{\partial y} = x \cdot 1 = x$$

3.  $z = 3x^2y + 4xy^2$

$$\frac{\partial(3x^2y+4xy^2)}{\partial x} = 6xy + 4y^2 = y(6x+4y),$$

$$\frac{\partial(3x^2y+4xy^2)}{\partial y} = 3x^2 + 8xy$$

4.  $z = \frac{x}{x+y}$

$$\frac{\partial\left(\frac{x}{x+y}\right)}{\partial x} = \frac{(x+y) \cdot 1 - x \cdot 1}{(x+y)^2} = \frac{x+y-x}{(x+y)^2} = \frac{y}{(x+y)^2}$$

$$\frac{\partial\left(\frac{x}{x+y}\right)}{\partial y} = \frac{-x \cdot 1}{(x+y)^2} = \frac{-x}{(x+y)^2}$$

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$$5. z = x^2 - xy^2 + 4y^5$$

$$\frac{\partial z}{\partial x} = 2x - y^2$$

$$\frac{\partial z}{\partial y} = -2xy + 20y^4$$

$$6. z = -x^3 + 6x^2y^3 + 5y^2$$

$$\frac{\partial z}{\partial x} = -3x^2 + 12xy^3$$

$$\frac{\partial z}{\partial y} = 18x^2y^2 + 10y$$

$$7. z = 5x^4y^3 - x^2y^6 + 6x^5 - 4y$$

$$\frac{\partial z}{\partial x} = 20x^3y^3 - 2xy^6 + 30x^4$$

$$\frac{\partial z}{\partial y} = 15x^4y^2 - 6x^2y^5 - 4$$