

EXERCISES 14.10**Finding Quadratic and Cubic Approximations**

In Exercises 1–10, use Taylor's formula for $f(x, y)$ at the origin to find quadratic and cubic approximations of f near the origin.

1. $f(x, y) = xe^y$

2. $f(x, y) = e^x \cos y$

3. $f(x, y) = y \sin x$

5. $f(x, y) = e^x \ln(1 + y)$

7. $f(x, y) = \sin(x^2 + y^2)$

4. $f(x, y) = \sin x \cos y$

6. $f(x, y) = \ln(2x + y + 1)$

8. $f(x, y) = \cos(x^2 + y^2)$

9. $f(x, y) = \frac{1}{1 - x - y}$ 10. $f(x, y) = \frac{1}{1 - x - y + xy}$
11. Use Taylor's formula to find a quadratic approximation of $f(x, y) = \cos x \cos y$ at the origin. Estimate the error in the approximation if $|x| \leq 0.1$ and $|y| \leq 0.1$.
12. Use Taylor's formula to find a quadratic approximation of $e^x \sin y$ at the origin. Estimate the error in the approximation if $|x| \leq 0.1$ and $|y| \leq 0.1$.