1. Find an affine map that represents the linear approximation of \( f(x, y) = \sin x - \cos y^2 \) near \((0, 0)\).

2. Find the Hessian of \( f(x, y, z) = xe^{y^2+z^2} \).

3. Problem 5.3 on page 68.

4. Problem 5.4 on page 68.

5. Problem 5.5 on page 68.

6. Find an integer power of \( x \) such that \( f(x) = (\sin x^2, e^x - x - 1, x^3 - x^5) \) is \( O(x^k) \).

7. Find an integer power of \( x \) such that \( f(x) = (x^3 \cos x, x \sin(x^2)) \) is \( o(x^k) \).

8. Problem 5.6 on page 68.

9. Problem 5.8 on page 69.

10. Problem 5.9 on page 69.