Homework Assignment 24

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1. Find the linear function which approximates \( f(x) = \sqrt{x} \) near \( x = 4 \) and use this linear function to approximate \( \sqrt{3.991} \). (Do not use a calculator.) Then compute \( \sqrt{3.991} \) on your calculator and compare this answer to the answer you computed manually.

2. Find the linear function which approximates \( f(x) = x^3 - 2x \) near \( x = 1 \) and use this linear function to approximate \( (1.03)^3 - 2 (1.03) \). (Do not use a calculator.) Then compute \( (1.03)^3 - 2 (1.03) \) directly (with or without a calculator) and compare this answer to the answer you computed using your linear approximation.

3. Find the linear function (of two variables) which approximates \( f(x, y) = x^2 - xy \) near \( (x, y) = (1, 3) \) and use this linear function to approximate \( (1.01)^2 - (1.01) (2.98) \). (Do not use a calculator.) Then compute \( (1.01)^2 - (1.01) (2.98) \) directly (with or without a calculator) and compare this answer to the answer you computed using your linear approximation.

4. Find the linear function (of two variables) which approximates \( f(x, y) = \sqrt{x^2 + y^2} \) near \( (x, y) = (3, 4) \) and use this linear function to approximate \( \sqrt{(2.8)^2 + (4.02)^2} \). (Do not use a calculator.) Then compute \( \sqrt{(2.8)^2 + (4.02)^2} \) directly (with a calculator) and compare this answer to the answer you computed using your linear approximation.


6. In Grossman, Section 13.8, do problems 1–7 (odd) and numbers 19, 20, and 21.
7. In Grossman, Section 13.9, do problems 1, 3, 5,