Math 1A Calculus Fall, 2004
Prof. Haiman

Quiz 6 Solution (Version B)

1. If $z^3 = x^2 + y$, find dz/dt when $x = 2$, $y = 4$, $dx/dt = 1$ and $dy/dt = 2$.

Differentiate to get $3z^2(dz/dt) = 2x(dx/dt) + dy/dt$. Now, $z^3 = 2^2 + 4 = 8$, so $z = 2$, and $12\, dz/dt = 4 \cdot 1 + 2 = 6$. Hence $dz/dt = 1/2$.

2. Use a linear approximation or differentials to approximate the number

$$\sqrt{99.4}$$

Take $f(x) = \sqrt{x}$, $f'(x) = 1/(2\sqrt{x})$. If $x = 100$, $dx = -.6$, then $f(x) = 10$, $df = (1/20)dx = -.03$. Hence $\sqrt{99.4} \approx 9.97$ (a calculator gives $9.969955\ldots$).