Math 1A Calculus Fall, 2004
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Quiz 6 Solution (Version A)

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

Differentiate to get $e^z(dz/dt) = x(dy/dt) + y(dx/dt)$. Now, $e^z = xy = 2$, so $2\,dz/dt = 2 \cdot 3 + 1 \cdot 4 = 10$, and $dz/dt = 5$.

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

$$(2.02)^3$$

Take $f(x) = x^3$, $f'(x) = 3x^2$. If $x = 2$, $dx = .02$, then $f(x) = 8$, $df = 12\,dx = .24$. Hence $(2.02)^3 \approx 8.24$ (the exact value is 8.242408).