Math 1A Calculus Fall, 2004
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Quiz 9 Solution (Version B)

1. Find the most general antiderivative of the function

$$f(x) = \sqrt[3]{x} + \frac{3}{x^2+1}.$$

$$F(x) = (3/4)x^{4/3} + 3\tan^{-1} x + C.$$

2. Using Newton's method to approximate a solution to $x^2 - 2x - 1 = 0$, with an initial guess $x_1 = 2$, find the next two approximants x_2 and x_3 (express your answers as exact fractions). Check by verifying that $x_3^2 - 2x_3 - 1$ is close to zero.

Newton's formula gives

$$x_{n+1} = x_n - \frac{x_n^2 - 2x_n - 1}{2x_n - 2}.$$

From this, compute $x_2 = 5/2$, $x_3 = 29/12$. To check, compute $x_3^2 - 2x_3 - 1 = 1/144$, quite a small number.