MATH 126 SPRING 2011, QUIZ 8

(1) Solve the differential equation $\dfrac{dy}{dt} = \dfrac{y}{t^2}$

(2) Determine whether the following limits are convergent or divergent. If they are convergent, find the limit.

a. $\lim_{n\to\infty} \sin(2n)e^{-n}$

b. $\lim_{n\to\infty} \ln(2n^2+1) - \ln(n^2+1)$

c. $\lim_{n\to\infty} \left(1+\dfrac{e}{n}\right)^n$

(3) Newton's Method for finding square roots starts with an initial guess, say $x_1 = a$, then applies the formula

$$x_{n+1} = \frac{1}{2}\left(x_n - \frac{a}{x_n}\right).$$

Show that this sequence will converge to one of the two square roots of a.