MATH 155B, Quiz 5
October 18, 2012
Name: KEY

You have 10 minutes to complete this quiz. The use of calculators is not permitted. **Show all work if you want full credit for your solutions. Zero credit will be given for answers with zero work shown, even if the answer is correct.** Good luck!

(1) Determine whether the sequence $a_n = \dfrac{3^{n+2}}{5^n}$ converges or diverges. If it converges, find the limit.

$a_n = \dfrac{3^{n+2}}{5^n} = 9\left(\dfrac{3}{5}\right)^n$, so the sequence converges to 0

(2) Find the solution of the differential equation $\dfrac{dy}{dx} = \dfrac{\ln x}{xy}$ that satisfies the initial condition $y(1) = 2$.

$u = \ln x$

$du = \dfrac{dx}{x}$

$y\,dy = \dfrac{\ln x}{x}\,dx = u\,du$

$\dfrac{1}{2}y^2 = \dfrac{1}{2}u^2 + C$; $\dfrac{1}{2}(2^2) = \dfrac{1}{2}(\ln 1)^2 + C = C$

$= \dfrac{1}{2}(\ln x)^2 + C$

$\dfrac{1}{2}y^2 = \dfrac{1}{2}(\ln x)^2 + 2$, $y^2 = (\ln x)^2 + 4$, $y = \sqrt{(\ln x)^2 + 4}$

I have neither given nor received aid on this _____