Quiz 6 Name: Key

Math 201 F01 03/9/12

Determine whether the following converge, and if they do, give their value.

1. $\int_1^2 \frac{1}{(x-1)^{3/2}}\,dx$

$u = x-1$

$du = dx$

$= \int_0^1 u^{-3/2}\,du = \lim_{a\to 0^+} \int_a^1 u^{-3/2}\,du$

$= \lim_{a\to 0^+} -2u^{-1/2}\Big|_a^1$

$= \lim_{a\to 0^+} \left(-2 + \frac{2}{\sqrt{a}}\right) = \infty$

diverges

2. $5 + \frac{5}{9} + \frac{5}{81} + \frac{5}{729} + \cdots$

$= \frac{5}{1-\frac{1}{9}} = \frac{5}{\frac{8}{9}} = \frac{45}{8}$

geometric series

$a + ar + ar^2 + ar^3 + \cdots = \frac{a}{1-r}$

$a = 5$

$r = \frac{1}{9}$